Pearson SUCCESS COMPANION

Objective BIOLOGY for NEET

NATIONAL ELIGIBILITY CUM ENTRANCE TEST

Vol I

HIGHLIGHTS

- Structured as per NCERT curriculum
- 'Assertion and Reason' type questions for exclusive AIIMS preparation
- 2500+ MCQs included chapter-wise

Pearson

RAJIV VIJAY

About Pearson

Pearson is the world's learning company, with presence across 70 countries worldwide. Our unique insights and world-class expertise comes from a long history of working closely with renowned teachers, authors and thought leaders, as a result of which, we have emerged as the preferred choice for millions of teachers and learners across the world.

We believe learning opens up opportunities, creates fulfilling careers and hence better lives. We hence collaborate with the best of minds to deliver you class-leading products, spread across the Higher Education and K12 spectrum.

Superior learning experience and improved outcomes are at the heart of everything we do. This product is the result of one such effort.

Your feedback plays a critical role in the evolution of our products and you can contact us - reachus@pearson.com. *We look forward to it.*

This page is intentionally left blank.

OBJECTIVE BIOLOGY

for

NEET

(National Eligibility Cum Entrance Test)

and Other Medical Entrance Examinations

Volume 1

Third Edition

Dr Rajiv Vijay, MBBS

Government Medical College, Kota

Pearson

ISBN 978-93-530-6224-8

eISBN 9789353066048

First Impression

Head Office: 15th Floor, Tower-B, World Trade Tower, Plot No. 1, Block-C, Sector 16,
Noida 201 301, Uttar Pradesh, India.
Registered Office: 4th Floor, Software Block, Elnet Software City, TS 140, Block 2 & 9,
Rajiv Gandhi Salai, Taramani, Chennai 600 113, Tamil Nadu, India.
Fax: 080-30461003, Phone: 080-30461060 www.pearson.co.in,
Email id: companysecretary.india@pearson.com

Contents

Volume 2

Preface

Objective Biology for NEET and other Medical Entrance Examinations is a comprehensive practice material for students aspiring to get admission into prestigious medical colleges. The contents of this book have been carefully drafted to help students master the latest trends in questions from across key medical entrance examinations. This book can also be used as a resource to prepare for class XI and XII board examinations—based on NCERT.

Highlights of the book:

- Structured as per class XI and XII syllabus of NCERT.
- Content designed to help maximise scores.
- Assertion and Reason questions to aid in preparing for AIIMS and similar exams.
- Previous years question embedded in every chapter.
- Includes latest NEET solved paper for practice.
- Mock tests and sample papers for student's self-practice.

Students Note:
As an experienced teacher, I would suggest that before starting any chapter of this book, a student should meticulously scan the theory and diagrams of the NCERT Textbook and complete minimum three rounds of reading of its chapters. In my opinion, the book will prove to be an asset and will serve to fulfill the requirement of the medical aspirants.

Rajiv Vijay

Acknowledgments

This book is a result of the enormous effort and support given by my team members who were always there to support me. I believe that the blessings of my parents (Late Gopallal Vijay and Late Suryakanta Vijay) and my grandparents have always played a prime role in making me more focused and determined towards my goal. My wife Shubha Vijay, brother Jeetu Vijay and all other family members inspired me throughout the preparation of this book.

My sincere thanks to the team of Pearson Education for providing me the platform to serve students and I appreciate their efforts in bringing out this book in such an excellent manner.

Careful attempts have been made in making the book error free; however, corrections, suggestions, queries, and criticism will be highly appreciated and are welcome.

Once again special thanks to my wife Shubha Vijay for always being there with me and helping me in ensuring high quality throughout the book.

Rajiv Vijay

About the Author

Dr Rajiv Vijay has completed his schooling from JNV HURDA, Bhilwara, Rajasthan and qualified for MBBS through PMT in 1997. After completing MBBS in 2003 from Government Medical College, Kota, he established his Medical and Engineering Entrance Coaching Institute in Vadodara (Gujarat) which is today known as RJ VISION Pvt. Ltd.

In his career of 16 years, he has taught a lot of students and most of them are extremely successful in various reputed pre-medical entrance examinations. In 2011, he was selected as the head of the pre-medical division of Resonance, Kota. As the head of pre-medical division and HOD of biology he nurtured, developed, installed and supervised the pre-medical division at Kota and all centers across India.

Many of his students have secured excellent ranks in different types of medical entrance examinations in India and have enrolled in prestigious medical colleges like AIIMS, SMS Jaipur, KEM Mumbai, AFMC Pune and JIPMER Puducherry, etc. The author also mentors his students through free video lectures in his youtube page, www.youtube.com/c/drrajiv_vijay.

Trend Analysis 2007–2018

Ch. No	Chapter Name	Number of Question(s) in								
		2010	2011	2012	2013	2014	2015	2016	2017	2018
1	The Living World	0	1	0	1	0	0	1	1	
2	Biological Classification	3	8	4	1	6	2	5	4	
3	Plant Kingdom	3	1	3	4	4	4	2	3	
4	Animal Kingdom	4	3	1	4	4	3	3	3	
5	Morphology of Flowering Plants	3	4	4	2	5	5	5	4	
6	Anatomy of Flowering Plants	3	4	5	3	2	4	1	2	
7	Structural Organisations in Animals	1	3	2	1	2	2	2	2	
8	Cell: The Unit of Life	4	4	5	3	4	4	5	4	
9	Biomolecules	1	2	3	4	2	1	3	4	
10	Cell Cycle and Cell Division	2	1	2	2	3	2	3	2	
11	Transport in Plants	0	0	0	1	0	1	2	0	
12	Mineral Nutrition	3	4	3	1	1	2	1	2	
13	Photosynthesis	3	2	2	1	1	2	3	2	
14	Respiration in Plants	1	0	0	2	1	0	0	1	
15	Plant Growth and Development	2	0	0	2	4	2	1	2	
16	Digestion and Absorption	2	2	1	1	2	2	2	1	
17	Breathing and Exchange of Gases	2	0	1	2	1	2	2	2	
18	Body Fluids and Circulation	3	5	0	1	2	3	1	2	
19	Excretory Products and their Elimination	3	5	1	1	1	2	1	3	
20	Locomotion and Movement	0	0	1	3	1	2	1	3	
21	Neural Control and Coordination	1	2	3	2	3	2	1	2	
22	Chemical Coordination and Regulation	4	2	3	3	2	1	3	2	
23	Reproduction in Organisms	0	1	1	3	0	0	1	2	
24	Sexual Reproduction in Flowering Plants	4	5	3	6	3	4	5	3	

Ch. No	Chapter Name	Number of Question(s) in								
		2010	2011	2012	2013	2014	2015	2016	2017	2018
25	Human Reproduction	13	3	4	3	3	3	2	2	
26	Reproductive Health	1	2	2	3	3	1	2	3	
27	Principles of Inheritance and Variations	5	4	2	4	4	3	7	4	
28	Molecular Basis of Inheritance	4	1	4	2	4	6	3	5	
29	Evolution	1	1	4	4	2	1	3	2	
30	Human Health and Disease	3	5	6	2	2	6	4	2	
31	Strategies for Enhancement in Food Production	2	3	2	1	1	2	1	2	
32	Microbes in Human Welfare	3	2	7	2	1	0	1	0	
33	Biotechnology: Principles and processes	5	2	5	2	3	0	3	1	
34	Biotechnology and its Applications	3	3	1	1	2	3	2	4	
35	Organisms and Environment	2	4	0	2	4	2	3	1	
36	Ecosystem	2	2	6	3	1	6	2	3	
37	Biodiversity and its Conservation	1	3	2	1	4	2	2	1	
38	Environmental Issues	4	4	3	3	2	3	3	4	
	Total Questions	**100**	**100**	**100**	**90**	**90**	**90**	**90**	**90**	

Unit I

Diversity in The Living World

Students Note

Unit I is one of the most important units from the examples point of view. As this unit contains animal and plant classifications which require some extra input, so prepare these two chapters in some more detail. Do not deviate so much from textbook. By solving questions you can learn all the examples. Also nowadays, a question may be asked from Chapter 1, i.e. 'Living World'. Since all diagrams are important, you need to analyze each diagram because questions can be asked in any format. Unit I contributes 8–10 questions in AIPMT. Employ the process of *mnemonic* to increase the efficiency of memory. To elaborate, for examples coming under Echinodermates given in textbook, you can employ the following:

[**A, B, C, D, E**: **A** for **A**sterias (star fish) **B** for **B**rittle star (ohpiura) **C** for **C**ucumaria (sea cucumber) **D** for ante**D**on(sea lily) and **E** for **E**chinus (sea urchin)].

This page is intentionally left blank.

CHAPTER

1

Living World

PRACTICE QUESTIONS

Diversity in the Living World

1. Who is known as '*the Darwin of the 20th century*'?
(a) Lamarck (b) Ernst Mayr
(c) Carolus Linneaus (d) Robert May

2. The number of known and described species that are in the range of, (approximately)
(a) 1.3 to 1.4 million (b) 1.4 to 1.5 million
(c) 1.7 to 1.8 million (d) 1.9 to 2.2 million

3. Twin characteristics of growth are
(a) Increase in mass (b) Increase in number
(c) Both (a) and (b) (d) Increase in length and volume

4. Growth in living organism
(a) Is from outside (b) Is from inside
(c) Both (a) and (b) (d) Does not take place

5. Which of the following does not grow?
(a) Amoeba (b) Yeast (c) Dead body (d) Planaria

6. Growth cannot be taken as a defining property of living organisms because
(a) All living organism do not show growth.
(b) Non-living things also grow from inside.
(c) Non-living things also grow.
(d) Some living organism does not exhibit the process of reproduction.

7. Select the total number from the following organism that multiply by budding.
Hydra, Sponges, yeast, earthworm, Planaria, honey bee
(a) 2 (b) 3 (c) 4 (d) 5

8. For which organism, the growth is synonymous with reproduction?
(a) Unicellular algae (b) Amoeba (c) Bacteria (d) All of these

9. Which of the following multiply through fragmentation?
(a) Fungi (b) Filamentous algae (c) Planaria (d) All of these

10. Mark the correct statement.
(a) The growth in living organisms is from inside.
(b) Plants grow only up to a certain age.
(c) Only living organisms grow.
(d) All of these

11. The growth and reproduction are mutually exclusive events in
(a) Plants only (b) Animals only
(c) Higher animal and plants (d) Primitive organisms

12. Reproduction cannot be an all-inclusive defining characteristic of living organisms because
(a) All living organism do not show growth.
(b) Many organism do not reproduce.
(c) Non-living things show reproduction.
(d) All living organism show small period of reproductive phase in their life.

13. Living organism shows
(a) Self-replication (b) Evolution
(c) Self-regulation and response to external stimuli (d) All of these

14. The sum total of chemical reactions occurring in our body is called
(a) Metabolism (b) Homeostasis (c) Catabolism (d) Anabolism

15. Select the incorrect statement from the following.
(A) NBRI is situated at Lucknow.
(B) Plant families like *Convolvulaceae* and *Solanaceae* are included in the order polymoniales mainly based on the floral characters.
(C) All living organisms such as from present, past and future are linked to one another by the sharing of the common genetic material but to varying degree.
(D) The order Solanum, Datura and Petunia are placed in family Solanaceae.
(a) (A) only (b) (B) and (D) only
(c) (D) only (d) (B) and (C) only

16. Which of the following statement is incorrect?
(a) All plants, animals, fungi and microbes exhibit metabolism.
(b) Interactions among the molecular components of the organelles result into the properties of cell organelles.
(c) Properties of cellular organelles are present in the molecular constituents of the organelles.
(d) Celluar organization of the body is the defining feature of life forms.

17. Properties of organs are
(a) Present in the constituent cells
(b) Due to different cells in them
(c) Due to their similar origin
(d) A result of interactions among the constituent tissues

18. Which two points are known as the twin characteristics of growth?
(1) Increase in mass (2) Metabolism
(3) Increase in the number of individuals (4) Sense of environment
(a) (1) and (2) (b) (1) and (4) (c) (2) and (3) (d) (1) and (3)

19. Growth by cell division occurs _____ in plants and _____ in animals
(a) Continuously, only up to a certain age
(b) Only up to a certain age, continuously
(c) Continuously, never
(d) Continuously, continuously

20. Which of the following match is incorrect?

	Common name	Genus	Order	Class
(a)	Man	Homo	Primata	Mammalia
(b)	Mango	Mangifera	Sapindales	Dicotyledonae
(c)	Housefly	Musca	Coelopetra	Insecta
(d)	Wheat	Tritium	Poales	Monocotyledonae

21. Which set of organisms multiply through fragmentation?
(a) Planaria, hydra, yeast
(b) Echinoderms, fungi, bacteria
(c) Fungi, filamentous algae, protonema of mosses
(d) Amoeba, hydra, virus

22. Which of the following organism does not reproduce?
(a) Mules (b) Sterile worker bees
(c) Sterile human couple (d) All of these

23. Which one of the following aspects is an exclusive characteristic of living things?
(a) Isolated metabolic reactions occur *in vitro*.
(b) Increase in mass from inside only.
(c) Perception of events happening in the environment and their memory.
(d) Increase in mass by accumulation of material both on surface as well as internally.

24. Which of the following is self-conscious?
(a) Human being (b) Tiger (c) Lion (d) Frog

25. Metabolic reactions take place
(a) In vitro (b) In vivo
(c) both (a) and (b) (d) only in unicellular organisms

26. Organisms that can sense and respond to environmental cues
(a) Eukaryotes only
(b) Prokaryotes only
(c) Both (a) and (b)
(d) Those with a well-developed neuroendocrine system

27. Growth, development and functioning of living body is due to
(a) Decrease in entropy (b) Increase in Gibbs-free energy
(c) Metabolism (d) Adaptations

28. A living organism can be exceptionally differentiated from a non-living thing on the basis of its ability for
(a) Reproduction and Excretion
(b) Growth and Movement
(c) Responsiveness to touch and temperature
(d) Interaction with environment and progressive evolution

29. Two components of binomial nomenclature are
(a) Generic name (b) Specific epithet
(c) Both (a) and (b) (d) Subspecies

30. In *Mangifera indica Linn*, Linn stands for
(a) Latin (b) Lower organism
(c) Linnaeus (d) Lamarck

31. Alsatian is a breed of
(a) Dog (b) Cat (c) Cow (d) Horse

32. Modern taxonomy studies require
(a) Knowledge of external and internal structure.
(b) Knowledge of structure of cell.
(c) Knowledge development process and ecological information of organisms.
(d) All of these

33. Which of the following term include all other terms?
(a) Classification (b) Nomenclature (c) Taxonomy (d) Systematics

34. Linnaeus evolved a system of nomenclature called
(a) Trinomial (b) Vernacular (c) Binomial (d) Polynomial

35. Binomial nomenclature seems to be difficult because a scientific name is derived from
(a) Hindi (b) Sanskrit (c) Latin (d) Arabic

36. A group of plants or animals with similar traits of any rank is
(a) Species (b) Order (c) Genus (d) Taxon

37. Binomial nomenclature means
(a) Two names in which one is given by zoologist and other by botanist.
(b) One scientific name consisting of a generic name and a specific epithet.
(c) Two names in which one is latinized and other is french.
(d) Two names in which one is scientific and other is local.

Taxonomy

38. Basic unit of taxonomic hierarchy is
(a) Species (b) Kingdom (c) Class (d) Phylum

39. Botanical name of mango is
(a) *Mangifera indica* (b) *Solanum tuberosum*
(c) *Solanum melongena* (d) *Panthera leo*

40. Botanical name of potato is
(a) *Mangifera indica* (b) *Solanum tuberosum*
(c) *Solanum melongena* (d) *Panthera leo*

41. Zoological name of lion is
(a) *Mangifera indica* (b) *Solanum tuberosum*
(c) *Solanum melongena* (d) *Panthera leo*

42. The branch connected with characterization, nomenclature, identification and classification is
(a) Ecology (b) Taxonomy
(c) Morphology (d) Eugenics

43. The third name in trinomial nomenclature is
(a) Species (b) Subgenus (c) Subspecies (d) Holotype

44. In binomial nomenclature
(a) Both genus and species are printed in italics.
(b) Genus and species may be of same name.
(c) Both the initial letters in genus and species is capital.
(d) Genus is written after the species.

45. As we go from higher species to kingdom, the number of common characterstic goes on _____.
(a) Increasing (b) Decreasing (c) Remains same (d) None of these

46. The binomial nomenclature was given by
(a) Lamarck (b) Ernst Mayr
(c) Carolus Linnaeus (d) Darwin

47. The term 'taxon' is used for
(a) The ranks of species and genus (b) The ranks up to phylum
(c) The species epithet only (d) Any rank of taxonomic hierarchy

48. The taxonomic aid that provides information for the identification of names of species found in an area is
(a) Monograph (b) Manual (c) Catalogue (d) Periodical

49. The Indian Botanical Garden is located in
(a) Howrah (b) Lucknow (c) Mumbai (d) Mysore

50. The famous botanical garden 'Kew' is located in
(a) England (b) Lucknow (c) America (d) Australia

51. Identify the correct sequence of taxonomic categories.
(a) Species–order–kingdom–phylum (b) Species–family–genus–class
(c) Genus–species–order–phylum (d) Species–genus–order-phylum

52. Which biological name is wrongly written?
(a) *Apis indica* (b) *Triticum aestivum*
(c) *Felis domesticus* (d) *Mangifera Indica*

53. The descending arrangement of categories is called
(a) Classification (b) Taxonomy (c) Hierarchy (d) Key

54. Petunia is a
(a) Variety (b) Subspecies (c) Species (d) Genus

55. Which one of the following is not a category?
(a) Species (b) Class (c) Phylum (d) Convolvulaceae

56. In the hierarchy of classification, the order is present between
(a) Family and genus (b) Phylum and kingdom
(c) Family and class (d) Family and species

57. Select the incorrect statement from the following.
(a) Each statement in key is called lead.
(b) Taxonomic keys are tools that helps in identification based on characterstics.
(c) ICZN stands for International Code of Zoological Nomenclature.
(d) Ernst Mayr used the *system a Nature* as the title of his publication.

58. The place where we store dry plants for information purpose is called
(a) Key (b) Museum (c) Monograph (d) Herbarium

59. Which is not a part of taxonomic hierarchy?
(a) Genus and species (b) Order and class
(c) Kingdom and class (d) Catalogue and herbarium

60. Find out the incorrect statement from the following:
(a) Closely related species differ in morphological features.
(b) Genus comprises a group of related species.
(c) Taxonomic studies are useful in agricultural, forestry and industries.
(d) Notochord and ventral hollow neural system are common features of phylum chordata.

61. ICBN stands for
(a) International Code for Biosphere Nomenclature
(b) International Code for Botanical Nomenclature
(c) International Class for Biological Nobel leurette
(d) International Committe for Biological Naming

62. Zoological name of tiger is
(a) *Mangifera indica* (b) *Solanum tuberosum*
(c) *Solanum melongena* (d) *Panthera tigris*

63. Zoological name of leopard is
(a) *Mangifera indica* (b) *Solanum tuberosum*
(c) *Solanum melongena* (d) *Panthera pardus*

64. Zoological name of house fly is
(a) *Mangifera indica* (b) *Solanum tuberosum*
(c) *Solanum melongena* (d) *Musca domestica*

65. Zoological name of man is
(a) *Mangifera indica* (b) *Solanum tuberosum*
(c) *Solanum melongena* (d) *Homo sapiens*

66. Botanical name of wheat is
(a) *Mangifera indica* (b) *Solanum tuberosum*
(c) *Solanum melongena* (d) *Triticum aestivum*

67. Zoological name of cat is
(a) *Mangifera indica* (b) *Solanum tuberosum*
(c) *Solanum melongena* (d) *Felis domesticus*

68. Botanical name of makoi is
(a) *Mangifera indica* (b) *Solanum tuberosum*
(c) *Solanum melongena* (d) *Solanum nigrum*

69. Potato and brinjal belongs to the genus
(a) *Mangifera* (b) *Solanum* (c) *Allium* (d) *Brassica*

70. Genera Petunia and Datura belongs to the family
(a) *Solanaceae* (b) *Fabaceae* (c) *Liliaceae* (d) any of the above

71. Select the total number of family from the following:
Felis, Felidae, Solanaceae, Liliaceae, Canidae, Hominidae, Poaceae, Muscidae, Insecta, Convolvulaceae
(a) 5 (b) 6 (c) 7 (d) 8

72. Family *Solanaceae* and *Convolvulaceae* belongs to the order
(a) *Poales* (b) *Polymoniales* (c) *Diptera* (d) *Dicot*

73. Common features of *Chordata* are
(a) The presence of notochord in any stage of life
(b) Dorsal hollow neural system
(c) Paired pharyngeal gill slits
(d) All of these

74. Which of the following is a common feature of category 'insecta'?
(a) Presence of ostium
(b) Presence of coxal gland for excretion
(c) Three pair of jointed legs in thoracic region
(d) Exoskeleton of cutin

75. Which of the following represent the family of mango?
(a) *Sapindales* (b) *Anacardiaceae* (c) *Poales* (d) *Poaceae*

76. House fly belongs to the order
(a) *Diptera* (b) *Carnivora* (c) *Primata* (d) *Insecta*

77. Which is not required for the preservation of insect?
(a) Collecting (b) Killing (c) Pinning (d) Pressing

78. IBG is situated at
(a) Kew (b) Howrah (c) Lucknow (d) Jodhpur

79. A museum has a collection of
(a) Preserved plants (b) Preserved animals
(c) Skeleton of animals (d) All of these

80. Which of the following animals is usually stuffed and preserved?
(a) Large birds (b) Mammals
(c) Small lizards (d) Both (a) and (b)

81. Zoological parks are places for
(a) Wild animals (b) Pet animals
(c) Wild plants (d) Endangered crops

82. Zoological park is a place where
(a) Wild animals are kept in protected environment under human care.
(b) We can learn about wild animal's food habit.
(c) We can learn about wild animal's behavior.
(d) All of these

83. The keys are based on contrasting characters generally in pairs called
(a) Duplex (b) Couplet (c) Dimer (d) All of these

84. Which of the following is incorrect about keys?
(a) Key is a taxonomical aid used for the identification of plants and animals based on the similarities and dissimilarities.
(b) Separate taxonomic keys are required for each taxonomic category such as family, genus and species for identification purposes.
(c) Keys are generally analytical in nature.
(d) Key is another taxonomical aid used for the nomenclature of plants and animals based on the similarities and dissimilarities.

85. Which of the following is a mean of recording description?
(a) Flora and manuals (b) Monographs
(c) Catalogues (d) All of these

86. Flora contains information about the habitat and distribution of
(a) Animals of a given area (b) Plants of a given area
(c) Some useful plants of a given area (d) Some useful animals of a given area

87. Monographs contains the information of
(a) genus (b) species (c) family (d) any one taxon

88. Manuals contain information for
(a) Habitat and distribution of animals in a given area
(b) Habitat and distribution of plants in a given area
(c) Identification of names of species found in an area
(d) Habitat and distribution of some useful animals in a given area

89. Organisms vary in
(a) Size and colour (b) Habitat
(c) Physiological and morphological features (d) All of these

90. Live specimens of organisms are found in
(a) Herbaria (b) Museum
(c) Zoological parks and botanical gardens (d) All of these

91. The name of a plant written on herbarium sheet is its
(a) English name (b) Local name (c) Botanical name (d) All of these

92. NBRI is situated in
(a) Kolkata (b) Lucknow (c) Delhi (d) Jodhpur

93. Which is the prime source of taxonomical studies?
(a) Collection of actual specimen (b) Nomenclature
(c) Characterization (d) Identification

94. Tiger, dog and cat are placed in order of
(a) Insectivora (b) Carnivora (c) Primata (d) Lagomorpha

95. Monkey, gorilla and gibbons belongs to which of the following order and class respectively
(a) Primata and prototheria (b) Primata and mammalia
(c) Carnivora and eutheria (d) Carnivora and mammalia

96. In plants, the families are characterized on the basis of
(a) Vegetative structures (b) Reproductive features
(c) Both (a) and (b) (d) None of these

97. Match the column:

Column I	**Column II**
A. Man	1. Order–Carnivora
B. Mango	2. Family–Poaceae
C. House fly	3. Genus–Musca
D. Tiger	4. Phylum–Chordata
E. Wheat	5. Family–Anacardiaceae

(a) A–1, B–5, C–3, D–4, E–2 (b) A–4, B–5, C–3, D–1 and 4, E–2
(c) A–4, B–2, C–3, D–1, E–5 (d) A–1, B–2, C–3, D–4, E–5

98. Select the incorrect combination:

(a) Fragmentation	Fungi, Planaria, Protonema of moss
(b) Budding	Yeast, hydra and sponges
(c) Order	Mammalia, primata, diptera, poales, polymoniales, sapindales
(d) Genus	*Homo*, *Triticum*, *Musca*, *Felis*, *Panthera*, *Datura*, *Petunia*, *Mangifera*, *Solanum*

99. Select the correct combination:
(a) Earliest classification based on – Uses of various organisms
(b) Reproduction is synonymous with growth – Primitive multicellular organism
(c) ICZN – International Code of Zoo Nomenclature
(d) NBRI – National Botanical Registered Institute

100. Single-horned Rhinoes are found in
(a) Ghana (b) Bastar of Madhya Pradesh
(c) Kaziranga National Park (d) Khasi in Meghalaya

101. Herbarium sheet provides the information of
(a) Collector's name (b) Family of plant
(c) Local, English and botanical name (d) All of these

102. Select the total number of correct statements from the following:
1. Photoperiod affects the reproduction in seasonal breeders, both plants and animals.
2. All organisms handle chemicals entering their bodies.
3. Metabolism is a characterstic feature of all living organisms.
4. In animals, growth is seen only up to a certain age.
5. Non-living object exhibits metabolism.
6. No non-living object is capable of reproducing or replicating by itself.

(a) 2 (b) 3 (c) 4 (d) 6

103. All plants, animals, fungi and microbes exhibit
(a) Reproduction
(b) Growth by increase in mass only
(c) Metabolism
(d) Self-consciousness

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

104. **Assertion:** Systematics is an important branch of biology.
Reason: Systematics name the organisms and divides them into groups and subgroups according to the set rules to make their study easy.

105. **Assertion:** Members of a species breed only with others of the same species.
Reason: In some cases, members of different species may also breed, producing sterile or fertile offspring.

106. **Assertion:** No non living object exhibit metabolism.
Reason: Cellular organization is absent in non-living organisms.

107. **Assertion:** Metabolic reactions can be demonstrated outside the body in cell free systems.
Reason: An isolated metabolic rection performed in test tube is neither living nor non-living.

108. **Assertion:** Conservative characters are more useful in classification.
Reason: These characters do not change during evolution. Therefore, their similarities show relationships among organisms.

109. **Assertion:** Linnaeus insisted that the scientific names should be Latinized.
Reason: This gives beauty to the names.

110. **Assertion:** There is no difference between the terms taxon and category.
Reason: Aves is a taxon that includes the category 'birds'.

111. **Assertion:** Each rank or taxon represents a unit of classification.
Reason: Taxonomic categories are distinct biological entities and not merely morhpological aggregates.

112. **Assertion:** Human being has self-conciousness.
Reason: Human is an organism who is aware of himself.

113. **Assertion:** In unicellular organism, the reproduction is synonymous with growth.
Reason: Increase in the number of cells is also called growth.

114. **Assertion:** Growth is not taken as a defining property of living organism.
Reason: Non living organism can also grow by accumulation of material on their surface.

115. **Assertion:** Growth in plant is said to be open.
Reason: In plant, growth by cell division occurs throughout their life.

116. **Assertion:** In Planaria we call regeneration as true regeneration.
Reason: A fragmented organism regenerates the lost part of its body and becomes a new organism.

117. **Assertion:** Growth and reproduction is synonymous in amoeba .
Reason: Amoeba is unicellular organism.

118. **Assertion:** All organisms handle chemicals entering in their bodies.
Reason: All organisms are aware of their surroundings.

119. **Assertion:** All living organism present, past and future are linked to one another.
Reason: Because all organism sharing common genetic material, but to varying degrees.

120. **Assertion:** Properties of tissues are arises due to interaction of cells.
Reason: Properties of tissues are present in constituent cells.

121. **Assertion:** Scientific names of all organisms are based on agreed principles and criteria provided by ICBN.
Reason: ICBN is International code for biological nomenclature.

122. **Assertion:** Binomial system provided by Linnaeus is used by biologist all over the world.
Reason: This naming system using a two word format is convenient.

123. **Assertion:** Earliest classifications were based on the uses of various organisms.
Reason: In early days human beings needed to find sources for their basic needs of food, clothing and shelter.

124. **Assertion:** Cockroach belongs to Insecta.
Reason: Cockroach posses three pair of jointed legs in their thoracic region.

PREVIOUS YEAR QUESTIONS

1. The Indian rhinoceros is a natural inhabitant of which one of the Indian states?
[AIPMT MAINS 2010]

(a) Uttarakhand (b) Uttar Pradesh
(c) Himachal Pradesh (d) Assam

2. Which one of the following aspects is an exclusive characteristic of living things?
[AIPMT MAINS 2011]

(a) Isolated metabolic reactions occurs *in vitro.*
(b) Increase in mass from inside only.
(c) Perceptions of events happening in the environment and their memory.
(d) Increase in mass by accumulation of material both on surface as well as internally.

3. Which one of the following is common to multicellular fungi, filamentous algae and protonema of mosses?
[AIPMT PRE 2012]

(a) Diplontic life cycle (b) Members of kingdom Planate
(c) Mode of Nutrition (d) Multiplication by fragmentation

4. Which one of the following is not a correct statement?
[AIPMT MAINS 2013]

(a) Herbarium houses dried pressed and preserved plant specimens
(b) Botanical gardens have collection of living plants for reference
(c) A museum has collection of photographs of plants and animals
(d) Key is a taxonomic aid for identification of specimens.

5. Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature? [NEET - I, 2016]
(a) Biological names can be written in any language
(b) The first word in a biological name represents the genus name, and the second is a specific epithet
(c) The names are written in Latin and are italicized
(d) When written by hand, the names are to be underlined

6. The label of a herbarium sheet does not carry information on [NEET - II, 2016]
(a) Name of collector (b) Local names
(c) Height of the plant (d) Date of collection

7. Match Column – I with Column – II for housefly classification and select the correct option using the codes given below: [NEET - II, 2016]

Column – I	**Column – II**
A. Family	1. Diptera
B. Order	2. Arthropoda
C. Class	3. Muscidae
D. Phylum	4. Insecta

(a) A–3, B–2, C–4, D–1 (b) A–4, B–3, C–2, D–1
(c) A–4, B–2, C–1, D–3 (d) A–3, B–1, C–4, D–2

8. Study the four statements (A-D) given below and select the two correct ones out of them: [NEET - II, 2016]
A. Definition of biological species was given by Ernst Mayr.
B. Photoperiod does not affect reproduction in plants.
C. Binomial nomenclature system was given by R. H. Whittaker
D. In unicellular organisms, reproduction is synonymous with growth
The two correct statements are
(a) C and D (b) A and B
(c) A and D (d) B and C

NCERT EXEMPLAR QUESTIONS

1. As we go from species to kingdom in a taxonomic hierarchy, the number of common characteristics
(a) Will decrease (b) Will increase
(c) Remain same (d) May increase or decrease

2. Which of the following 'suffixes' used for the units of classification in plants indicates a taxonomic category of 'family'?
(a) –Ales (b) –Onae
(c) –Aceae (d) –Ae

3. The term 'systematics' refers to
(a) The identification and classification of plants and animals.
(b) The nomenclature and identification of plants and animals.

(c) The diverse kind of organisms and their relationship.
(d) The different kinds of organisms and their classification.

4. Genus represents
(a) An individual plant or animal.
(b) A collection of plants or animals.
(c) Group of closely related species of plants or animals.
(d) Different kinds of organisms and their classification.

5. The taxonomic unit 'Phylum' in the classification of animals is equivalent to which hierarchical level in the classification of plants?
(a) Class (b) Order
(c) Division (d) Family

6. Botanical garden and zoological parks have
(a) Collection of endemic living species only.
(b) Collection of exotic living species only.
(c) Collection of endemic and exotic living species.
(d) Collection of only local plants and animals.

7. Taxonomic key is one of the taxonomic tools in the identification and classification of plants and animals. It is used in the preparation of
(a) Monographs (b) Flora
(c) Both (a) and (b) (d) None of these

8. All living organisms are linked to one another because
(a) They have common genetic material of the same type.
(b) They share common genetic material but to varying degrees.
(c) All have common cellular organization.
(d) All of these

9. Which of the following is a defining characteristic of living organisms?
(a) Growth (b) Ability to make sound
(c) Reproduction (d) Response to external stimuli

10. Match the following by choosing the correct option:

a.	Family	i.	*Tuberosum*
b.	Kingdom	ii.	*Polymoniales*
c.	Order	iii.	*Solanum*
d.	Species	iv.	*Plantae*
e.	Genus	v.	*Solanaceae*

Options
(a) i – d, ii – c, iii – e, iv – b, v – a
(b) i – e, ii – d, iii – b, iv – a, v – c
(c) i – d, ii – e, iii – b, iv – a, v – c
(d) i – e, ii – c, iii – b, iv – a, v – d

Answer Keys

Practice Questions

1. (b)	2. (c)	3. (c)	4. (b)	5. (c)	6. (c)	7. (b)	8. (d)	9. (d)	10. (a)
11. (c)	12. (b)	13. (d)	14. (a)	15. (c)	16. (c)	17. (d)	18. (d)	19. (a)	20. (c)
21. (c)	22. (d)	23. (b)	24. (a)	25. (c)	26. (c)	27. (c)	28. (d)	29. (c)	30. (c)
31. (a)	32. (d)	33. (d)	34. (c)	35. (c)	36. (d)	37. (b)	38. (a)	39. (a)	40. (b)
41. (d)	42. (b)	43. (c)	44. (a)	45. (b)	46. (c)	47. (d)	48. (b)	49. (a)	50. (a)
51. (d)	52. (d)	53. (c)	54. (d)	55. (d)	56. (c)	57. (d)	58. (d)	59. (d)	60. (d)
61. (b)	62. (d)	63. (d)	64. (d)	65. (d)	66. (d)	67. (d)	68. (d)	69. (b)	70. (a)
71. (d)	72. (b)	73. (d)	74. (c)	75. (b)	76. (a)	77. (d)	78. (b)	79. (d)	80. (d)
81. (a)	82. (d)	83. (b)	84. (d)	85. (d)	86. (b)	87. (d)	88. (c)	89. (d)	90. (c)
91. (d)	92. (b)	93. (a)	94. (b)	95. (b)	96. (c)	97. (b)	98. (c)	99. (a)	100. (c)
101. (d)	102. (c)	103. (c)							

Assertion and Reason Questions

104. (a)	105. (b)	106. (a)	107. (b)	108. (a)	109. (c)	110. (d)	111. (b)	112. (a)	113. (a)
114. (a)	115. (a)	116. (a)	117. (a)	118. (a)	119. (a)	120. (c)	121. (d)	122. (a)	123. (a)
124. (a)									

Previous Year Questions

1. (d)	2. (b)	3. (d)	4. (c)	5. (a)	6. (c)	7. (d)	8. (c)

NCERT Exemplar Questions

1. (a)	2. (c)	3. (c)	4. (c)	5. (c)	6. (c)	7. (c)	8. (d)	9. (d)	10. (a)

CHAPTER 2

Biological Classification

PRACTICE QUESTIONS

Kingdom Classification

1. Who was the first to attempt a more scientific basis of classification?
(a) Linnaeus (b) Aristotle
(c) Whittaker (d) Bentham and Hooker

2. Aristotle classified plants in herbs, shrubs and trees on the basis of
(a) Anatomical feature (b) Morphological characters
(c) Physiological characters (d) Biochemical characters

3. In how many groups did Aristotle divide the animals on the basis of presence/absence of RBC?
(a) 1 (b) 2 (c) 3 (d) 4

4. Two kingdom classification does not distinguish between
(a) Eukaryote and prokaryote
(b) Unicellular and multi-cellular organisms
(c) Photosynthetic (green algae) and non-photosynthetic (fungi) organisms
(d) All the above

5. In which year Whittaker proposed the five kingdom classification?
(a) 1960 (b) 1959 (c) 1969 (d) 1979

6. Whittaker's kingdom are
(a) *Plantae* and *Animalia* (b) *Monera and Protista*
(c) *Fungi* (d) All of these

7. How many main criteria were used by Whittaker for classification?
(a) 1 (b) 3 (c) 4 (d) 5

8. What is the criteria used by Whittaker for classification?
(1) Cell structure (2) Thallus organization
(3) Mode of nutrition (4) Reproduction
(5) Phylogenetic relationship (6) Biochemical difference
(7) Physiological character
(a) All except (5) and (6) (b) All except (5) and (7)
(c) All except (6) and (7) (d) All except (3) and (4)

9. In earlier classification (like two kingdoms), the following are included in plant
(1) Bacteria, blue green algae, fungus (2) Mosses and fern
(3) Gymnosperms and angiosperm
(a) (1) only (b) (2) and (3) only (c) (3) only (d) All of these

10. What is common to bacteria, mosses and fungus?
(a) It is a mode of nutrition (b) Presence of cell wall
(c) Autotrophic (d) Body organization

11. All prokaryotic groups are put under ———— kingdom
(a) Monera (b) Plantae (c) Fungi (d) Protista

12. Kingdom protista contains
(a) Blue green algae (b) Fungi
(c) Unicellular eukaryotes (d) All of these

13. Chlamydomonas, chlorella, paramecium and amoeba are placed in which kingdom of Whittaker's classification?
(a) Monera (b) Plantae (c) Fungi (d) Protista

14. Phylogeny refers to
(a) Morphology (b) Physiology
(c) Reproduction (d) Evolutionary relationship

15. Kingdom monera contains
(a) Bacteria (b) Dinoflagellate
(c) Slime moulds (d) Euglenoid

16. Most abundant microorganism are
(a) bacteria (b) virus (c) amoeba (d) paramecium

17. Which of the following is incorrect about bacteria?
(A) It is grouped under five categories on the basis of shape.
(B) It can live in hot spring, deep ocean, snow and desert areas.
(C) It can live as a parasite.
(D) It is composed of simple behaviour and complex structure.
(a) (A) and (B) only (b) (A) and (D) only
(c) (B) and (C) only (d) (C) and (D) only

18. Most extensive metabolic diversity is found in
(a) Protozoans (b) Amphibian (c) Bacteria (d) Fungi

19. Most of the bacteria are
(a) Chemo-autotrophs (b) Photo-autotrophs (c) Heterotroph (d) Holozoic

20. Match the column:

Column I	**Column II**
A. Salty area	1. Thermoacidophile
B. Hot spring	2. Methanogen
C. Marshy area	3. Halophiles

(a) A–3, B–1, C–2 (b) A–1, B–2, C–3
(c) A–2, B–1, C–3 (d) A–2, B–3, C–1

21. Archaebacteria can live in some of the most harsh habitats because of
(a) Presence of mesosome (b) High power of multiplication
(c) Special cell wall structure (d) All of these

22. Following are present in gut of cows and buffaloes and is responsible for the production of methane from the dung of these animals
(a) Methanogen (b) Thermoacidophiles
(c) Halophils (d) All of these

23. Motile bacteria possess
(a) Cilia (b) Flagella
(c) Both (a) and (b) (d) None of these

24. Which of the following statements is true about cyanobacteria?
(a) It is found in fresh water only.
(b) It may be unicellular, colonial or filamentous.
(c) They often form bloom in non-polluted fresh water bodies.
(d) Colonies are not surrounded by gelatinous sheath.

25. Specialized cell of nostoc and anabaena fix nitrogen are known as
(a) Cyst (b) Heterocyst
(c) Oocytes (d) Cholecyst

26. Find out the total number of false statements:
A. Cyanobacteria have chlorophyll 'a' like green plants.
B. Bacteria which oxidizes various inorganic substance such as nitrates and ammonia and uses the released energy for ATP production are chemosynthesis autotrophic bacteria.
C. Heterotrophic bacteria are less in abundance in nature.
D. Majority of heterotrophic bacteria are decomposers.
E. Chemosynthetic autotrophic bacteria play an important role in recycling of nutrients like nitrogen, phosphorus iron and sulphur.
(a) 1 (b) 2 (c) 3 (d) 4

27. Heterotrophic bacteria helps in
(a) Curding of milk (b) Production of antibiotic
(c) Nitrogen fixation in leguminous plant (d) All of these

28. Select the total number of disease from the following caused by bacteria:
Mumps, Smallpox, Citrus canker, Cholera, Typhoid, Tetanus, Sleeping sickness, Malaria
(a) 2 (b) 4 (c) 5 (d) 6

29. Which one is correct about reproduction in bacteria?
(a) Mainly by binary fission
(b) Spores are formed under unfavorable condition
(c) Sexual reproduction by transfer of DNA from one to another
(d) All of these

30. Following features belong to
A. Complete lacking of cell wall
B. Anaerobic
C. Smallest living cell
D. Many of them are pathogenic to plant and animals
(a) Chrysophytes (b) Prions
(c) Viroids (d) Mycoplasma

31. Which of the following is incorrect about protista?
(a) All are single cell eukaryotes
(b) Some have flagella or cilia
(c) Sexually reproduce by cell fusion and zygote formation
(d) Members of protista are primarily terrestrial

32. Kingdom protista include
(a) Chrysophyte (b) Dinoflagellate (c) Euglenoids (d) All of these

33. Which kingdom of Whittaker are not well-defined?
(a) Monera (b) Protista (c) Fungi (d) Animalia

34. Which of the following is correct about chrysophytes?
I. Found in fresh and marine water II. Microscopic plankton
III. Cell walls are embedded with $CaCO_3$ IV. Most of them are photosynthetic
(a) I and III only (b) I, III and IV only (c) I, II and IV only (d) I and IV only

35. Chief producers in ocean are
(a) Euglenoids (b) Dinoflagellate (c) BGA (d) Chrysophytes

36. Chrysophytes include
(a) Diatoms (b) Golden algae (c) Desmids (d) All of these

37. Diatomaceous earth is used in
(a) Polishing (b) Filteration of oils
(c) Filteration of syrups (d) All of these

38. In _____ cell wall forms two thin overlapping shells which fit together as in a soap box.
(a) Dinoflagellates (b) Diatoms (c) Euglenoids (d) None of these

39. Mostly marine, photosynthetic and biflagellate organisms are
(a) Diatoms (b) Desmids (c) Dinoflagellates (d) Euglenoids

40. The following features belong to
I. Appear yellow, green, brown, blue and red depending on the pigment in cell.
II. Stiff cellulose plate forms cell wall.
III. One longitudiual and one transverse flagella present.
IV. Photosynthetic
(a) Diatoms (b) Desmids (c) Dinoflagellates (d) Euglenoids

41. Red tide is because of
(a) Desmids (b) Gonyaulax (c) Euglena (d) Red algae

42. Which of the following is true about gonyaulax?
(a) Release toxin (b) Slow multiplication causing red tide
(c) Heterotropic (d) All of these

43. Habitat of euglenoids is
(a) Fresh river water (b) Fresh stagnant water
(c) Marine water (d) All of these

44. Mode of nutrition in euglenoids is
(a) Autotropic (b) Heterotropic (c) Symbiotic (d) Mixotropic

45. Characteristic feature of euglenoids are
A. Presence of cell wall
B. Presence of two flagella
C. Photosynthetic in presence of sunlight
D. Presence of pellicle on their cell
(a) A and D only
(b) B and D only
(c) B, C and D only
(d) All of these

46. Euglenoids have flexible body because of
(a) Cellulosic wall
(b) Protein rich pellicle
(c) Lipoic wall
(d) Pectinic wall

47. Pigments of euglenoids are identical to
(a) Bacteria (b) Diatoms (c) Dinoflagellates (d) Higher plants

48. Euglena posses all except
(a) Pellicle
(b) Two equal flagella
(c) Two unequal flagella
(d) Mixotrophic nutrition

49. Character belongs to slime moulds
A. Saprophytes
B. Forms plasmodium under favourable condition
C. Spores posses true walls
D. Spores are dispersed by water
E. Body moves along decaying twings and leaves engulfing organic matter.
(a) All except E
(b) All except D
(c) All except C and E
(d) All except B

50. Which protist are believed to be the relatives of animals?
(a) Slime moulds (b) Dinoflagellates (c) Protozoans (d) Diatoms

51. Protozoans are
A. Hetrotrops
B. Parasites or predators
C. Protist
D. Belived to be primitive relative of animals
(a) A and B only (b) B and C only (c) D and A only (d) All of these

52. Amoeboid protozoans
(a) Live in fresh water, sea water or moist soil
(b) Captures prey by putting pseudopodia
(c) Marine forms have shells on their surface
(d) All of the above

53. False feet is the characteristic of which protozoan?
(a) Sporozoan
(b) Ciliated protozoan
(c) Flagellated protozoan
(d) Amoeboid protozoans

54. Sleeping sickness is caused by
(a) Plasmodium (b) Paramoecium (c) Trypanosoma (d) Entamoeba

55. The protist which possess flagella is
(a) Paramoecium (b) Plasmodium (c) Trypanosoma (d) Entamoeba

56. Ciliated protozoan possess
(a) Thousands of cilia (b) Gullet that opens outsides to cell
(c) Coordinated movement of rows of cilia (d) All of these

57. Sporozoans possesss
(a) Spore like stage in life cycle (b) They are infectious
(c) They are motile (d) Both (a) and (b)

58. Select the correct statement from the following for kingdom fungi
A. They are heterotrophic.
B. They show less diversity in morphology and habitat.
C. Yeast is an unicellular fungus.
D. They prefer to grow in warm and humid places.
(a) A and D only (b) C and D only (c) A, C and D only (d) A and B only

59. Which of the following are example of fungus?
(a) Toadstool (b) Puccinia (c) Yeast (d) All of these

60. Which of the following pairs belongs to the same kingdom?
(a) Mycoplasma and Euglena (b) Golden algae and Green algae
(c) Toadstool and Albugo (d) Lichens and Alternaria

61. Refrigeration prevents food from spoilage by
(a) Fungus (b) Bacteria (c) Both (d) None of these

62. Which is not a correct matching?
(a) Rust → Puccinia (b) Yeast → Bread and beer
(c) Chrysophyte → Diatomaceous earth (d) Penicillium → Red tide

63. The following features belongs to
A. Body consist of long, slender thread-like structures called hyphae.
B. Cell wall consist of chitin.
C. Cosmopolitan
(a) Ciliated protozoans (b) Slime moulds
(c) Fungi (d) Euglenoids

64. If hyphae are continuous tube filled with multinucleated cytoplasm it is known as
(a) Septate hyphae (b) Coenocytic hyphae
(c) Mycelium (d) None of these

65. Select the correct matching:
A. Fungi depend on dead substrate – Saprophytic
B. Fungi depend on living plants and animals – Parasite
C. Fungi as symbiont with algae – Lichens
D. Fungi as symbiont with root of higher plant – Mycorrhazia
(a) A and B only (b) B and C only (c) C and D only (d) All of these

66. Vegetative reproduction in fungus takes place by
(a) Fragmentation (b) Fission (c) Budding (d) All of these

67. Asexual reproduction in fungus occurs by spores known as
(a) Conidia (b) Sporangiospores
(c) Zoospores (d) Any of the above

68. Sexual reproduction in fungus is by
(a) Oospores (b) Ascospores
(c) Basidiospores (d) Any of the above

69. Sexual reproduction in fungus occurs in the following sequential event. Arrange them properly.
A. Fusion of two nuclei called karyogamy.
B. Fusion of protoplasm between two motile or non-motile gametes.
C. Meiosis in zygote resulting in haploid spores.
(a) $A \rightarrow B \rightarrow C$ (b) $B \rightarrow A \rightarrow C$ (c) $C \rightarrow B \rightarrow A$ (d) $C \rightarrow A \rightarrow B$

70. Dikaryon and dikaryophase is seen in the case of
(a) Ascomycetes (b) Basidiomycetes
(c) Phycomycetes (d) Both (a) and (b)

71. The kingdom fungi is divided into various classes on the basis of
(a) Morphology of mycelium (b) Mode of spore formation
(c) Type of fruiting bodies (d) All of these

72. During sexual reproduction in fungus
(a) Hyphae of same class come together and fuse.
(b) Hyphae of same genus come together and fuse.
(c) Hyphae of closely related species come together and fuse.
(d) Hyphae of compatible mating type come together and fuse.

73. Habitats of phycomycetes are
(a) Aquatic (b) Decaying wood in moist and damp place
(c) Obligate parasite in plant (d) All of these

74. Endogenously produced spores are found in all except
(a) Mushroom (b) Mucor
(c) Albugo (d) Rhizopus

75. The following features belong to class
A. Asexual reproduction by zoospores or aplanospores.
B. Fusion of gametes may be isogamous, anisogamous or oogamous.
C. Mycelium is aseptate and coenocytic.
D. Spores are endogenously produced in sporangium.
(a) Ascomycetes (b) Deuteromycetes
(c) Phycomycetes (d) Basidiomycetes

76. The following fungus belongs to class ascomycetes (count the total number).
Rhizopus, Penicillium, Yeast, Mucor, Agaricus, Puccinia, Albugo, Claviceps, Neurospora, Alternaria, Trichoderma, Aspergillus, Ustilago, Morels, Buffles, Colletotrichum, Toadstool
(a) 5 (b) 7 (c) 9 (d) 10

77. Ascomycetes are mostly
(a) Acellular (b) Unicellular (c) Multicellular (d) All of these

78. Unicellular ascomycetes is
(a) Penicillium (b) Alternaria
(c) Saccharomyces (yeast) (d) Agaricus

79. The following features belongs to class
A. Mycelium branched and septate.
B. Asexual spores conidia produced exogenously.
C. Sexual spores produced endogenously.
D. Many members of this class are edible.
(a) Ascomycetes (b) Phycomycetes (c) Basidiomycetes (d) Deuteromycetes

80. Which of the following is extensively used in biochemical and genetic work?
(a) Aspergillus (b) Claviceps (c) Neurospora (d) Penicillium

81. The commonly known form of basidiomycetes are
(a) Mushrooms (b) Bracket fungi (c) puffballs (d) all

82. The following characteristics are of which of the given fungi?
A. Mycelium branched and septate.
B. Asexual spores are generally not found.
C. Vegetative reproduction by fragmentation is common.
D. Sex organs are absent but plasmogamy is by fusion of two somatic cells of different strains or genotype.
(a) Phycomycetes (b) Basidiomycetes (c) Deuteromycetes (d) Ascomycetes

83. Karyogamy and meiosis occurs in basidium produces _____ basidiospores.
(a) 1 (b) 2 (c) 3 (d) 4

84. Basidiospores are produced on basidium
(a) Endogenously (b) Exogenously (c) Both (a) and (b) (d) None of these

85. Find out the correct matching:
(a) Ustilago–Smut (b) Puccinia–Rust
(c) Agaricus–Mushroom (d) All are correct

86. Which of the following fungi only reproduce by asexual spores conidia?
(a) Alternaria (b) Colletotrichum (c) Trichoderma (d) All of these

87. Deuteromycetes are known as imperfect fungi because
(a) Only sexual phase is found.
(b) Only asexual or vegetative phase are known.
(c) Both asexual and sexual phase are known.
(d) Reproduction in these fungi is absent.

88. Many members of _____ class are decomposers of litter and help in mineral cycling.
(a) Ascomycetes (b) Deuteromycetes
(c) basidiomycetes (d) phycomycetes

89. The following features belongs to
A. Mycelium septate and branched.
B. Some members are saprophytes or parasites.
C. Reproduce only by conidia.
(a) Ascomycetes (b) Deuteromycetes (c) Basidiomycetes (d) Phycomycetes

90. Which of the following are examples of insectivorous plants?
(a) Bladderwort (b) Venus fly trap (c) Cuscuta (d) Both (a) and (b)

91. Kingdom plantae include
(a) Algae and bryophytes
(b) Pteridophytes and gymnosperms
(c) Angiosperms
(d) All of these

92. Plant cells have all except
(a) Chloroplast
(b) Cellulosic cell wall
(c) Large vacuole
(d) Centriole

93. Alternation of generation is seen in all except
(a) Fucus (b) Sphagnum (c) Equisetum (d) Alternaria

94. Life cycle in plant has generally two distinct phase the _____ sporophytic and the _____ gametophytic that alternate with each other. This phenomenon is called as alternation of generation.
(a) diploid, diploid
(b) diploid, haploid
(c) haploid, diploid
(d) haploid, haploid

95. Select from the following the total number of features belonging to animal kingdom.
1. Multicellular, heterotrophic.
2. Most of them capable of locomotion.
3. Have definite shape and size.
4. Digestion of food in internal cavity.
5. Holozoic mode of nutrition.
6. Stored food reserve as glycogen or fat.
7. Higher forms shows sensory and neuromotor mechanism.
8. Some members are autotrophic.
9. Presence of cellulose cell wall.
10. Sexual reproduction generally by copulation of male and female.

(a) 6 (b) 7 (c) 8 (d) 10

Viruses,Viroids and Lichens

96. In five kingdom classification of Whittaker, some acellular organisms are not included, they are
(a) Virus (b) Viroids (c) Lichens (d) Both (a) and (b)

97. Virus is
(a) Completely non-living
(b) Inert crystalline structure outside the living cell
(c) Cellular organism
(d) One of Whittaker's classification

98. 'Virus', the name means
(a) Venom or poisonous fluid
(b) Acellular form
(c) Non-cellular form
(d) The connecting link between living and non-living

99. 'Virus' , the name was given by
(a) Ivanowsky (b) Pasteur (c) Whittaker (d) Beijerinck

100. *Contagium vivum fluidum* (infections living fluid) name given to fluid extract from infected tobacco plant was given by
(a) Ivanowsky (b) Pasteur (c) Whittaker (d) Beijerinek

101. Viruses are
(a) Inert outside their specific host cell
(b) Obligate parasite
(c) Passes through bacteria proof filter
(d) All above statements are correct

102. Who showed that virus can be crystallized out?
(a) Ivanowsky (b) Beijerinck
(c) Stanley (d) Pasteur

103. Virus contains
(a) Protein (b) DNA
(d) RNA (d) (a) and either (b) or (c)

104. Virus infected plants generally have
(a) Single stranded DNA (b) Double stranded DNA
(c) Double stranded RNA (d) Single stranded RNA

105. Viruses which infect animals have
(a) Single stranded RNA (b) Double stranded RNA
(c) Double stranded DNA (d) Any of the above

106. Bacteriophage generally have
(a) Single stranded RNA (b) Double stranded RNA
(c) Double stranded DNA (d) Any of the above

107. Capsomeres may be arranged in
(a) Helical (b) Polyhedral (c) Ellipsoid (d) Either (a) or (b)

108. In virus infected plants the following symptoms can be observed
(a) Mosaic formation and stunted growth (b) Leaf rolling and curling
(c) Yellowing and vein clearing (d) All of these

109. Select the total number of diseases from the following which can be caused by virus in plant or animals.
Mumps, Small pox, Rust, Smut, Herpes, Influenza, Potato spindle tuber, Red rot of sugar cane, Turnip mosaic, Black rot crucifier
(a) 4 (b) 5 (c) 7 (d) 8

110. Potato spindle tuber disease is caused by
(a) Virus (b) Viroids (c) Lichens (d) Fungi

111. 'Viroids' is discovered by
(a) Ivanowsky (b) T. O. Diener (c) Beijerinck (d) Stanley

112. Viroids are
(a) Free protein (b) Free RNA (c) Free DNA (d) Free saccharides

113. The molecular weight of RNA of viroid is
(a) High (b) Low
(c) Very high (d) Any of the above

114. Lichens are symbiotic association between
(a) Algae and bacteria (b) Bacteria and fungus
(c) Algae and fungus (d) Fungus and root of higher plant

115. In lichen, the algal component is called _____ and fungal component is called _____.
(a) mycobiont, phycobiont (b) phycobiont, mycobiont
(c) phycobiont, mycorrhazia (d) mycorrhaiza, mycobiont

116. Which one of the following is heterotrophic in lichen?
(a) Fungus (b) Algae (c) Both (a) and (b) (d) None

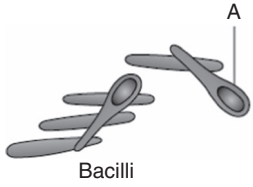
117. Lichens are
(a) Pollution indicators
(b) Symbiotic association between algae and fungus
(c) Pioneer species in primary succession on rocks
(d) All of the above

118. Which of the following is incorrect about lichens?
(a) Algae part is autotrophic (b) Fungus part absorb nutrient and minerals
(c) Fungus provide shelter to algae (d) Algae provide shelter to fungus

119. Identify the A, B, C and D in this figure.

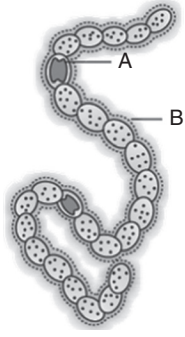
(a) A–Spirilla, B–Vibrio, C–Flagellum, D–Cocci
(b) A–Cocci, B–Flagellum, C–Spirilla, D–Vibrio
(c) A–Vibrio, B–Spirilla, C–Cocci, D–Flagellum
(d) A–Flagellum, B–Spirilla, C–Cocci, D–Vibrio

120. Identify around structure 'A' in this diagram



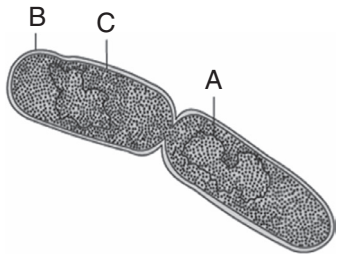
(a) dsDNA (b) Plasmid (c) Spore (d) Cosmid

121. What indicates A in this figure?



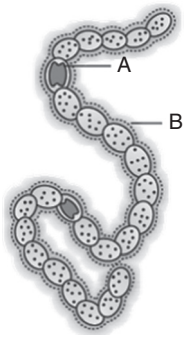
(a) Heterocyst (b) Mucilaginous sheath
(c) Cyanobacteria (d) ATP

122. Identify the A, B and C shown in this figure?



(a) A–Cell wall, B–DNA, C–Cell membrane
(b) A–DNA, B–Cell membrane, C–Cell wall
(c) A–Cell membrane, B–DNA, C–Cell wall
(d) A–DNA, B–Cell wall, C–Cell membrane

123. Identify the organism given in this diagram and its feature.



(a) Vibrio–Comma shape bacteria which causes cholera
(b) Fungi–Body organization is loose tissue level
(c) Blue green algae–Filamentous structure, helps in nitrogen fixation
(d) Algae–Heterotrophic structure feeds on Nostoc

124. Select the incorrect statement about the organism given in this diagram.

(a) Autotrophic in sunlight
(b) Heterotrophic in deprived sunlight
(c) Biflagellate
(d) They are surrounded by protein rich layer known as cell wall

125. Identify A, B, C in this diagram.

A B C

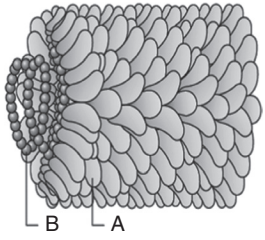
(a) A–Euglena, B–Paramoecium, C–Vibrio
(b) A–Paramoecium, B–Vibrio, C–Euglena
(c) A–Flagella, B–Paramoecium, C–Vibrio
(d) A–Paramoecium, B–Slipper animalcule, C–Vibrio

126. Identify the A, B and C in this figure.

A B C

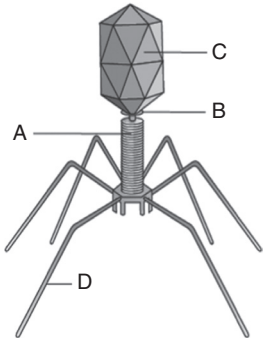
(a) A–Agaricus, B–Mucor, C–Aspergillus
(b) A–Mucor, B–Agaricus, C–Aspergillus
(c) A–Aspergillus, B–Mucor, C–Agaricus
(d) A–Agaricus, B–Aspergillus, D–Mucor

127. Identify the A and B shown in this figure.



(a) A–DNA, B–Capsid
(b) A–RNA, B–DNA
(c) A–Capsid, B–RNA
(d) A–RNA, B–Capsid

128. What is indicating A to D in this figure.



(a) A–Collar, B–Tail Fibres, C–Head, D–Sheath
(b) A–Sheath, B–Collar, C–Head, D–Tail fibres
(c) A–Tail fibres, B–Sheath, C–Collar, D–Head
(d) A–Tail fibres, B–Collar, C–Head, D–Sheath

ASSERTION AND REASON QUESTIONS

Read the assertion and reason *carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

129. **Assertion:** Chemotaxonomy is classifying organisms at molecular level.
Reason: Cytotaxonomy is classifying organisms at cellular level.

130. **Assertion:** Bacteria are prokaryotic.
Reason: Bacteria do not possess true nucleus and membrane bound cell organelles.

131. **Assertion:** Bacteria are grouped under four categories based on their shapes.
Reason: Cocci and Bacilli may form clusters or chain of a definite length.

132. **Assertion:** Mycoplasma can survive without oxygen.
Reason: They have no cell wall.

133. **Assertion:** Bacterial cell wall are not like the plant cell.
Reason: Bacterial cell wall is made up of cellulose.

134. **Assertion:** Bacteria do not always move with the help of flagella.

Reason: Flagellated bacteria employs rotary motion of flagellum when it moves.

135. **Assertion:** Amoeba contains a contractile vacuole.
Reason: It helps in both digestion and osmoregulation.

136. **Assertion:** Whittaker proposed a five kingdom classification.
Reason: The main criteria were cell structure, body organization, mode of nutrition, reproduction and phylogenetic relationship.

137. **Assertion:** Paramecium is aquatic, actively moving organism.
Reason: Paramecium contains two nucleus.

138. **Assertion:** Fresh water protozoan possess contractile vacuoles.
Reason: The main function of the vacuole is contraction during digestion.

139. **Assertion:** Sexual reproduction in protozoan is not a frequent occurrence.
Reason: Sexual reproduction has no significance.

140. **Assertion:** Bacteria are the most abundant micro-organism.
Reason: Bacteria show most extensive metabolic diversity.

141. **Assertion:** Euglenoids have flexible body.
Reason: Euglenoids are covered by protein rich layer called pellicle

142. **Assertion:** Slime moulds are saprophytic protists.
Reason: Slime moulds derive their nutrition mainly from decaying organic matter.

143. **Assertion:** Slime moulds are called protistan fungi.
Reason: A Slime mould resembles both protozoa and true fungi.

144. **Assertion:** Cell walls of diatoms are indestructible.
Reason: Cell walls of diatoms embedded with silica.

145. **Assertion:** Mycoplasma is pleomorphic (means can change their shape).
Reason: Cell wall is absent in Mycoplasma.

146. **Assertion:** Euglenoids shows mixotrophic nutrition.
Reason: Euglenoids are autotrophic in sunlight and heterotrophic in absence of sunlight.

147. **Assertion:** Neurospora is used extensively in genetic work.
Reason: Neurospora belongs to Ascomycetes.

148. **Assertion:** Bladderwort and Venus fly trap are parasite
Reason: Cuscuta is insectivorous plant.

149. **Assertion:** Lichens are very good pollution indicators.
Reason: Lichens do not grow in polluted areas.

150. Assertion: Virus is obligate parasite
Reason: Virus can't multiply without host cell.

151. **Assertion:** Aristotle used simple morphological characters to classify plants into trees, shrubs and herbs.
Reason: Aristotle divides animals in two groups on the basis of presence or absence of red blood.

152. **Assertion:** Fungi are no more considered as plant.
Reason: Fungi posses heterotrophic nutrition and their cell wall consist of chitin mainly.

153. **Assertion:** Kingdom Protista brought together chlorella and paramecium, which in earlier classification were placed in different kingdom.
Reason: Criteria for different classification are different in many aspects.

154. **Assertion:** Bacteria are the most abundant micro-organisms
Reason: Bacteria only shows autotrophic mode of nutrition.

155. **Assertion:** Bacteria have simple structure.
Reason: Bacteria show most extensive metabolic diversity.

156. **Assertion:** Archaebacteria is most resistant to adverse environmental conditions.
Reason: Archaebacteria has complex cell wall structure.

157. **Assertion:** Methane is produced from the dung of ruminating animals.
Reason: Methanogens present in gut of many ruminant animals.

158. **Assertion:** Chemosynthetic autotrophic bacteria are useful for ecosystem.
Reason: They play great role in recycling nutrients like nitrogen, phosphorus, iron and sulphur.

159. **Assertion:** Bacteria reproduce mainly by binary fission.
Reason: Under unfavourable condition they produce spores.

160. **Assertion:** All single called eukaryotes reproduce by asexual means only placed under kingdom Protista.
Reason: Protistan cell contain well defined nucleus but not membrane bound cell organelles.

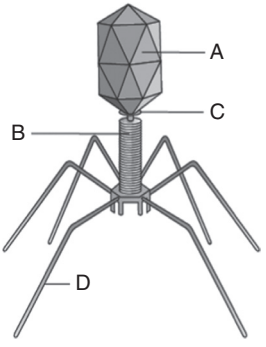
161. **Assertion:** Classification system has undergone several changes over a period of time.
Reason: This is because the criteria for classification gradually get changed.

162. **Assertion:** Deuteromycetes are referred as imperfect fungi
Reason: Sexual stage is not known in these fungi.

PREVIOUS YEAR QUESTIONS

1. Given below is the diagram of a bacteriophage. In which one of the options all four parts A, B, C and D are correct?

[AIPMT MAINS 2010]



(a) A: Tail fibres, B: Head, C: Sheath, D: Collar
(b) A: Sheath, B: Collar, C: Head, D: Tail fibres
(c) A: Head, B: Sheath, C: Collar, D: Tail fibres
(d) A: Collar, B: Tail fibres, C: Head, D: Sheath

2. Select the correct combination of the statements (A-D) regarding the characteristics of certain organisms

[AIPMT MAINS 2010]

(A) Methanogens are archaebacteria which produce methane in marshy areas.
(B) Nostoc is a filamentous blue–green algae which fixes atmospheric nitrogen.
(C) Chemosynthetic autotrophic bacteria synthesize cellulose from glucose.
(D) Mycoplasma lack a cell wall and can survive without oxygen.
The correct statements are:
(a) (B) and (C) (b) (A), (B) and (C)
(c) (B), (C) and (D) (d) (A), (B) and (D)

3. Some hyperthermophilic organisms that grow in highly acidic (pH = 2) habitats belong to the two groups called

[AIPMT PRE 2010]

(a) Eubacteria and archaea
(b) Cyanobacteria and diatoms
(c) Protists and mosses
(d) Liverworts and yeasts

4. Single-celled eukaryotes are included in

[AIPMT PRE 2010]

(a) Protista
(b) Fungi
(c) Archaea
(d) Monera

5. The virus envelope is known as

[AIPMT PRE 2010]

(a) Capsid
(b) Virion
(c) Nucleoprotein
(d) Core

6. Infectious proteins are present in

[AIPMT PRE 2010]

(a) Gemini viruses
(b) Prions
(c) Viroids
(d) Satellite viruses

7. Organisms called methanogens are most abundant in a

[AIPMT PRE 2011]

(a) Cattle yard
(b) Polluted stream
(c) Hot spring
(d) Sulphur rock

8. How many organisms in the list given below are autotrophs?
Lactobacillus, Nostoc, Chara, Nitrosomonas, Nitrobacter, Streptomyces, Saccharomyces, Trypanosoma, Porphyra, Wolffia

[AIPMT MAINS 2012]

(a) Five
(b) Six
(c) Three
(d) Four

9. The most abundant prokaryotes helpful to humans in making curd from milk and in production of antibiotics are the ones categorized as:

[AIPMT PRE 2012]

(a) Cyanobacteria
(b) Archaebacteria
(c) Chemosynthetic autotrophs
(d) Heterotrophic bacteria

10. The cyanobacteria are also referred to as:

[AIPMT PRE 2012]

(a) Protists
(b) Golden algae
(c) Slime moulds
(d) Blue-green algae

11. Which statement is wrong for viruses?

[AIPMT PRE 2012]

(a) All are parasites.
(b) All of them have helical symmetry.
(c) They have the ability to synthesize nucleic acids and proteins.
(d) Antibiotics have no effect on them.

12. Which one single organism or the pair of organisms is correctly assigned to its or their named taxonomic group?

[AIPMT PRE 2012]

(a) Paramoecium and plasmodium belong to the same kingdom as that of penicillium.
(b) Lichen is a composite organism formed from the symbiotic association of an algae and a protozoan.
(c) Yeast used in making bread and beer is a fungus.
(d) Nostoc and Anabaena are examples of protista.

13. Maximum nutritional diversity is found in the group

[AIPMT PRE 2012]

(a) Fungi
(b) Animalia
(c) Monera
(d) Plantae

14. Pigment containing membranous extensions in some cyanobacteria are

[AIPMT PRE 2013]

(a) Heterocysts
(b) Basal bodies
(c) Pneumatophores
(d) Chromatophores

15. The five kingdom system of classification suggested by R. H. Whittaker is not based on

[AIPMT PRE 2014]

(a) Presence or absence of a well defined nucleus
(b) Mode of reproduction
(c) Mode of nutrition
(d) Complexity of body organization

16. Which one of the following fungi contains hallucinogens?

[AIPMT PRE 2014]

(a) Morchella esculenta
(b) Amanita muscaria
(c) Neurospora sp.
(d) Ustilago sp.

17. Archaebacteria differ from eubacteria in

[AIPMT PRE 2014]

(a) Cell membrane structure
(b) Mode of nutrition
(c) Cell shape
(d) Mode of reproduction

18. Anoxygenic photosynthesis is the characteristic of

[AIPMT PRE 2014]

(a) Rhodospirillum
(b) Spirogyra
(c) Chlamydomonas
(d) Ulva

19. Which of the following shows coiled RNA strand and capsomeres?

[AIPMT PRE 2014]

(a) Polio virus
(b) Tobacco mosaic virus
(c) Measles virus
(d) Retrovirus

20. Viruses have

[AIPMT PRE 2014]

(a) DNA enclosed in a protein coat
(b) Prokaryotic nucleus
(c) Single chromosome
(d) Both DNA and RNA

21. A location with luxuriant growth of lichen on the trees indicated that the [AIPMT PRE 2014]

(a) Tress are very healthy
(b) Trees are heavily infested
(c) Location is highly polluted
(d) Location is not polluted

22. Which of the following matches is correct? [AIPMT 2015]

(a) Phytophthora → Aseptate mycelium → Basidiomycetes
(b) Alternania → Sexual reproduction absent → Deuteromycetes
(c) Mucor → Reproduction by conjugation → Ascomycetes
(d) Agaricus → Parasitic fungus → Basidiomycetes

23. The guts of cow and buffalo posses [AIPMT 2015]

(a) Fucus spp
(b) Chlorella spp
(c) Methanogens
(d) Cyanobacteria

24. The imperfect fungi which are decomposers of litter and help in mineral cycling belong to [RE-AIPMT 2015]

(a) Basidiomycetes
(b) Phycomycetes
(c) Ascomycetes
(d) Deuteromycetes

25. Pick up the wrong statement: [RE-AIPMT 2015]

(a) Protista have photosynthetic and heterotrophic modes of nutrition.
(b) Some fungi are edible.
(c) Nuclear membrane is present in Monera.
(d) Cell wall is absent in Animalia.

26. Chromatophores take part in [RE-AIPMT 2015]

(a) Growth
(b) Movement
(c) Respiration
(d) Photosynthesis

27. Which of the following disease is caused by a protozoan? [RE-AIPMT 2015]

(a) Influenza
(b) Babesiosis
(c) Blastomycosis
(d) Syphilis

28. Select the wrong statement [RE-AIPMT 2015]

(a) W.M. Stanley showed that viruses could be crystallized
(b) The term 'contagium vivum fluidum' was coined by M.W. Beijerinek
(c) Mosaic disease in tobacco and AIDS in human being are caused by viruses
(d) The viroids were discovered by D.J. Ivanowsky

29. Cell wall is absent in [RE-AIPMT 2015]

(a) Funaria
(b) Mycoplasma
(c) Nostoc
(d) Aspergillus

30. In which group of organisms the cell walls from two thin overlapping shells which fit together? [RE-AIPMT 2015]

(a) Euglenoids
(b) Dianoflagellates
(c) Slime moulds
(d) Chrysophytes

31. Choose the wrong statement: [RE-AIPMT 2015]
(a) Neurospora is used in the study of biochemical genetics
(b) Morels and Buffles are poisonous mushrooms
(c) Yeast is unicellular and useful in fermentation
(d) Penicillium is multicellular and produces antibiotics

32. Which of the following statements is wrong for viroids? [NEET - I, 2016]
(a) They lack a protein coat
(b) They causes infections
(c) They are smaller than viruses
(d) Their RNA is of high molecular weight

33. Which of the following statements is wrong? [NEET - I, 2016]
(a) Cyanobacteria are also called blue-green algae.
(b) Golden algae are also called desmids.
(c) Eubacteria are also called false bacteria.
(d) Phycomycetes are also called algal fungi.

34. Which of the following would appear as the pioneer organisms on bare rocks? [NEET - I, 2016]
(a) Lichens
(b) Mosses
(c) Liverworts
(d) Green algae

35. Chrysophytes, Euglenoids, Dinoflagellates and Slime moulds are included in the kingdom: [NEET - I, 2016]
(a) Monera
(b) Protista
(c) Fungi
(d) Animalia

36. The primitive prokaryotes responsible for the production of biogas from the dung of ruminant animals, include the: [NEET - I, 2016]
(a) Halophiles
(b) Thermoacidophiles
(c) Methanogens
(d) Eubacteria

37. Which one of the following is wrong for fungi? [NEET - II, 2016]
(a) All fungi possess a purely cellulosic cell wall
(b) They are heterotrophic
(c) They are both unicellular and multicellular
(d) They are eukaryotic

38. Methanogens belong to [NEET - II, 2016]
(a) *Archaebacteria*
(b) *Dianoflagellates*
(c) *Slime moulds*
(d) *Eubacteria*

39. Select the wrong statement: [NEET - II, 2016]
(a) 'Diatomaceous earth' is formed by the cell walls of diatoms
(b) Diatoms are chief producers in the oceans
(c) Diatoms are chief microscopic and float passively in water
(d) The walls of diatoms are easily destructible

NCERT EXEMPLAR QUESTIONS

1. All eukaryotic unicellular organisms belong to
(a) Monera (b) Protista
(c) Fungi (d) Bacteria

2. The five kingdom classification was proposed by
(a) R.H. Whittaker (b) C. Linnaeus
(c) A. Roxberg (d) Virchow

3. Organisms living in salty areas are called as
(a) Methanogens (b) Halophiles
(c) Heliophytes (d) Thermoacidophiles

4. Naked cytoplasm, multinucleated and saprophytic specifications are the characteristics of
(a) Monera (b) Protista
(c) Fungi (d) Slime moulds

5. An association between roots of higher plants and fungi is called
(a) Lichen (b) Fern
(c) Mycorrhiza (d) BGA

6. A dikaryon is formed when
(a) Meiosis is formed
(b) The two haploid cells do not fuse completely
(c) Cytoplasm does not fuse
(d) None of the above

7. *Contagium vivum fluidum* was proposed by
(a) D. J. Ivanovsky (b) M. W. Beijerinck
(b) Stanley (d) Robert Hook

8. The association between mycobiont and phycobiont is found in
(a) Mycorrhiza (b) Root
(c) Lichens (d) BGA

9. Difference between a Virus and a Viroid is
(a) Absence of protein coat in viroid but present in virus.
(b) Presence of low molecular weight RNA in virus but absent in viroid.
(c) Both a and b
(d) None of the above

10. With respect to fungal sexual cycle, choose the correct sequence of events.
(a) Karyogamy, Plasmogamy and Meiosis
(b) Meiosis, Plasmogamy and Karyogamy
(c) Plasmogamy, Karyogamy and Meiosis
(d) Meiosis, Karyogamy and Plasmogamy

11. Viruses are non-cellular organisms but replicate themselves once they infect the host cell. To which of the following kingdom do viruses belong to?
(a) Monera (b) Protista
(c) Fungi (d) None of the above

12. Members of phycomycetes are found in
i. Aquatic habitats
ii. On decaying wood
iii. Moist and damp places
iv. As obligate parasites on plants
Choose from the following options.
(a) None of the above
(b) i and iv
(c) ii and iii
(d) All the above

Answer Keys

Practice Questions

1. (b)	2. (b)	3. (b)	4. (d)	5. (c)	6. (d)	7. (d)	8. (c)	9. (d)	10. (b)
11. (a)	12. (c)	13. (d)	14. (d)	15. (a)	16. (a)	17. (b)	18. (c)	19. (c)	20. (a)
21. (c)	22. (a)	23. (b)	24. (b)	25. (b)	26. (a)	27. (d)	28. (b)	29. (d)	30. (d)
31. (d)	32. (d)	33. (b)	34. (c)	35. (d)	36. (d)	37. (d)	38. (b)	39. (c)	40. (c)
41. (b)	42. (a)	43. (b)	44. (d)	45. (c)	46. (b)	47. (d)	48. (b)	49. (b)	50. (c)
51. (d)	52. (d)	53. (d)	54. (c)	55. (c)	56. (d)	57. (d)	58. (c)	59. (d)	60. (c)
61. (c)	62. (d)	63. (c)	64. (b)	65. (d)	66. (d)	67. (d)	68. (d)	69. (b)	70. (d)
71. (d)	72. (d)	73. (d)	74. (a)	75. (c)	76. (b)	77. (c)	78. (c)	79. (a)	80. (c)
81. (d)	82. (b)	83. (d)	84. (b)	85. (d)	86. (d)	87. (b)	88. (b)	89. (b)	90. (d)
91. (d)	92. (d)	93. (d)	94. (b)	95. (c)	96. (d)	97. (b)	98. (a)	99. (b)	100. (d)
101. (d)	102. (c)	103. (d)	104. (d)	105. (d)	106. (c)	107. (d)	108. (d)	109. (b)	110. (b)
111. (b)	112. (b)	113. (b)	114. (c)	115. (b)	116. (a)	117. (d)	118. (d)	119. (d)	120. (c)
121. (a)	122. (d)	123. (c)	124. (d)	125. (a)	126. (b)	127. (c)	128. (b)		

Assertion and Reason Questions

129. (b)	130. (a)	131. (b)	132. (b)	133. (a)	134. (b)	135. (c)	136. (b)	137. (b)	138. (c)
139. (c)	140. (b)	141. (a)	142. (a)	143. (a)	144. (a)	145. (a)	146. (a)	147. (b)	148. (d)
149. (a)	150. (a)	151. (b)	152. (a)	153. (a)	154. (c)	155. (b)	156. (a)	157. (a)	158. (a)
159. (b)	160. (d)	161. (a)	162. (a)						

Previous Year Questions

1. (c)	2. (d)	3. (a)	4. (a)	5. (a)	6. (b)	7. (a)	8. (b)	9. (d)	10. (d)
11. (b)	12. (c)	13. (c)	14. (d)	15. (a)	16. (b)	17. (a)	18. (a)	19. (b)	20. (a)
21. (d)	22. (b)	23. (c)	24. (d)	25. (c)	26. (d)	27. (b)	28. (d)	29. (b)	30. (d)
31. (b)	32. (d)	33. (c)	34. (a)	35. (b)	36. (c)	37. (a)	38. (a)	39. (d)	

NCERT Exemplar Questions

1. (b)	2. (a)	3. (b)	4. (d)	5. (c)	6. (b)	7. (b)	8. (c)	9. (a)	10. (c)
11. (d)	12. (d)								

CHAPTER

3

Plant Kingdom

PRACTICE QUESTIONS

Classification System

1. Who suggested the five kingdom of classifications?
(a) Robert Hooke (b) Joseph Dalton Hooker
(c) Carolus Linnaeus (d) Whittaker

2. The earliest classification used only
(a) Physiological characters (b) Gross anatomical characters
(c) Gross morphological characters (d) All of these

3. Artificial systems gave equal weightage to
(a) Morphological and anatomical characters
(b) Vegetative and sexual characters
(c) Vegetative and anatomical characters
(d) Morphological and sexual characters

4. _____ characters are easily affected by environment
(a) Sexual (b) Somatic (c) Anatomical (d) All of these

5. Natural classification system developed were
(a) Natural affinities amongst organism (b) Ultra structure and anatomy
(c) Embryology (d) All of these

6. The classification based on evolutionary history was
(a) Phylogenetic classification (b) Artificial classification
(c) Numerical classification (d) None of these

7. Numbers and codes are assigned to the characters in
(a) Cytotaxonomy (b) Chemotaxonomy
(c) Numerical taxonomy (d) None of these

8. Chemotaxonomy is based on
(a) Information of chromosome number, structure and behaviour.
(b) Chemical constituents of plants
(c) All observable characters
(b) Only sexual characters

9. According to phylogenetic classification the organisms belonging to same taxa
(a) Are same in anatomy (b) Have same genetic constituent
(c) Have a common ancestor (d) Have all same characteristics

10. The characters used to classify organism when no fossil evidence is supportive is
(a) Numerical taxonomy (b) Cytotaxonomy
(c) Chemotaxonomy (d) All of these

Algae

11. Chlorophyll bearing, thalloid, simply, autotropic and mainly aquatic organisms are
(a) Bryophytes (b) Protist (c) Algae (d) All of these

12. Filamentous forms of algae are
(a) Ulothrix (b) Spirogyra (c) Chlamydomonas (d) Both (a) and (b)

13. Volvox is a
(a) Unicellular algae (b) Filamentous algae (c) Colonial algae (d) Symbiotic algae

14. The modes of reproduction found in algae are
(a) Vegetative (b) Asexual (c) Sexual (d) All of these

15. Vegetative reproduction in algae is by
(a) Binary fusion (b) Fragmentation (c) Budding (d) Cyst formation

16. Spore formation in algae occur during
(a) Vegetative reproduction (b) Asexual reproduction
(c) Sexual reproduction (d) During germination

17. Isogamy is seen in
(a) Chlamydomonas (b) Spirogyra (c) Both (a) and (b) (d) None of these

18. Algae possesing both isogamy and anisogamy is
(a) Chlamydomonas (b) Volvox (c) Spirogyra (d) Fucus

19. Male gamete is small and motile and female gamete is large and immotile in
(a) Fucus (b) Spirogyra (c) Ulothrix (d) All of these

20. 50 per cent CO_2 fixation on earth is carried out by
(a) Protist (b) Higher plants (c) Algae (d) None of these

21. Marine algae used as food are
(a) Laminaria (b) Sargassum (c) Porphyra (d) All of these

22. Hydrocolloids are secreted by
(a) All of the algae (b) Only brown algae
(c) Only red algae (d) Both red and brown algae

23. Algin is secreted by
(a) All of the algae (b) Only brown algae
(c) Only red algae (d) Both red and brown algae

24. Carrageen is secreted by
(a) All of the algae (b) Only brown algae
(c) Only red algae (d) Both red and brown algae

25. Microbes used in the preparation of ice cream and jellies are grown on the product secreted by
(a) Chlorella (b) Spirullina
(c) Gelidium and gracilaria (d) All of these

26. The algae rich in proteins and used as food by space travellers is
(a) Chlorella (b) Spirullina (c) Both (a) and (b) (d) Laminaria

27. Agar is commercially obtained from
(a) Gelidium and gracilaria (b) Laminaria and spirulina
(c) Chlorella and spirullina (d) Chlamydomonas and spirogyra

28. Green algae are kept in
(a) *Phaeophyceae* (b) Xanthophylls (c) *Xhlorophyceae* (d) *Rhodophyceae*

29. The organism which contain chlorophyll 'a' and 'b' cup-shaped chloroplast and is unicellular is
(a) Spirogyra (b) Chlamydomonas (c) Volvox (d) Ulothrix

30. Dominance of chlorophyll 'a' and 'b', pyrenoids and starch as stored food are found in
(a) Members of *chlorophyceae* (b) Members of *rhodophyceae*
(c) Members of *phaeophyceae* (d) All of these

31. Chlorophyceae are grass green due to the dominance of pigment
(a) Chlorophyll a, c (b) Chlorophyll b, a
(c) Chlorophyll d, c (d) All of these

32. Pyrenoids are located in
(a) Cytoplasm (b) Mitochondria (c) Chloroplast (d) Nucleus

33. Pyrenoids store
(a) Protein (b) Starch (c) Lipids (d) Both (a) and (b)

34. Cell wall of green algae is made up of
(a) Cellulose and pectose
(b) Cellulose and pectin
(c) Inner layer of pectose and outer layer of cellulose
(d) Inner layer of cellulose and outer layer of pectose

35. Zoospores are formed during asexual reproduction of algae and formed in
(a) Sporangia (b) Zoosporangia (c) Microsporangia (d) Megasporangia

36. Sexual reproduction is of isogamous, anisogamous and oogamous in
(a) Chlorophyceae (b) Rhodophyceae
(c) Chlorophyceae and Phaeophyceae (d) Chlorophyceae and Rhodophyceae

37. Algae which are primarily marine is
(a) Red algae (b) Brown algae (c) Green algae (d) All of these

38. Filamentous brown algae is
(a) Spirogyra (b) Laminaria (c) Ectocarpus (d) Porphyra

39. Green algae performs _____ oogamous type sexual reproduction
(a) Sphagnum (b) Volvox (c) Dictyota (d) Spirogyra

40. Kelps represent the group of
(a) Bryophytes (b) Red algae (c) Green algae (d) Brown algae

41. Kelps may reach a height up to
(a) 120 m (b) 100 m (c) 1000 m (d) 10 m

42. The algae which possess chlorophyll a, c, carotenoids and xanthophylls belong to
(a) Green algae (b) Brown algae (c) Both (a) and (b) (d) None of these

43. Brown algae vary in colour from _____ to various shades of _____ depending on the amount of _____ pigment and _____ present in them
(a) fucoxanthin, xanthophyll, blue, brown
(b) blue, brown, fucoxanthin, xanthophyll
(c) yellow, brown, fucoxanthin, xanthophyll
(d) olive green, brown, fucoxanthin, xanthophyll

44. Laminaria and mannitol are stored foods of
(a) Euglena (b) Green algae (c) Liverworts (d) Brown algae

45. The plant body of algae is divided in holdfast, stipe and fronds in
(a) Chara (b) Laminaria (c) Porphyra (d) All of these

46. The plant body attached to substratum in brown algae is by
(a) Rhizoids (b) Multicellular hair (c) Holdfast (d) Roots

47. The photosynthetic leaf like organ found in some of the algae are called
(a) Sporophyll (b) Fronds (c) Leaves (d) Scaly leaves

48. Zoospores of brown algae are
(a) Uniflagellate (b) Multiflagellate
(c) Biflagellate (d) May be any of the above three

49. The arrangement of flagella in brown algae is
(a) One and equally arranged
(b) Two unequal and laterally arranged
(c) Many flagella arranged anywhere on the body
(d) Depends from organism to organism

50. The biflagellate pear-shaped zoospores are characteristics of
(a) Red algae (b) Green algae (c) Brown algae (d) All of these

51. Fertilization in brown algae occurs in
(a) Water (b) Within the oogonia (c) Both (a) and (b) (d) None of these

52. Sexual reproduction shown by members of brown algae is
(a) Isogamous (b) Anisogamous (c) Oogamous (d) All of these

53. Pyriform gametes means
(a) Pea-shaped gametes (b) Pear shaped gametes
(c) Gametes with one flagella (d) All of these

54. Dictyota belongs to
(a) Bryophytes (b) Green algae (c) Brown algae (d) None of these

55. Red algae are red due to the presence of pigment
(a) Phycoerythrin (b) r-phycocyanin (c) r-phycoerythrin (d) r-phepocyamin

56. Red algae are found in
(a) Cold seas (b) Seas with moderate temperature
(c) Warm water (d) None of these

57. Algae found in the areas where no light penetrates is
(a) Green algae (b) Dinoflagellates (c) Red algae (d) Brown algae

58. Algae found in areas with abundant light as well as areas of great depths with no light is
(a) Red algae (b) Green algae (c) Blue algae (d) Brown algae

59. Red algae are mostly
(a) Unicellular (b) Multicellular
(c) May be multicellular and unicellular (d) None of these

60. Floridean starch is stored food found in
(a) Some protist (b) Some bryophytes (c) Some algae (d) Prokaryotes

61. Floridean starch is similar to
(a) Amylopectin (b) Glycogen (c) Fructose (d) Both (a) and (b)

62. The spores and gametes of red algae are
(a) Motile and non-motile (b) Both are motile
(c) Both non-motile (d) Motile spores and non-motile gamete

63. Sexual reproduction of oogamous type is found in
(a) Red algae (b) Green algae (c) Brown algae (d) All of these

64. The most reduced type of sexual reproduction is found in the members of
(a) Red algae (b) Green algae (c) Brown algae (d) All of these

65. _____ reproduction is shown by the members of rhodophyceae.
(a) Oogamous (b) Isogamous (c) Anisogamous (d) All of these

66. Fronds are found in which of the following algae?
I. Laminaria II. Fucus
III. Dictyota IV. Porphyra
(a) I, II, and III (b) I and II (c) II and III (d) All of these

67. Air bladders are shown by
(a) Fucus (b) Laminaria (c) Dictyota (d) All of these

68. How many of the following algae belong to the category of red algae?
Polysiphonia, Gelidium, Laminaria, Spirogyra, Porphyra, Fucus, Chlamydomonas
(a) 2 (b) 3 (c) 4 (d) 5

69. Members of phaeophyceae are
(a) Ectocarpus, dictyota, fucus and sargassum
(b) Ectocarpus, dictyota, fucus and porphyra
(c) Chlamydomonas, volvox, ulothrix
(d) Gracilaria and gelidium

70. Polysulphate esters are present in the cell wall of
(a) Ectocarpus and dictyota (b) Gelidium and gracilaria
(c) Ectocarpus and sargassum (d) Spirogyra and chara

71. Pear-shaped gametes are found in
(a) Ectocarpus, dictyota and fucus (b) Ulothrix, spirogyra, and ectocarpus
(c) Ectocarpus, gelidium and gracilaria (d) None of these

72. The complex post-fertilization events are seen in
(a) Chlorella and spirullina (b) Gracilaria and porphyra
(c) Volvox and ulothrix (d) All of these

Bryophytes

73. Organisms referred to as amphibians of plant kingdom are
(a) Pteridophytes (b) Bryophytes (c) Angiosperms (d) Gymnosperms

74. Bryophytes are found in
(a) Rocky places (b) Hilly areas
(c) Moist and shady places (d) Aquatic areas

75. Organisms that play an important role in plant succession on base rocks are
(a) Mosses (b) Pteridophytes (c) Protist (d) None of these

76. Bryophytes requires _____ for fertilization
(a) Nutrients (b) Water (c) Both (a) and (b) (d) None of these

77. Which of the following statement is incorrect with respect to bryophytes?
(a) The plant body is thallus like, more differentiated than algae and attached to substratum by the help of rhizoids.
(b) The antherozoids are released in water for fertilization.
(c) Zygote formed undergoes meiotic cell division immediately.
(d) They have leaf like, stem like and root like structures.

78. The sporophyte of bryophytes develops after
(a) Reduction division of zygote (b) Multiplication in zygote
(c) Before the formation of zygote (d) None of these

79. Sporophyte of bryophytes is
I. Multicellular body
II. Parasite on gametophyte
III. Partially undergoes reduction division to form spores
IV. Derives the water from gametophytes
(a) II and III (b) III and IV (c) Only I (d) All of these

80. _____ forms gametophyte of bryophytes.
(a) Zygote (b) Sporophyte (c) Gametes (d) Spores

81. The organism having more differentiated plant body than algae is
(a) Protist (b) Mosses (c) Monera (d) None of these

82. The gametophyte possessing leaf like, root like and stem like structure is
(a) Gymnosperm (b) Chlorophyceae (c) Slime molds (d) Mosses

83. The male sex organ of bryophyte is called
(a) Antherozoids (b) Testes (c) Globule (d) None of these

84. The sex organ in bryophytes are
(a) Reduced to single celled stage (b) Multicellular
(c) Net cell developed (d) Formed in sporophyte stage

85. The main plant body of bryophyte is
(a) Haploid (b) Diploid (c) Polyploid (d) All of these

86. Female sex organ of bryophytes is
(a) Oval in shape (b) Irregular
(c) Flask shaped (d) Depends on the organism

87. Female sex organ of bryophyte is called
(a) Nucleus (b) Ovary (c) Oogonia (d) Archegonium

88. Archegonium contains _____ egg cells in bryophytes
(a) More than one (b) Two (c) Four (d) One

89. Division in zygote results in the formation of _____ in bryophytes
(a) Gametophyte (b) Sporophyte (c) Antherozoids (d) Archegonium

90. Gametophyte of bryophyte is
(a) Free living and sporophyte (b) Free living and autotrophic
(c) May be free living or autotropic (d) Always pressure

91. Peat used in transshipment is a product obtained by
(a) Liverworts (b) Phaeophyceae (c) Mosses (d) None of these

92. Organisms which first colonizes the base rocks is
(a) Mosses (b) Mycorrhiza (c) Lichens (d) Both (a) and (c)

93. Mosses are ecologically important because
I. The first organism to colonize base rocks.
II. It decompose rocks making suitable for the growth of higher plant.
III. It forms dense mats on soil.
IV. It reduces the impact of falling rain and soil erosion.
(a) Only I (b) Only II (c) III and IV (d) All of these

94. Peat which is long used as fuel is a product obtained from
(a) Gelidium (b) Species of sphagnum
(c) All mosses (d) All liverworts

95. Organisms participating as pioneers in ecological succession belongs to
(a) Lichens (b) Mosses (c) Liverworts (d) Both (a) and (b)

96. Liverworts are found in
(a) Moist shady places
(b) Banks of steams, marshy ground
(c) Damp soil, bard of trees and deep in the woods
(d) All of the above

97. The thallus of liverworts are
(a) Sexual multiplication of the formation of sex organs called gemmae.
(b) Dorsiventral and appressed to substrate.
(c) Found in xeric habitats.
(d) Diploid

98. Asexual reproduction in liverworts means
(a) Fragmentation of thalli
(b) Formation of specialized structure called gemmae
(c) Both (a) and (b)
(d) None of these

99. Gemmae in liverworts are formed during
(a) Sexual reproduction (b) Asexual reproduction
(c) Spore formation (d) Adverse conduction

100. Marchantia is
(a) An algae (b) Gymnosperm (c) Fern (d) Bryophyte

101. Sexual reproduction in liverworts takes place by
(a) Formation of sex organs always on the same thallus.
(b) Formation of male and female sex organs on different thallus.
(c) Sexual reproduction is absent.
(d) Male and female sex organs may be present on same or different thalli.

102. The sporophyte in liverworts
(a) Is the dominant and main phase of the plant body.
(b) Is differentiated into foot, seta and capsule.
(c) Parasite on the gametophyte
(d) Both (b) and (c)

103. Spore in bryophytes are formed
(a) On the gametophyte (b) On the sporophyte
(c) In the seta of sporophyte (d) In the capsule of sporophyte

104. The gametophyte of bryophyte develops from
(a) A haploid spore (b) A diploid spore (c) Zygote (d) None of these

105. Zygote of bryophyte
(a) Multiply and forms gametophyte
(b) Multiply and forms sporophyte
(c) Undergoes reduction division just after formation
(d) All are correct

106. The dominant stage of gametophyte of mosses consists of
(a) Protonema which develops from the lateral bud
(b) A leafy stage developing from a spore
(c) Both (a) and (b)
(d) A leafy stage developing from the secondary protonema

107. Protonema is found in
(a) Liverworts (b) Selaginella (c) Funaria (d) None

108. Which one is correct about protonema?
(a) It is a dominant stage mosses
(b) Develops from spore
(c) It is creeping, green, branched and frequently filamentous
(d) All are correct

109. Leafy stage in bryophytes
(a) Develops from secondary protonema.
(b) Consist of upright, slender axis and bears consist of alternately arranged leaves.
(c) Attached to the soil through unicellular and branched rhizoids.
(d) All of these

110. Sex organs in mosses develops on
(a) Secondary protonema (b) Leafy stage
(c) On capsule of sporophyte (d) None of these

111. Vegetative reproduction in mosses takes place by
(a) Fragmentation and budding in secondary protonema
(b) Binary fission
(c) Spore dispersal
(d) All of these

112. Sporophyte of mosses is more elaborated from
(a) Ferns (b) Pinus (c) Polytrichum (d) Marchantia

113. Spores in bryophytes are formed by
(a) Mitosis (b) Meiosis in gametophyte
(c) Mitosis in zygote (d) Meiosis in zygote

114. Elaborate mechanism of spore dispersal is found in
(a) Ferns (b) Mosses (c) Liverworts (d) None of these

115. Sphagnum belongs to
(a) Ferns (b) Liverworts (c) Mosses (d) None of these

116. The plants frequently grown as ornamentals and are used for medicinal purpose belong to
(a) Angiosperms (b) Pteridophytes (c) Algae (d) Some protist

117. The first terrestrial plants to posses vascular tissues are
(a) Gymnosperms (b) Bryophyte (c) Pteridophytes (d) All of these

118. The main plant body of pteridophytes is
(a) Gametophytes as well as sporophyte (b) Sporophyte
(c) None of these (d) Both (a) and (b)

119. The plant body of pteridophyte is
(a) Not well-developed
(b) Lacks vascular tissue
(c) Is thalloid
(d) Posses true root, leaves and stem

120. Pteridophytes have only
(a) Small microphyllous leaves
(b) Large macrophyllous leaves
(c) Both microphyllous as well as macrophyllous in some of the ferns
(d) All of the above

121. Which one is false about pteridophyte?
(a) They flourish well moist and shady condition
(b) They are found in cool damp and shady place
(c) The xylem posses vessels
(d) None of these

122. Prothallus is the gametophyte of
(a) Bryophytes (b) Algae (c) Pteridophyte (d) Gymnosperm

123. The gametophyte of pteridophyte grows in damp, moist and shady places because
(a) They are limited and restricted to a narrow geographical region.
(b) They need water for fertilization of gametes formed on the gametophyte.
(c) Water is required for gametogenesis.
(d) Egg cell swims in water to reach to the antheridia.

124. Gametophyte of pteridophyte
(a) Parasite on sporophyte
(b) Not a free living stage
(c) Photosynthetical and free living
(d) Is unicellular

125. Vascular plants which do not bear seeds is
(a) Angiosperms (b) Pteridophytes (c) Gymnosperms (d) None of these

126. Macrophylls leaves are characteristics of
(a) Mosses (b) Ferns (c) Funaria (d) None of these

127. Pteridophyte having microphylls is
(a) Ferns (b) Psilotum (c) Selaginella (d) All of these

128. The production of spores by the spore mother cells is the result of
(a) Mitosis
(b) Meiosis
(c) Mitosis and meiosis both
(d) Amitosis

129. The leaves bearing sporangia are called
(a) Sporophylls (b) Fronds (c) Tropophylls (d) Scaly leaves

130. Cones in pteridophytes are formed in
(a) Salvinia
(b) Selaginella and lycopodium
(c) Dryopteris
(d) Selaginella and Equisetum

131. Spores in pteridophytes give rise to
(a) Sporophyte
(b) Parasite gametophyte
(c) Free living gametophyte
(d) Free living sporophyte

132. Which of the following are correct about pteridophytes?
I. The sporophytes bear sporangia that are formed on the sporophylls.
II. They are frequently grown as ornamentals.
III. They are the first terrestrial plants to forms seeds.
IV. Vascular tissues are absent in pteridophytes.
V. some species flourish well in sandy soil conditions.
(a) V and IV (b) I, II and IV (c) III, IV and V (d) I and II

133. Sex organs in pteridophytes are formed on the
(a) Multicellular well-developed sporophyte.
(b) Multicellular main gametophyte phase of the plant.
(c) Photosynthetic, free living gametophyte.
(d) Parasite, gametophyte dependent on sporophyte.

134. The male and female sex organs of pteridophyte are called
(a) Globule and nucule respectively
(b) Antheridia and archegonia respectively
(c) Spermatangia and oogonia respectively
(d) Tests and ovary respectively

135. Zygote of pteridophyte
(a) Undergoes reduction division just often formation
(b) Produces multicellular gametophyte
(c) Produces multicellular sporophyte
(d) Remains dormant

136. Majority of the pteridophytes are
I. Homosporous and produce only one kind of spores.
II. Aquatic in nature.
III. Heterosporus and produce small and large spores.
IV. Restricted to narrow geographical zone because of specific requirement of water.
(a) I and II (b) II and III (c) III and IV (d) IV and I

137. Heterosporous pteridophytes are
(a) Dryopteris and pteris (b) Selaginella and lycopodium
(c) Selaginella and salvinia (d) Equisetum and Adiantum

138. Heterosporous plants are
(a) Plants producing one kind of spores.
(b) Plants producing large and small spores.
(c) Plants producing two type of spores which are similar in size.
(d) None of these

139. Megaspore germinate into
(a) Female gametophyte
(b) Gametophyte having both male and female sex organs
(c) Male gametophyte
(d) Male sporophyte

140. The female gametophytes are retained on the parent sporophyte in
(a) Homosporous species of pteridophytes
(b) Heterosporous species of pteridophytes
(c) Both are correct
(d) Both are incorrect

141. Process similar to seed habit considerably is observed in
(a) Homosporous species of pteridophytes
(b) Heterosporous species of pteridophyte
(c) All the members of pteridophytes
(d) Not seen in pteridophyte

142. Vascular plants, with seeds but no fruits are
(a) Bryophyte (b) Angiosperms (c) Gymnosperms (d) Pteridophytes

143. In heterosporous pteridophyte
(a) Zygote develops into young embryo in the female gametophyte.
(b) Zygote multiples and develop into sporophyte in the soil.
(c) All spores are similar
(d) None of these

144. Naked seed plants are
(a) Algae (b) Bryophyte (c) Angiosperms (d) Gymnosperms

145. Ovules are not enclosed by the ovaries in
(a) Pteridophytes (b) Angiosperms
(c) Gymnosperms (d) All of these

146. The tallest gymnosperms is
(a) Sequoia (red wood tree) (b) Pinus
(c) Cycas (d) Ginkgo

147. Coralloid roots having association with N_2 fixing bacteria are found in
(a) Pinus (b) Cedrus (c) Sequoia (d) Cycas

148. In gymnosperms, the mycorrhizal association are found in
(a) Cycas (b) Pinus (c) Cedrus (d) All of these

149. Gymnosperms
(a) Are naked seeds plants (b) Have tap roots
(c) Are heterosporous (d) All of these

150. Which of the following are correct for gymnosperms?
I. Have adventitious root system.
II. The leaves in gymnosperms can withstand extreme temperature, humidity and wind.
III. Microspores are produced in microsporangia.
IV. They include medium or tall sized trees and shrubs.
(a) I and III (b) I, II and II (c) II, III and IV (d) I and IV

151. In cycas
(a) The stems are unbranched.
(b) The pinnately compound leaves persist for years.
(c) Have symbiotic association with n_2 fixing cynobacteria.
(d) All are correct.

152. Which of the following statements are correct for conifers?
I. Needle like leaves to reduce surface area.
II. Thick cuticle on leaves.
III. Sunken stomata to reduce water loss.
IV. The main plant body is gametophyte.
(a) II and III (b) IV only (c) I only (d) II, I and III

153. Which of the following are correct for gymnosperms?
I. They are heterosporous.
II. They are the first vascular plants.
III. Posses fruits
IV. Requires water for fertilization.
(a) I (b) I and II (c) II and III (d) I, II, III and IV

154. Which of the following sequence is correct?
(a) Strobili–Sporophylls Sporangia Spores
(b) Strobili–Sporangia Sporophylls Spores
(c) Sporophylls–Strobili Sporangia Spores
(d) Spores–Sporangia Strobili Cones

155. Male gametophyte which is highly reduced and confined to only limited numbers of cells is called
(a) Antherozoid (b) Spermatozoid
(c) Pollen grain (d) All of these

156. Male and female cones are formed on the same tree of
(a) Cycas (b) Pinus (c) Both (a) and (b) (d) None of these

157. In gymnosperms
(a) Pollen grains germinate inside the ovary.
(b) The development of pollen grain takes place within the microsporangia.
(c) The cones barring megasporophylls are called male cones or male strobili.
(d) All are correct

158. Megaspore mother cell
(a) Develops from one of the cell of nucleus (b) Forms four megaspore after meiosis
(c) Formed in the megasporangium (d) All of these

159. The female gametophyte of gymnosperms
(a) Bear two archegonia (b) Retained within megasporangium
(c) Is unicellular (d) Both (a) and (b)

160. In gymnosperms, the male and female gametophyte
I. Do not have independent free living existence.
II. Remain within the sporangia retained on parent sporophyte.
III. May be born on same or different tree.
IV. Perform meiosis to produce gametes.
(a) I and II (b) II and III (c) III and IV (d) All

161. Pollination in gymnosperms takes place by
(a) Wind (b) Water
(c) Only physical factors like wind and water (d) All of these

162. Angiosperms include
(a) Vascular plants with naked seeds
(b) Vascular plants with covered seeds
(c) Few vascular plants with naked seeds
(d) Few vascular plants with covered seeds

163. Microscopic angiosperm is
(a) Sequoia (b) Eucalyptus
(c) Wolfia (d) Never microscopic

164. Angiosperms include
(a) Massive woody trees
(b) Shrubs and herbs
(c) Ranges from tiny microscopic plants to tall trees
(d) None of these

165. The height of eucalyptus tree is approximately
(a) 100 m (b) 1000 m (c) 10 m (d) 10–20 m

166. Male sex organ in angiosperm is located in
(a) Male cone (b) Sporophyll (c) Flower (d) Carpel

167. Male sex organ in flower is
(a) Antheridia (b) Stamens (c) Spermatangia (d) Nucule

168. The female sex organ of flower is called
(a) Archegonia (b) Nucule (c) Oogonia (d) Pistil

169. The pistil in flower encloses
(a) One ovule (b) Only two ovules
(c) Three ovules (d) One too many ovules

170. Embryo sacs in angiosperms is
(a) Male gametophyte (b) Well-developed female gametophyte
(c) Highly reduced female gametophyte (d) Well-developed female sporophyte

171. Embryo sac of angiosperms posses
(a) Egg apparatus (b) Synergids (c) Antipodal (d) All of these

172. Egg apparatus of angiosperms contain
(a) One egg cell (b) Two synergids
(c) Both (a) and (b) (d) Two antipodals

173. The cells of embryo sac are
(a) Diploid (b) Haploid
(c) May be haploid or diploid (d) None of these

174. Diploid secondary nucleus in embryo sac of angiosperm is the product of
(a) Fusion of two synergid cells (b) Fusion of two antipodal cells
(c) Fusion of two polar nuclei (d) Fusion of egg cell and antipodal cell

175. The pistil in angiosperm is made up of
(a) Ovary (b) Stigma (c) Style (d) All of these

176. Ovary is the characteristic feature of
(a) Gymnosperms (b) Angiosperm (c) Pteridophyte (d) All of these

177. In double fertilization
(a) Male gamete fuses with egg cell to form zygote.
(b) Male gamete fuses with diploid endosperm nucleus to produce triploid primary endosperm nucleus.
(c) Both (a) and (b)
(d) Fertilization takes place in two plants simultaneously.

178. Synergids and antipodals
(a) Develop into new plants (b) Are diploid
(c) Degenerate after fertilization (d) Are produced in male gametophyte

179. Fruit formation in angiosperm takes place by
(a) Development of ovule after fertilization
(b) Development of ovary after fertilization
(c) Axillary bud
(d) Terminal bud

180. Double fertilization is the unique characterisitic feature of
(a) Angiosperm (b) Gymnosperm
(c) Pteridophyte (d) Dicotyledons only

181. Zygote after multiplication in angiosperm develop in
(a) Endosperm (n) (b) Embryo (n)
(c) Endosperm (d) Embryo (2n)

182. Endosperm in angiosperm is formed
(a) Before fertilization (b) After fertilization
(c) Vary from species to species (d) All of these

183. Meiosis in plants can take place in
(a) Only haploid species
(b) Only diploid species
(c) Both in haploid as well as diploid species
(d) None of these

184. The haploid plant body produces _____ and is referred to as _____
(a) spores, sporophyte (b) gametes, gametophyte
(c) zoospores, zoosporangia (d) conidia, conidiophores

185. Haploid spore divides by _____ to form haploid plant body
(a) Mitosis (b) Meiosis (c) Amitosis (d) Any of these

186. In haplontic life cycle, the sporophytic generation is seen by
(a) Well-developed multicellular sporophyte
(b) Zygote
(b) Embryo
(d) None of these

187. In haplontic life cycle, the zygote divides by
(a) Mitosis (b) Meiosis (c) Any of these (d) Amitosis

188. Volvox, spirogyra chlamydomonas come under
(a) Haplodiplontic life cycle organism (b) Diplohaplontic organism
(c) Haplontic life cycle (d) Diplontic life cycle

189. Sporophyte, dominant, photosynthetic and independent phase of plant represents
(a) Haplontic (b) Diplontic
(c) Diplohaplontic life cycle (d) Both (b) and (c)

190. Diplontic life cycle is seen in
(a) Angiosperms and gymnosperms (b) Spermatophytes
(c) Both (a) and (b) (d) Pteridophyte

191. When both the phases of life cycle are multicellular, i.e., haploid and diploid phases are more than one celled
(a) Life cycles are called haplodiplontic
(b) They differ in the dominant phase
(c) They are in pteridophytes and bryophytes
(d) All of these

192. In bryophytes
(a) Dominant, diploid, multicellular sporophyte alters dominant with multicellular gametophytes.
(b) Dominant haploid multicellular gametophyte alters with diploid sporophyte.
(c) The plant body shows diplontic life cycle.
(d) The plant body shows haplontic life cycle.

193. Most of the alga show
(a) Haplontic life cycle (b) Diplontic life cycle
(c) Haplodiplontic life cycle (d) None of these

194. Algae showing haplodiplontic life cycle are
(a) Spirullina and spirogyra (b) Ectocarpus and polysiphonia
(c) Kelps (d) Both (b) and (c)

195. Which alga shows diplontic life cycle?
(a) Chara (b) Fucus (c) Ectocarpus (d) Polysiphonia

196. How many organisms show haplodiplontic life cycle?
Sphagnum, Volvox, Ulothrix, Marchantia, Polytrichum, Selaginella, Pinus, Cedrus, Ectocarpus, Polysiphonia
(a) 8 (b) 6 (c) 7 (d) 9

197. How many organisms show diplontic life cycle?
Selaginella, Equisetum, Cycas, Cedrus, Ectocarpus, Fucus, Sequoia
(a) 7 (b) 5 (c) 4 (d) 6

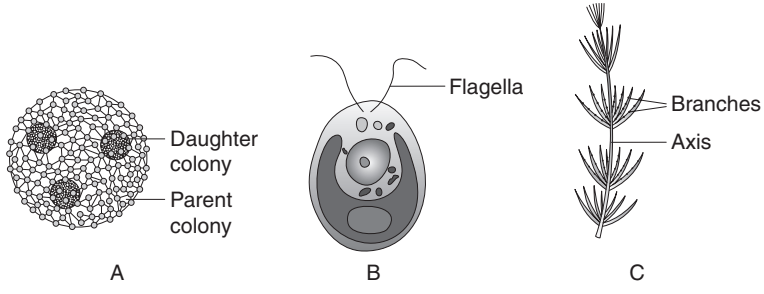
198. Which of the organisms show haplontic life cycle?
(a) Chlamydomonas, volvox (b) Ectocarpus, polysiphonia
(c) Fucus (d) All of these

199. In diplontic life cycle gametogenesis takes place by
(a) Mitosis (b) Meiosis
(c) Both (a) and (b) (d) Neither mitosis nor meiosis

200. Gametogenesis in organism showing haplontic life cycle takes place in
(a) Mitosis (b) Meiosis (c) Both (a) and (b) (d) Amitosis

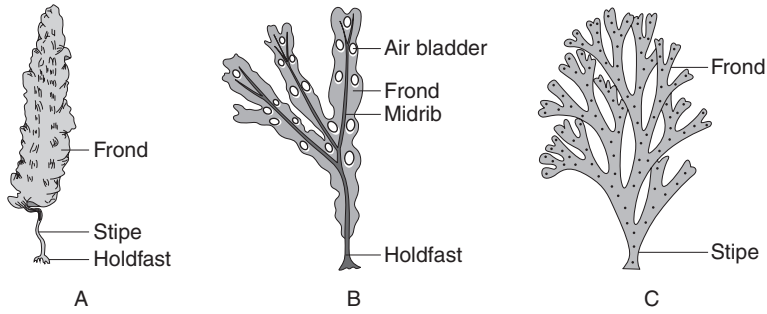
Diagram Related Questions

201. Identify a, b, c in diagram:



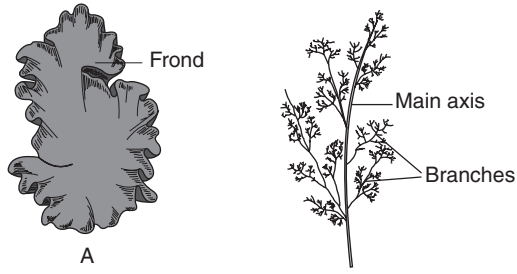
(a) A– Volvox, B–Chlamydomonas, C–Chara (b) A–Chara, B–Volvox, C–Chlamydomonas
(c) A–Chlamydomonas, B–Chara, C–Volvox (d) A–Chara, B–Chlamydomonas, C–Volvox

202. Identify a, b, c in diagram:



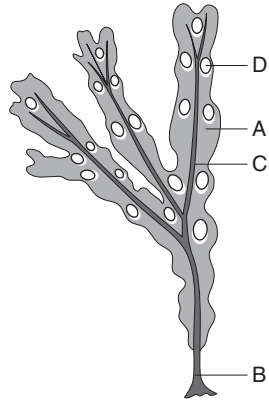
(a) A–Fucus, B–Laminaria, C–Dictyota
(b) A–Laminaria, B–Dictyota, C–Fucus
(c) A–Laminaria, B–Fucus, C–Dictyota
(d) A–Dictyota, B–Fucus, C–Laminaria

203. Identify A and B:



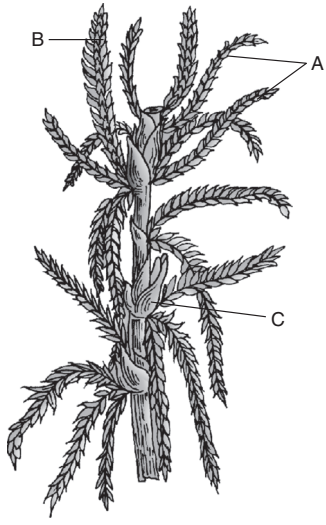
(a) A–Porphyra, B–Laminaria
(b) A–Porphyra, B–Polysiphonia
(c) A–Polysiphonia, B–Porphyra
(d) A–Volvox, B–Chara

204. Identify the A, B, C and D shown in this figure?



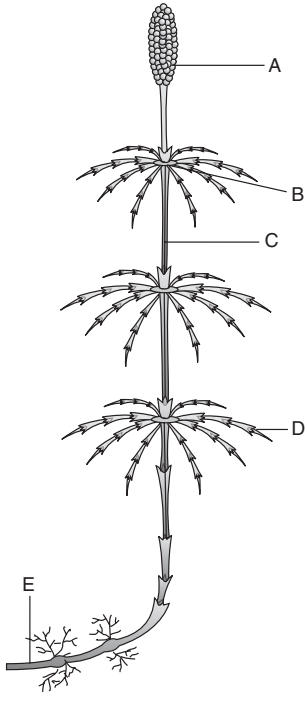
(a) A–Holdfast, B–Air bladder, C–Midrib, D–Frond
(b) A–Frond, B–Midrib, C–Air bladder, D–Holdfast
(c) A–Air bladder, B–Midrib, C–Holdfast, D–Frond
(d) A–Frond, B–Holdfast, C–Midrib, D–Air bladder

205. Identify the A, B and C shown in this figure?



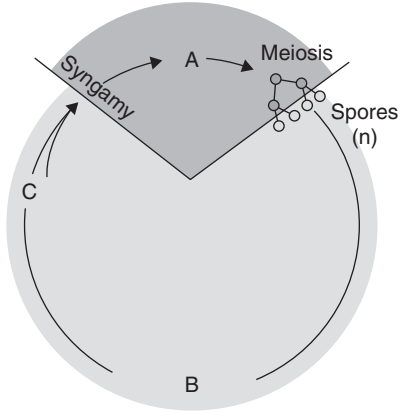
(a) A–Branches, B–Antheridial branch, C–Archegonial branch
(b) A–Antheridial branch, B–Branches, C–Archegonial branch
(c) A–Branches, B–Archegonial branch, C–Antheridial branch
(d) A–Archegonial branch, B–Archegonial branch, C–Branches

206. What indicates A to E in the below figure?



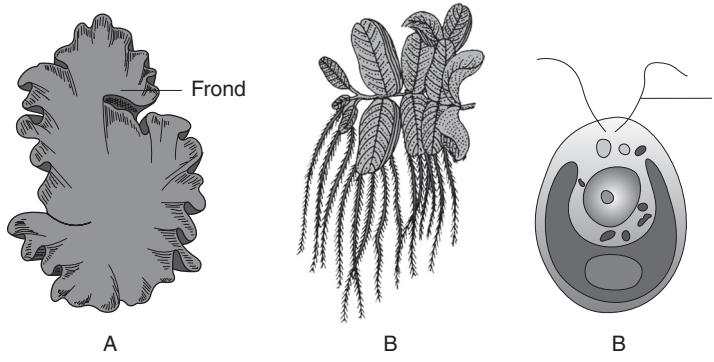
(a) A–Node, B–Rhizome, C–Internode, D–Strobilus, E–Branch
(b) A–Strobilus, B–Node, C–Internode, D–Branch, E–Rhizome
(c) A–Branch, B–Internode, C–Strobilus, D–Node, E–Rhizome
(d) A–Strobilus, B–Node, C–Branch, D–Internode, E–Rhizome

207. Identify the A, B and C shown in this figure?



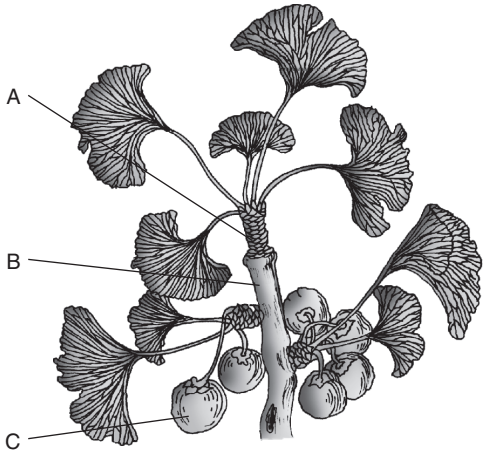
(a) A–Gametophyte (n), B–Zygote (2n), C–Gametogenesis
(b) A–Zygote (2n), B–Gametophyte (n), C–Gametogenesis
(c) A–Zygote (2n), B–Gametogenesis, C–Gametophyte (n)
(d) A–Gametogenesis, B–Zygote (2n), C–Gametophyte (n)

208. Identify the A, B and C.



(a) A–Salvinia, B–Chlamydomonas, C–Porphyra
(b) A–Chlamydomonas, B–Porphyra, C–Salvinia
(c) A–Porphyra, B–Salvinia, C–Chlamydomonas
(d) A–Chlamydomonas, B–Salvinia, C–Porphyra

209. What indicates A, B and C in this figure.



(a) A–Dwarf shoot, B–Long shoot, C–Seeds
(b) A–Long shoot, B–Seeds, C–Dwarf shoot
(c) A–Long shoot, B–Dwarf shoot, C–Seeds
(d) A–Seeds, B–Long Shoot, C–Dwarf Shoot

ASSERTION AND REASON QUESTIONS

Read the **assertion** and reason *carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false

210. **Assertion:** The earliest systems of classification used only superficial morphological characters.
Reason: Artificial system gave equal weightage to vegetative and sexual characterstics.

211. **Assertion:** Cytotaxonomy is based on the cytological information like chromosome number, structure and behaviour.
Reason: Chemotaxonomy that uses the chemical constituents of the plants.

212. **Assertion:** In some species of Chlamydomonas, the fusion of gamete is termed as anisogamous.
Reason: Because gametes which undergo fusion in these species are of dissimilar in size.

213. **Assertion:** Bryophytes are called amphibian of plant kingdom.
Reason: These plants live in soil but are dependent on water for sexual reproduction.

214. **Assertion:** Mosses along with lichens are the first organisms to colonize rocks.
Reason: They decompose rocks by scereting acid substances.

215. **Assertion:** Pteridophytes are used for medicinal purposes and soil binders.
Reason: They are the first terrestrial plants to possess vascular tissues.

216. **Assertion:** Only the red algae is able to flourish at the great depth of sea.
Reason: Red algae has the pigments r-phycoerythrin and r-phycocyanin.

217. **Assertion:** Gymnosperms are heterosporous.
Reason: They produce haploid microspores and megaspores.

218. **Assertion:** PEN is triploid in angiosperm.
Reason: PEN is formed by fusion of haploid male gamete with the dipoid secondary nucleus.

219. **Assertion:** The cells of highly reduced female gametophyte (embryo sac in angiosperm) is haploid.
Reason: The embryosac is formed by meiosis.

220. **Assertion:** In pinus the coralloid roots are associated with nitrogen fixing cynobacteria.
Reason: In Cycas, mycorrhiza is present.

221. **Assertion:** Cyanobacteria included in kingdom Plantae.
Reason: Cyanobacteria belong to algae.

222. **Assertion:** Algae are autotrophic.
Reason: Algae contain chlorophyll pigments.

223. **Assertion:** Half of the total CO_2 fixation on earth is carried out by algae.
Reason: Algae increases the level of dissolved oxygen in their nearby environment.

224. **Assertion:** Pyrenoids are storage bodies.
Reason: Pyrenoids contains starch and proteins.

225. **Assertion:** Rhodophytes of shallow water body do not appear reddish.
Reason: Rhodophytes of shallow water body have lesser synthesis of phycoerythrin.

226. **Assertion:** Phaeophyceae are brown algae.
Reason: Phaeophyceae contain large amount of xanthophyll pigment called fucoxanthin which gives brown colour.

227. **Assertion:** Chlorella used as a food supplement by space travellers.
Reason: Chlorella is unicellular green algae.

228. **Assertion:** Sphagnum is used for transhipment of living material like seedlings.
Reason: Sphagnum has capacity of water retention.

229. **Assertion:** Pteridophytes evolutionarily, are first terrestrial vascular plants.
Reason: Pteridophytes are soil binders

230. **Assertion:** Development of zygote into young embryo takes places within the female gametophytes in Pteridophytes
Reason: This event is a precursor to seed habit, considered an important step in evolution.

231. **Assertion:** Algae are useful to man.
Reason: At least half of the total CO_2 fixation on earth is carried out by algae.

232. **Assertion:** Algae increases level of dissolved oxygen in their immediate environment.
Reason: They show oxygenic photosynthesis

233. **Assertion:** Rhodophyceae commonly known as red algae.
Reason: Their body predominantly contain red pigment r-prycoerythrin.

234. **Assertion:** The spread of living Pteridophytes is restricted to narrow geographical region.
Reason: They require cool, damp and shady place to grow and require water for fertilization.

235. **Assertion:** Sexual reproduction in volvox is oogamous type.
Reason: Both of fusing gamete of volvox is non flagellated and similar in size.

236. **Assertion:** Bryophytes are of great ecology importance.
Reason: Bryophytes play important role in plant succession on bare rocks.

237. **Assertion:** Leaves of gymnosperm can't withstand extremes of temperature.
Reason: Leaves of gymnosperm posses' large surface area with thin cuticle.

238. **Assertion:** Volvox show diplontic type of life cycle.
Reason: They show free living sporophyte.

239. **Assertion:** Most algae show haplontic type of life cycle.
Reason: They show free living sporophyte

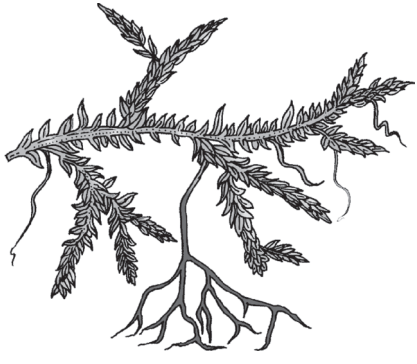
240. **Assertion:** Most algae show haplontic type of life cycle.
Reason: A Fucus alga shows diplontic type of life cycle.

241. **Assertion:** Pollination in angiosperm is occurred by means of wind only.
Reason: Pollen grains in angiosperm are developed from filament.

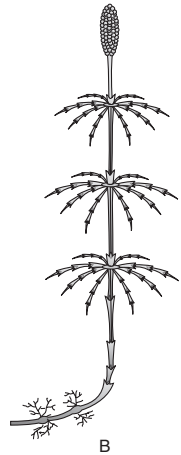
PREVIOUS YEAR QUESTIONS

1. Examine the figures A, B, C and D. In which one of the four options all the items A, B, C and D are correct?

[AIPMT MAINS 2010]



A



B

C

D

(a) A: Chara, B; Marchantia, C: Fucus, D: Pinus
(b) A: Equisetum, B: Ginkgo, C: Selaginella, D: Lycopodium
(c) A: Selaginella, B: Equisetum, C; Salvinia, D: Ginkgo
(d) A: Funaria, B: Adiantum, C: Salvinia, D: Riccia

2. Male and female gametophytes are independent and free-living in

[AIPMT PRE 2010]

(a) Mustard
(b) Castor
(c) Pinus
(d) Sphagnum

3. Algae have cell wall made up of

[AIPMT PRE 2010]

(a) Cellulose, galactans and mannans
(b) Hemicellulose, pectins and proteins
(c) Pectins, cellulose and proteins
(d) Cellulose, hemicellulose and pectins

4. Consider the following four statements and specify whether they are correct or wrong.

[AIPMT MAINS 2011]

(A) The sporophyte in liverworts is more elaborate than that in mosses.
(B) Salvinia is heterosporous.
(C) The life-cycle in all seed-bearing plants is diplontic.
(D) In Pinus, the male and female cones are born on different trees.
The two wrong statements together are

(a) A and C
(b) A and D
(c) B and C
(d) A and B

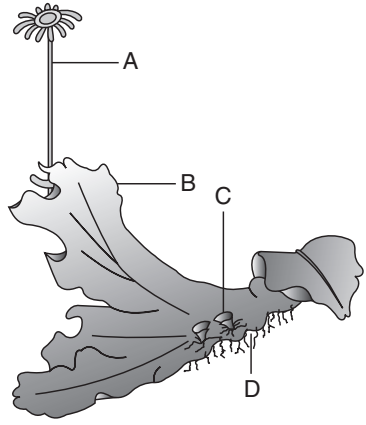
5. Selaginella and Salvinia are considered to represent a significant step towards the evolution of seed habit because

[AIPMT MAINS 2011]

(a) Female gametophyte is free and gets dispersed like seeds.
(b) Female gametophyte lacks archegonia.
(c) Megaspores possess endosperm and embryo surrounded by seed coat.
(d) Embryo develops in the female gametophyte which is retained on parent sporophyte.

6. Examine the figure given below and select the correct option giving all the four parts (A, B, C and D) correctly identified.

[AIPMT MAINS 2011]



(a) A: Archegoniophore, B: Female thallus, C: Gemma cup, D: Rhizoids
(b) A: Archegoniophore, B: Female thallus, C: Bud, D: Food
(c) A: Seta, B: Sporophyte, C: Protonema, D: Rhizoids
(d) A: Antheridiophore, B: Male thallus, C: Globule, D: Roots

7. Compared with the gametophytes of the bryophytes, the gametophytes of vascular plants tends to be

[AIPMT PRE 2011]

(a) Larger but to have smaller sex organs
(b) Larger and to have large sex organs
(c) Smaller and to have smaller sex organs
(d) Smaller but to have larger sex organs

8. The gametophyte is not an independent, free living generation in

[AIPMT PRE 2011]

(a) Adiantum (b) Marchantia
(c) Pinus (d) Polytrichum

9. Archegoniophore is present in

[AIPMT PRE 2011]

(a) Chara (b) Adiantum
(c) Funaria (d) Marchantia

10. A prokaryotic autotrophic nitrogen fixing symbiont is found in

[AIPMT PRE 2011]

(a) Cycas (b) Cicer
(c) Pisum (d) Alnus

11. Read the following five statements (A - E) and answer as asked next to them.

[AIPMT MAINS 2012]

(A) In Equisetum, the female gametophyte is retained on the parent sporophyte.
(B) In Ginkgo, the male gametophyte is not independent.
(C) The sporophyte in Riccia is more developed than that in Polytrichum.
(D) Sexual reproduction in Volvox is isogamous.
(E) The spores of slime moulds lack cell walls.
How many of the above statements are correct?

(a) Three (b) Four
(c) One (d) Two

12. In the five-kingdom classification, Chlamydomonas and Chlorella have been included in [AIPMT MAINS 2012]

(a) Algae (b) Plantae
(c) Monera (d) Protista

13. Which one of the following pairs is wrongly matched? [AIPMT MAINS 2012]

(a) Salvinia – Prothallus (b) Viroids – RNA
(c) Mustard – Synergids (d) Ginkgo – Archegonia

14. Cycas and Adiantum resemble each other in having [AIPMT PRE 2012]

(a) Seeds (b) Motile Sperms
(c) Cambium (d) Vessels

15. Which one of the following is a correct statement? [AIPMT PRE 2012]

(a) Pteridophyte gametophyte has a protonemal and leafy stage.
(b) In gymnosperms, the female gametophyte is free living.
(c) Antheridiophores and archegoniophores are present in pteridophyte.
(d) Origin of seed habit can be traced in pteridophytes.

16. Select the wrong statement: [AIPMT 2013]

(a) Isogametes are similar in structure, function and behaviour.
(b) Anisogametes differ either in structure, function or behaviour.
(c) In Oomycetes the female gamete is smaller and motile, while the male gamete is larger and non-motile.
(d) Chlamydomonas exhibits both isogamy and anisogamy and Fucus shows oogamy.

17. Isogamous condition with non-flagellated gametes is found in [AIPMT 2013]

(a) Chlamydomonas (b) Spirogyra
(c) Volvox (d) Fucus

18. Besides paddy fields, cyanobacteria are also found inside the vegetative part of [AIPMT 2013]

(a) Pinus (b) Cycas
(c) Equisetum (d) Psilotum

19. Megasporangium is equivalent to [AIPMT 2013]

(a) Embryo sac (b) Fruit
(c) Nucellus (d) Ovule

20. Read the following statements (A to E) and answer the question which follows them.
(A) In liverworts, mosses, and ferns the gametophytes are free-living.
(B) Gymnosperms and some ferns are heterosporous.
(C) Sexual reproduction in Fucus, Volvox and Albugo is oogamous.
(D) The sporophyte in liverworts is more elaborate than that in mosses.
(E) Both, Pinus and Marchantia are dioecious.
How many of the above statements are correct?
[AIPMT 2013]
(a) One (b) Two
(c) Three (d) Four

21. Which one of the following shows isogamy with non-flagellated gametes?
[AIPMT 2014]
(a) Sargassum (b) Ectocarpus
(c) Ulothrix (d) Spirogyra

22. Which one of the following is responsible for peat formation?
[AIPMT 2014]
(a) Marchantia (b) Riccia
(c) Funaria (d) Sphagnum

23. Read the following given statements (A to E) and select the option with all correct statements:
(A) Mosses and Lichens are the first organisms. [AIPMT 2015]
(B) *Selaginella* a homosporous pteridophyte.
(C) Coralloid roots in *Cycus* have VAM.
(D) The main plant body in bryophytes is gametophyte where as in pteridophytes it is saprophytic.
(E) In gymnosperms, the male and female gametophytes are present within sporangia located to sporophyte.
(a) (A), (C) and (D)
(b) (B), (C) and (D)
(c) (A), (D) and (E)
(d) (B), (C) and (E)

24. Which of the following gametophyte is not independent free living?
[AIPMT 2015]
(a) Funaria (b) Marchantia
(c) Pteris (d) Pinus

25. Which one of the following statements is wrong?
[AIPMT 2015]
(a) Algin and carrageen are products of algae.
(b) Agar–agar is obtained from Gelidum and Gmeilaria.
(c) Chlorella and Spirulina are used as space food Mannitol and is stored food in Rhodophyceae.
(d) Mannitol is the stored food in Rhodophyceae

26. Male gametes are flagellated in [AIPMT 2015]
(a) *Polysiphonia* (b) *Anabaena*
(c) *Ectocarpus* (d) *Spirogyra*

27. Which one is a wrong statement? [RE-AIPMT 2015]

(a) Mucor has biflagellate zoospores
(b) Haploid endosperm is typical feature of gymnosperms
(c) Brown algae have chlorophyll a and c, and fucoxanthin
(d) Archegonia are found in Bryophyta, Pteridophyta and Gymnosperms

28. Select the correct statement: [NEET - I, 2016]

(a) Gymnosperms are both homosporous and heterosporous
(b) *Salvinia*, *ginkgo* and *Pinus* all are gymnosperms
(c) *Sequoia* is one of the tallest trees
(d) The leaves of gymnosperms are not well adapted to extremes of climate

29. Conifers are adapted to tolerate extreme environmental conditions because of [NEET - II, 2016]

(a) Superficial stomata (b) Thick cuticle
(c) Presence of vessels (d) Broad hardy leaves

30. Which one of the following statements is wrong? [NEET - II, 2016]

(a) Algin is obtained from red algae, and carrageen an from brown algae
(b) Agar-agar is obtained from Gelidium and Gracilaria
(c) Laminaria and Sargassum are used as food
(d) Algae increase the level of dissolved oxygen in the immediate environment

NCERT EXEMPLAR QUESTIONS

1. Cyanobacteria are classified under

(a) Protista (b) Plantae
(c) Monera (d) Algae

2. Fusion of two motile gametes which are dissimilar in size is termed as

(a) Oogamy (b) Isogamy
(c) Anisogamy (d) Zoogamy

3. Holdfast, stipe and frond constitutes the plant body in case of

(a) *Rhodophyceae* (b) *Chlorophyceae*
(c) *Phaeophyceae* (d) All of the above

4. A plant shows thallus level of organization. It shows rhizoids and is haploid. It needs water to complete its life cycle because the male gametes are motile. Identify the group to which it belong to

(a) Pteridophytes (b) Gymnosperms
(c) Monocots (d) Bryophytes

5. A prothallus is

(a) A structure in pteridophytes formed before the thallus develops.
(b) A sporophytic free living structure formed in pteridophytes.
(c) A gametophytic free living structure formed in pteridophytes.
(d) A primitive structure formed after fertilization in pteridophytes.

6. Plants of this group are diploid and well adapted to extreme conditions. They grow bearing sporophylls in compact structures called cones. The group in reference is
(a) Monocots (b) Dicots (c) Pteridophytes (d) Gymnosperms

7. The embryo sac of an Angiosperm is made up of
(a) 8 cells (b) 7 cells and 8 nuclei
(c) 8 nuclei (d) 7 cells and 7 nuclei.

8. If the diploid number of a flowering plant is 36. What would be the chromosome number in its endosperm?
(a) 36 (b) 18 (c) 54 (d) 72

9. Protonema is
(a) Haploid and is found in mosses.
(b) Diploid and is found in liverworts.
(c) Diploid and is found in pteridophytes.
(d) Haploid and is found in pteridophytes.

10. The giant Redwood tree (*Sequoia sempervirens*) is a/an
(a) Angiosperm (b) Free fern (c) Pteridophyte (d) Gymnosperm

Answer Keys

Previous Year Questions

1. (d)	2. (c)	3. (b)	4. (b)	5. (d)	6. (a)	7. (c)	8. (b)	9. (c)	10. (d)
11. (c)	12. (d)	13. (c)	14. (d)	15. (b)	16. (b)	17. (c)	18. (a)	19. (a)	20. (c)
21. (d)	22. (d)	23. (b)	24. (c)	25. (c)	26. (c)	27. (a)	28. (c)	29. (b)	30. (a)
31. (b)	32. (c)	33. (d)	34. (d)	35. (b)	36. (c)	37. (b)	38. (c)	39. (b)	40. (d)
41. (b)	42. (b)	43. (d)	44. (d)	45. (b)	46. (c)	47. (b)	48. (c)	49. (b)	50. (c)
51. (c)	52. (d)	53. (b)	54. (c)	55. (c)	56. (c)	57. (c)	58. (a)	59. (b)	60. (c)
61. (d)	62. (c)	63. (d)	64. (a)	65. (a)	66. (d)	67. (a)	68. (b)	69. (a)	70. (b)
71. (a)	72. (b)	73. (b)	74. (c)	75. (a)	76. (b)	77. (c)	78. (b)	79. (d)	80. (d)
81. (b)	82. (d)	83. (a)	84. (b)	85. (a)	86. (c)	87. (d)	88. (d)	89. (b)	90. (b)
91. (c)	92. (d)	93. (d)	94. (b)	95. (d)	96. (d)	97. (b)	98. (c)	99. (b)	100. (d)
101. (d)	102. (d)	103. (d)	104. (a)	105. (c)	106. (d)	107. (c)	108. (d)	109. (a)	110. (b)
111. (a)	112. (d)	113. (d)	114. (b)	115. (c)	116. (b)	117. (c)	118. (b)	119. (d)	120. (c)
121. (c)	122. (c)	123. (b)	124. (c)	125. (b)	126. (b)	127. (c)	128. (b)	129. (a)	130. (d)
131. (c)	132. (b)	133. (c)	134. (c)	135. (c)	136. (d)	137. (c)	138. (b)	139. (a)	140. (b)
141. (b)	142. (c)	143. (a)	144. (d)	145. (c)	146. (a)	147. (d)	148. (b)	149. (d)	150. (c)
151. (d)	152. (d)	153. (a)	154. (a)	155. (c)	156. (b)	157. (b)	158. (d)	159. (d)	160. (d)
161. (a)	162. (b)	163. (c)	164. (c)	165. (a)	166. (c)	167. (b)	168. (d)	169. (d)	170. (c)
171. (d)	172. (c)	173. (b)	174. (c)	175. (d)	176. (b)	177. (c)	178. (c)	179. (b)	180. (a)
181. (d)	182. (b)	183. (b)	184. (b)	185. (a)	186. (b)	187. (a)	188. (c)	189. (b)	190. (c)
191. (d)	192. (b)	193. (a)	194. (d)	195. (b)	196. (b)	197. (c)	198. (a)	199. (b)	200. (a)
201. (a)	202. (c)	203. (c)	204. (d)	205. (a)	206. (b)	207. (b)	208. (c)	209. (a)	

Assertion and Reason Questions

210. (b)	211. (b)	212. (a)	213. (a)	214. (a)	215. (b)	216. (a)	217. (a)	218. (a)	219. (a)
220. (d)	221. (d)	222. (a)	223. (b)	224. (a)	225. (a)	226. (a)	227. (b)	228. (a)	229. (b)
230. (b)	231. (a)	232. (a)	233. (a)	234. (a)	235. (c)	236. (a)	237. (d)	238. (d)	239. (c)
240. (b)	241. (d)								

Previous Year Questions

1. (c)	2. (d)	3. (a)	4. (b)	5. (d)	6. (a)	7. (c)	8. (c)	9. (d)	10. (a)
11. (c)	12. (d)	13. (a)	14. (b)	15. (d)	16. (c)	17. (b)	18. (b)	19. (d)	20. (c)
21. (d)	22. (d)	23. (c)	24. (d)	25. (d)	26. (c)	27. (a)	28. (c)	29. (b)	30. (a)

NCERT Exemplar Questions

1. (c)	2. (c)	3. (c)	4. (d)	5. (c)	6. (d)	7. (b)	8. (c)	9. (a)	10. (d)

This page is intentionally left blank.

CHAPTER 4

Animal Classification

PRACTICE QUESTIONS

Basis of Classification

1. Living organism differ in
(a) Shape (b) Form (c) Size and habit (d) All of these

2. Which is not a character of sponges?
(a) Multicellular (b) Cells are functionally independent
(c) Cellular level of organization (d) Tissue level of organization

3. Which phylum shows tissue level of organization?
(a) Protozoa (b) Porifera (c) Coelenterate (d) All of these

4. Organ system level of organization is not found in
(a) Annelida (b) Arthropod (c) Molluscs (d) Platyhelminthes

5. Incomplete digestive tract (blind sac body plan) is found in
(a) Annelida (b) Arthropod (c) Molluscs (d) Platyhelminthes

6. Closed type of circulatory system is present in
(a) Annelida and arthropod (b) Arthropod and mollusc
(c) Annelida and cephalopods (d) Mollusc and echinodermates

7. In open type of circulatory system
(a) Blood flow in sinuses
(b) Blood pressure is low and irregular
(c) It is found in arthropods and molluscs (except cephalopods)
(d) All are true

8. Closed type of circulatory system is found in
(a) *Annelida* (b) Cephalopods (c) Vertebrate (d) All of these

9. What is false about closed circulatory system?
(a) Blood pressure is high and regular
(b) Amount of blood is limited
(c) Blood circulates through arteries, veins and capillaries
(d) Blood pressure is low and irregular

10. When the body of an animal can be divided into equal left and right halves by one plane symmetry. It is known as
(a) Bilateral (b) Radial (c) Biradial (d) Asymmetric

11. Radial symmetry is shown by
(a) Coelenterate (b) Platyhelminthes
(c) Adult echinodermates (d) Both (a) and (c)

12. Most of the sponges are
(a) Bilateral (b) Radial (c) Biradial (d) Asymmetric

13. The first diploblastic animal is
(a) Coelenterates (b) Platyhelminthes (c) Aschelminthes (d) Annelida

14. The first triploblastic animal is
(a) Coelenterates (b) Platyhelminthes (c) Aschelminthes (d) Annelida

15. Triploblastic animal contains
(a) Ectoderm (b) Mesoderm (c) Endoderm (d) All of these

16. Aschelminthes are
(a) Eucoelomate (b) Pseudocoelomate (c) Acoelomate (d) None of these

17. Which of the following is acoelomate?
(a) Porifera (b) Coelenterates (c) Platyhelminthes (d) All of these

18. Metameric segmentation is found in
(a) Annelida (b) Arthropod (c) Both (a) and (b) (d) Platyhelminthes

19. Notochord is derived from which layer?
(a) Ectoderm (b) Mesoderm (c) Endoderm (d) All of these

20. Which of the following is correct about notochord?
(a) Dorsally situated (b) Mesodermal in origin
(c) Rod like (d) All of these

21. Radial symmetry is shown by
(a) Ctenophores (b) Coelenterates
(c) Adult echinodermates (d) All of these

22. The undifferentiated layer present between the ectoderm and endoderm in coelenterate is
(a) Mesophyll (b) Gastral layer (c) Archenteron (d) Mesoglea

23. Which of the following is correct about metamerism (true segmentation)?
(a) Every organ shows serial repetition.
(b) The body is divided externally as well as internally
(c) Each segment is not supplied with separate nerve and blood vessels.
(d) All of these

24. In some animals, the body cavity is not lined by mesoderm. Instead the mesoderm is present as scattered pouches in between the ectoderm and endoderm. Such a body cavity is called
(a) Eucoelom (b) Pseudocoelom
(c) Acoelom (d) Any of the above

25. The following are coelomates except (true coelom)
(a) Annelida (b) Platyhelminthes
(c) Mollusca (d) Chordata

26. Select the total number of organism from the following which are sessile:
Amoeba, Euglena, Adamsia, Spongilla, Hydra, Jelly fish, Earthworm
(a) 1 (b) 2 (c) 3 (d) 4

27. Which of the following is incorrect about Porifera?
(a) It is a solitary or colonial organism
(b) Majority live in sea and some live in fresh water
(c) Most of them are asymmetric
(d) All of the above

28. Members of phylum Porifera are commonly known as
(a) Flatworms (b) Roundworms (c) Sponges (d) Corals

29. Water path in sponges is
(a) Ostia → Spongocoel → Osculum (b) Osculum → Spongocoel → Osculum
(c) Ostia → Spongocoel → Ostia (d) Spongocoel → Ostia → Osculum

30. The unique character of sponges is
(a) Choanocytes or collar cells line, the spongocoel and the canals.
(b) That they are hermaphrodite.
(c) That they live in marine water.
(d) It reproduces by asexual means only.

31. The character possessed by all sponges are
(a) That all are fresh water (b) All possess tissue level of organization
(c) External fertilization (d) Hermaphrodite

32. Select the total number of statements belonging to sponges:
(1) Cellular level of organization.
(2) Body is supported by endoskeleton made up of spicules or sponging fibres.
(3) Larva stage is morphologically different from adult.
(4) Pathway of water transport is helpful in gathering of food, respiratory exchange and removal of waste.
(5) Hermaphrodite organism.
(6) They show the power of regeneration.
(a) 5 (b) 6 (c) 4 (d) 3

33. Select the fresh water sponge from the following:
(a) Sycon (b) Euspongia (c) Spongilla (d) Hyalonema

34. Another name of sycon is
(a) Scypha (b) Euspongia (c) Spongilla (d) Hyalonema

35. Match the following:

Column I		**Column II**
A. Sycon	–	1. Bath sponge
B. Spongilla	–	2. Scypha
C. Euspongia	–	3. Fresh water sponge

(a) A–2, B–3, C–1 (b) A–1, B–2, C–3
(c) A–3, B–2, C–1 (d) A–3, B–1, C–2

36. Select the total number of marine sponges from the following:
Leucosolenia, Euspongia, Spongilla, Sycon, Hyalonema
(a) 3 (b) 4 (c) 5 (d) 2

37. The primitive multicellular animals having cellular level of organization are
(a) Ctenophores (b) Sponges (c) Corals (d) Crustacean

38. Water enters through minute pores in the body wall into central cavity in sponges. These minute pores are known as
(a) Osculum (b) Ostia (c) Spongocoel (d) Any of the above

39. In sponge, the sperm and ova are produced by the same individual. Such types of organisms are called
(a) Asexual (b) Unisexual (c) Hermaphrodite (d) Dioecious

40. Canal system and choanocytes are characteristic of
(a) Ctenophora (b) Coelenterates (c) Platyhelminthes (d) Porifera

41. In sponges, the commonly seen larva are
(a) Amphiblastula (b) Parenchymula (c) Planula (d) Both (a) and (b)

42. Digestion in sponges is
(a) Intracellular (b) Extracellular (c) Both (a) and (b) (d) None of these

43. Which of the following is correct about reproduction in sponges?
(a) The mode of asexual reproduction such as gemmule formation, budding and fragmentation.
(b) Fertilization is internal
(c) Development is indirect
(d) All of these

44. Exogenous budding is seen in case of
(a) Scypha (b) Euspongia (c) Spongilla (d) Hyalonema

45. The following characters are related to phylum:
(1) Aquatic, mostly marine (2) Sessile or free swimming
(3) Radially symmetrical animals (4) They show polymorphism
(a) Porifera (b) Ctenophora (c) Echinodermata (d) Coelenterata

46. Cnidoblast is a characteristic feature of
(a) Porifera (b) Coelenterata (c) Ctenophora (d) Arthropoda

47. The first diploblastic animal showing tissue level of organization is
(a) Sycon (b) Gorgonia (c) Taenia (d) Locust

48. Cnidoblast is used for
(a) Anchorage (b) Defense (c) Capture of prey (d) All of these

49. Select the total number of organisms from the following which shows both intra and extra cellular digestion.
Physalia, Pleurobrachia, Taenia, Culex, Apis, Neries, Echinus, Salpa, Meandrina, Pennatula, Doliolum, Catla, Hyla, Adamsia, Gorgonia, Ctenoplana.
(a) 6 (b) 8 (c) 7 (d) 10

50. Select the correct matching:
(a) Petromyzon – Hag fish
(b) Echinus – Brittle star
(c) Apis – Silkworm
(d) Pennatula – Sea pen

51. Select incorrect matching:
(a) Locusta – Locust
(b) Cucumaria – Sea cucumber
(c) Meandrina – Sea anemone
(d) Echinus – Sea urchin

52. Some cnidarians examples corals have a skeleton composed of
(a) Spongin fibres (b) Silica
(c) Calcium carbonate (d) Any of these

53. Metagenesis is shown by
(a) Hydra (b) Adamsia (c) Aurelia (d) Obelia

54. Which of the following is not true fish?
(a) Exocoetus (b) Betta (c) Saw fish (d) Jelly fish

55. The umbrella shape and free swimming form of coelenterate reproduced by sexual reproduction is
(a) Polyp (b) Medusa (c) Both (a) and (b) (d) None of these

56. Sessile, cylindrical form of coelenterate reproduced by asexual reproduction is
(a) Polyp (b) Medusa (c) Both (a) and (b) (d) None of these

57. Polyp $\rightarrow$ Asexually $\rightarrow$ Medusa $\rightarrow$ Sexually $\rightarrow$ Polyp

The above cycle is shown by
(a) Physalia (b) Aurelia (c) Obelia (d) Hydra

58. Select from the following total number of organisms which contain the word 'sea' in their common names.
Physalia, Adamsia, Pennatula, Gorgonia, Meandrina, Hydra, Aurelia, Obelia
(a) 2 (b) 3 (c) 4 (d) 5

59. Which of the following is known as Portuguese man-of-war?
(a) gorgonia (b) aurelia (c) physalia (d) obelia

60. The phylum in which first time nerve net arises
(a) Porifera (b) Coelenterate (c) Platyhelminthes (d) Protozoa

61. Gastro-vascular cavity with single opening is found in
(a) Porifera (b) Coelenterate (c) Aschelminthes (d) Annelida

62. Coelenterates asexually reproduce by
(a) Budding (b) Gametes (c) Conidia (d) Gemmules

63. The larva stage shown by coelenterate is called
(a) Amphiblastula (b) Parenchymula (c) Planula (d) All of these

64. Match the following:

Column I		Column II
A. Physalia	–	1. Brain coral
B. Adamsia	–	2. Sea fan
C. Pennatula	–	3. Sea pen
D. Gorgonia	–	4. Sea anemone
E. Meandrina	–	5. Portuguese man-of-war
F. Aurelia	–	6. Jellyfish

(a) A–5, B–4, C–2, D–3, E–1, F–6
(b) A–5, B–4, C–3, D–2, E–1, F–6
(c) A–5, B–4, C–2, D–1, E–2, F–6
(d) A–5, B–3, C–4, D–2, E–1, F–6

65. Ctenophores are commonly known as
(a) Sea walnut (b) Comb jellies (c) Both (a) and (b) (d) None of these

66. The following features belongs to which phylum?
(1) Exclusively marine (2) Radial symmetry
(3) Diploblastic (4) Tissue level organization
(a) Coelentrata (b) Porifera
(c) Ctenophora (d) Platyhelminthes

67. Body bears eight external rows of ciliated comb plates present in phylum _____.
(a) Coelentrata (b) Porifera (c) Ctenophora (d) Platyhelminthes

68. Ctenophores show
(a) Extra and intracellular digestion (b) Sexual reproduction only
(c) Bioluminescence (d) All of these

69. Example of ctenophores is
(a) Pleurobrachia (b) Ctenoplana (c) Both (a) and (b) (d) None of these

70. The following features belong to which phylum?
(1) Bilateral symmetry (2) Triploblastic, Acoelomate
(3) Organ level of organization (4) Dorsoventrally flattened body
(a) Platyhelminthes (b) Aschelminthes (c) Annelida (d) Arthropoda

71. Platyhelminthes are called flat worms because
(a) They are triploblastic (b) They are without coelom
(c) They have organ level of organization (d) Their body is dorsoventrally flattened

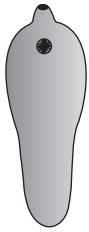
72. Which of the following are characters present in platyhelminthes?
(1) Some absorb nutrients from the host directly through their body surface.
(2) Digestive system is incomplete, branched and without anus.
(3) Flame cells/solenocyte protonephridia help in the excretion and osmoregulation.
(4) Hooks and suckers are present in parasitic form.
(5) Hermaphrodites
(6) Fertilization is internal.
(7) Indirect development through many larva stages.
(a) 1, 2, 3, 5, 6 (b) 2, 3, 4, 5, 7 (c) All except 1 (d) All

73. Which platyhelminthes posses high power of regeneration?
(a) Planaria/Dugesia (b) Taenia (c) Fasciola (d) Liver fluke

74. Flame cells helps in excretion and osmoregulation in
(a) Earthworm (b) Hookworm (c) Roundworm (d) Tapeworm

75. Internal fertilization is seen in
(a) Pleurobrachia (b) Fasciola (c) Ctenoplana (d) All of these

76. (1) Fertilization _____.
(2) Development _____.
(3) Excretion and osmoregulation by _____.
Fill in the blanks for organism given in the figure.



(a) Internal, direct, rennett cells
(b) Internal, indirect, flame cells
(c) External, direct, nephridia
(d) External, indirect, protonephridia

77. Phylum whose organism are mostly endoparasites is
(a) Platyhelminthes (b) Annelida (c) Arthropoda (d) Mollusca

78. Which of the following are pseudocoelomate?
(a) Roundworm (b) Hookworm (c) Filarial worm (d) All of these

79. The body of the aschelminthes is circular in cross section. Hence, it is named as
(a) Tapeworm (b) Earthworm (c) Hookworm (d) Roundworm

80. Roundworms/Nematodes are
(a) Free living (b) Aquatic or terrestrial
(c) Parasitic on animals and plants (d) All of these

81. Select the total number of organism which shows internal fertilization.
Ascaris, Wuchereria, Ancylostoma, Taenia, Fasciola, Sycon, Euspongia, Spongilla, pleurobrachia, ctenoplana
(a) 6 (b) 7 (c) 8 (d) 5

82. Which character does not belong to phylum Aschelminthes?
(a) Excretory tube (branched ducts) removes body waste form the body cavity through excretory pore.
(b) Usually sexes are separate (unisexual or dioecious).
(c) Development may be direct or indirect.
(d) Alimentary canal is incomplete with a well-developed muscular pharynx.

83. Match the following:

Column I		**Column II**
A. Ascaris	–	1. Intestinal round worm
B. Wuchereria	–	2. Filarial worm
C. Ancylostoma	–	3. Hook worm
D. Pheretima	–	4. Earth worm

(a) A–2, B–4, C–3, D–1 (b) A–1, B–2, C–3, D–4
(c) A–4, B–3, C–1, D–2 (d) A–2, B–1, C–4, D–3

84. Which of the following is correct about ascaris?
(a) Females are smaller than males
(b) Posterior end of male curved dorsally
(c) Females are longer than males
(d) Fertilization is external

85. Select the total number of organism from the following which contains well-developed muscular pharynx with complete alimentary canal.
Taenia, Fasciola, Planaria, Ascaris, Filarial worm, Hookworm
(a) 1 (b) 3 (c) 4 (d) 2

86. Metamerism is found in
(a) Ascaris (b) Leech (c) Loligo (d) Octopus

87. Nephridia helps in the excretion and osmoregulation in
(a) Nereis (b) Pheretima (c) Hirudinaria (d) All of these

88. Closed circulatory system is present in
(a) Nereis (b) Pheretima (c) Ascaris (d) Both (a) and (b)

89. Animals having cylindrical body having an organ system level of organization showing metamerism belongs to phylum
(a) Arthropoda (b) Mollusca (c) Annelida (d) Platyhelminthes

90. Annelids may be
(a) Aquatic (marine and fresh water), terrestrial
(b) Free living
(c) Parasite
(d) All of the above

91. The neural system consists of paired ganglia connected by lateral nerve to a double ventral nerve cord present in
(a) Fasciola (b) Ancylostoma (c) Nereis (d) Taenia

92. Which of the following are monoecious?
Ascaris, Wuchereria, Ancylostoma, Neries, Pheretima, Hirudinaria
(a) 3 (b) 2 (c) 3 (d) 4

93. The first true coelomates are
(a) Nereis (b) Centipede (c) Crab (d) Wuchereria

94. The following features belong to which of the following phylum?
(1) Triploblastic
(2) Bilateral symmetry
(3) Eucoelomate
(4) Metamerism
(a) Mollusca
(b) Aschelminthes
(c) Platyhelminthes
(d) Annelida

95. Which of the following is correct about parapodia?
(a) They are longitudinal muscles which help in locomotion.
(b) They are circular muscles which help in locomotion.
(c) It helps in swimming.
(d) It is the dorsal appendages of nereis.

96. Which of the following is the largest phylum?
(a) Mollusca (b) Echinodermata (c) Arthropoda (d) Annelida

97. How many species named on earth is arthropoda?
(a) $\frac{1}{2}$ (b) $\frac{2}{3}$ (c) $\frac{1}{4}$ (d) $\frac{3}{4}$

98. In which of the following phylum the body is generally divided into head, thorax and abdomen?
(a) Mollusca (b) Echinodermata
(c) Arthropoda (d) Annelida

99. Which of the following phylum shows segmentation?
(a) Annelida (b) Arthropoda (c) Both (a) and (b) (d) Platyhelminthes

100. The following features are seen in which of the below options?
(1) Exoskeleton of chitin
(2) Malpighian tubules as excretory organ
(3) Tracheal system for respiration
(4) Three pair of legs in thoracic region
(a) Limulus (b) Prawn (c) Spider (d) Cockroach

101. Respiration occurs through organs like gills, book gills, book lungs or tracheal system found in phylum.
(a) Mollusca (b) Annelida (c) Arthropoda (d) Echinodermata

102. Which of the following are sensory organs in phylum Arthropoda?
(1) Simple or compound eye
(2) Statocyst or balance organ
(3) Malpighian tubules
(4) Antennae
(a) All except (4) (b) All except (1) (c) All except (3) (d) All except (2)

103. Which of the following is correct about reproduction in Arthropods?
(a) Usually dioecious, mostly oviparous (b) Internal fertilization
(c) Some exhibit parthenogenesis (d) All of these

104. Ecdysis is seen in case of
(a) Nereis (b) Pila
(c) Sea urchin (d) Cockroach

105. Exoskeleton of Arthropods are chitinous and it sheds at interval for the growth and development process known as
(a) Autotomy (b) Metamerism
(c) Ecdysis (moulting) (d) Aestivation

106. The presence of joint appendages is the speciality of phylum _____
(a) Mollusca (b) Echinodermata
(c) Arthropoda (d) Annelidia

107. Bilaterally symmetrical, triploblastic, segmented, coelomate and covered by chitinous exoskeleton are features of
(a) Anneldia (b) Vertebrata (c) Amphibia (d) Arthropoda

108. Which of the following is true for Arthropoda?
(a) Development may be direct or indirect.
(b) Open circulatory system.
(c) Excretion takes place by green gland, coxal gland and Malpighian tubules.
(d) All of these

109. Select from the following the total number of useful insects.
Apis, Bombyx, Laccifer, Anopheles, Culex, Aedes, Prawn, Scorpion, Locust, Limulus.
(a) 3 (b) 4 (c) 3 (d) 5

110. Select from the following the total number of organism that belongs to phylum arthropoda.
Locust, Butterfly, Scorpion, Prawn, Salpa, doliolums, Pila, Chiton, Antedon, Hyla, Myxine, Locust, Loligo, Culex, Cucumaria, Cuttle fish.
(a) 4 (b) 6 (c) 8 (d) 12

111. Select the living fossil from the following:
(a) Culex (b) Silkworm (c) Lac insect (d) Limulus

112. Following mosquitoes used as vector for various diseases:
(a) Culex (b) Anopheles (c) Aedes (d) All of these

113. Other name of limulus is
(a) Laccifer (b) Locust (c) King crab (d) Gregarious pest

114. Which of the following is a gregarious pest?
(a) Laccifer (b) Locusta (c) King crab (d) Both (a) and (b)

115. Match the following:

Column I		**Column II**
A. Locusta	–	1. Apis
B. Honey bee	–	2. Locust
C. Silkworm	–	3. Bombyx
D. Lac insect	–	4. Laccifer

(a) A–4, B–1, C–3, D–4 (b) A–2, B– 1, C–4, D–3
(c) A–2, B–1, C–3, D–4 (d) A–4, B–3, C–1, D–4

116. Which of the following belongs to arthropods?
(a) Peripatus and crab (b) Prawn and scorpion
(c) Centipede and cockroach (d) All of these

117. Animals with soft body, bilateral symmetry, triploblastic and unsegmented, usually protected by a shell made up of calcium carbonate belongs to phylum _____
(a) Porifera (b) Echinodermata (c) Mollusca (d) Arthropoda

118. The mouth which has file-like rasping organ for feeding called radula is found in
(a) Mollusca (b) Hemichordata (c) Echinodermata (d) Arthropoda

119. The body of ___ is unsegmented with a distinct head, muscular foot and visceral mass
(a) Asterias (b) Ophiura (c) Balanoglossus (d) Devil fish

120. A. A soft and spongy layer of skin forms a _(i)_ over the visceral hump.
B. A _(ii)_ cavity containing _(iii)_ like gills.
C. The anterior head region has sensory _(iv)_.

Fill in the blanks in the above respective places about mollusca.

(a) Mantle, Mantle, Comb, Papilla (b) Mantle, Mesoglea, Feather, Papilla
(c) Mantle, Mantle, Feather, Tentacles (d) Mantle, Mantle, Comb, Tentacles

121. Which of the following is true about reproduction in mollusca?

(1) Mostly dioecious (2) Oviparous
(3) Mainly indirect development (4) Fertilization is external or internal
(a) All except (4) (b) All except (3) (c) All except (2) (d) All of these

122. Which of the following is not a fish?

(a) Devil fish (b) Cuttle fish (c) Jelly fish (d) All of these

123. Match the following:

Column I		**Column II**
A. Pila	–	1. Tusk shell
B. Chiton	–	2. Apple snail
C. Dentalium	–	3. Cuttle fish
D. Sepia	–	4. Chaetopleura

(a) A–2, B–1, C–4, D–3 (b) A–2, B–4, C–1, D–3
(c) A–4, B–2, C–3, D–1 (d) A–4, B–3, C–2, D–1

124. Devil fish is called

(a) Pearl oyster (b) Tusk shell (c) Sepia (d) Octopus

125. Majority of mollusca are

(a) Aquatic (b) Terrestrial (c) Aerial (d) Any of the above

126. Select the total number of organism from the following which are mollusca:
Pila, Pinctada, Sepia, Loligo, Aplysia, Echinus, Antedon, Salpa, Bufo, Chelone, Neophron, Pteropus, Elephas, Pavo

(a) 7 (b) 6 (c) 5 (d) 9

127. Mantle cavity is a site of

(a) Excretion (b) Respiration (c) Both (a) and (b) (d) None of these

128. Shell in molluscs is

(a) External (b) Internal (c) Any of the above (d) Shell is absent

129. Unsegmented, triploblastic, eucoelomate is

(a) Pheretima (b) Laccifer (c) Pila (d) All of these

130. Select the incorrect matching:

(a) Aurelia – Jelly fish
(b) Sepia – Cuttle fish
(c) Octopus – Devil fish
(d) Loligo – Fighting fish

131. Select the incorrect matching:

(a) Gorgonia – Sea fan
(b) Adamsia – Sea anemone
(c) Aplysia – Sea cucumber
(d) Antedon – Sea lily

132. Pinctada is a
(a) Sea hare (b) Cuttle fish (c) Pearl oyster (d) Apple snail

133. The common name of which organism contains 'sea' in their name?
(a) Chaetopleura (b) Dentalium (c) Sepia (d) Aplysia

134. Animals having calcareous endoskeleton with organ-system level of organization, completely marine are
(a) Arthropoda (b) Mollusca (c) Hemichordates (d) Echinodermates

135. In which phylum, the larva is bilaterally symmetrical and the adult have radial symmetry?
(a) Arthropoda (b) Mollusca (c) Hemichordata (d) Echinodermata

136. The most distinctive feature of echinoderm is
(a) Gastro vascular cavity
(b) Choanoctyes
(c) Water vascular system/ambulacral system
(d) Canal system

137. Water vascular system helps in
(a) Locomotion (b) Capture and transport of food
(c) Respiration (d) All of these

138. Which of the following is true about reproduction in echinoderms?
(a) Unisexuality
(b) Usually external fertilization
(c) Indirect development through free swimming larva
(d) All of the above

139. Find out the number of spiny-bodied animals from the following:
Pila, Pinctada, Asterias, Echinus, Antedon, Cucumaria, Brittle star, Octopus
(a) 4 (b) 5 (c) 6 (d) 3

140. Select the correct matching:
(a) Asterias – Sea urchin
(b) Pila – Pearl oyster
(c) Ophiura – Brittle star
(d) Loligo – Cuttle fish

141. Select the incorrect matching:
(a) Asterias – Star fish
(b) Echinus – Sea urchin
(c) Antedon – Sea lily
(d) Cucumaria – Sea fan

142. Sea urchin belongs to the class phylum
(a) Echinodermata (b) Hemichordata (c) Ctenophora (d) Mollusca

143. Another name of cucummaria is
(a) Sea urchin (b) Sea mouse (c) Sea pen (d) Sea cucumber

144. Which phylum shows regeneration in the lost part?
(a) Mollusca (b) Annelida (c) Arthropoda (d) Echinodermata

145. Which phylum has the following features?
(1) Digestive track is complete, straight or U shape.
(2) Worm like, unsegmented marine animal.
(3) Respiration is done by gills.
(4) Excretion by single proboscis gland.
(5) Circulatory system is naturally open.
(a) Arthropoda (b) Mollusca (c) Hemichordata (d) Urochordata

146. Which is a phylum?
(a) Hemichordata (b) Urochordata (c) Cephalochordata (d) All of these

147. Larva of hemichordate is
(a) Amphiblastula (b) Torneria (c) Ammocoete (d) Planula

148. Which of the following is correct about reproduction in hemichordata?
(a) Internal fertilization (b) Usually direct development
(c) Sexes are separate (d) Monoecious organism

149. The body which is cylindrical and composed of anterior proboscis and a collar and a long trunk is found in
(a) Ascidia (b) Salpa (c) Doliolum (d) Saccoglossus

150. The excretory organ of proboscis gland is present in
(a) Ascidia (b) Salpa (c) Doliolum (d) Saccoglossus

151. The fundamental character of chordate is
(a) Notochord (b) Dorsal hollow nerve cord
(c) Paired pharyngeal gill slits (d) All of these

152. Which is not a distinctive character of non-chordata?
(a) Notochordal is absent (b) Ventral and double nerve cord
(c) Heart is ventral (d) Post-anal tail is absent

153. Which of the following are the features of chordates?
(1) Notrchord is present.
(2) CNS is dorsal, hollow and single.
(3) Pharynx is perforated by gill slits.
(4) Heart is ventral.
(5) A post-anal is present
(a) All except (4) (b) All except (2) (c) All of these (d) All except (5)

154. Animal belonging to phylum chordata shows
(a) Bilateral symmetry, triploblastic and the coelom
(b) Organ system level of organization
(c) Closed circulatory system
(d) All of these

155. Urochordata and cephalochordate are referred as
(a) Non-chordates (b) Vertebrates (c) Protochordates (d) All of these

156. In which subphyla, the notochord is present in tail of larva only?
(a) Hemichordata (b) Urochordata (c) Cephalochordata (d) All of these

157. Notochord is extended from head to tail region and is persistent throughout their life in
(a) Hemichordata (b) Urochordata
(c) Cephalochordata (d) All of these

158. How many of the following belongs to the subphylum cephalochordate?
Ascidia, Salpa, Doliolum, Branchiostoma
(a) 1 (b) 2 (c) 3 (d) 4

159. The other name of Branchiostoma is
(a) Amphioxus (b) Lancelet (c) Both (a) and (b) (d) None of these

160. Select the incorrect statement from the following:
(a) In vertebrates, the notochord is replaced by cartilaginous or bony vertebral column.
(b) In cephalochordates, the notochord is extended from head to tail region and is persistent throughout life.
(c) Protochordates are exclusively marine.
(d) Notochord is present in tail of adult in urochordata.

161. Vertebrates have
(a) Ventral muscular heart with 3, 2 or 4 chamber.
(b) Kidneys for excretion and osmoregulation.
(c) Paired appendages which may be fins or limbs.
(d) All of these

162. Which of the following is exoskeleton in vertebrates?
(a) Scales (b) Feathers (c) Hair (d) Any of the above

163. All living members of which class is ectoparasite on fishes?
(a) Turbellaria (b) Chondrichthyes (c) Cephalopoda (d) Cyclostomata

164. Which of the following are characters of cyclostomata?
(a) 6–15 pairs of gill slits is present for respiration
(b) Sucking and circular mouth without jaws
(c) Body is devoid of scales and paired fins
(d) All of these

165. Which of the following organism possess cartilaginous cranium, vertebral column, closed type of circulatory system, which helps them migrate to fresh water for spawning?
(a) Ascidia (b) Scoliodon (c) Petromyzon (d) All of these

166. Which of the following are marine but migrate for spawning to fresh water. After spawning, within a few days, they die. Their larvae, after metamorphosis, return to ocean. Specify the correct one.
(a) Petromyzon (Lamprey) (b) Myxine (Hagfish)
(c) Scoliodon (d) Both (a) and (b)

167. Which of the following is correct about cyclostomes?
(a) Ectoparasite on fishes during their adult stage.
(b) Skin with scales and contain unicellular mucous gland.
(c) One kidney for excretion.
(d) Heart is two chambered and possess 4 pair of gill slits for respiration.

168. The class name 'cyclostomata' means
(a) Marine, but reproduction takes place in fresh water
(b) Mouth is anterio ventral, suctorial and circular
(c) Ectoparasite of fishes
(d) Jaws are absent

169. The study of fishes is called
(a) Ichthyology (b) Serpentology (c) Saurology (d) Chonchology

170. (1) Marine with streamlined body
(2) Cartilaginous endoskeleton
(3) Mouth is ventral
(4) Caudal fin in Heterocercal
(5) Notochord is persistent throughout life

The above characters belong to which of the following organism (select the total number)?
Dog fish, Saw fish, Flying fish, Fighting fish, Angle fish, Jelly fish, Star fish, Trygon, Torpedo, Rohu, Catla, Magur
(a) 3 (b) 4 (c) 6 (d) 7

171. The scales found in chondrichthyes is/are
(a) Placoid (b) Cycloid (c) Ctenoid (d) All of these

172. Which of the following is incorrect about cartilaginous fish?
(a) Teeth are modified with placoid scales which are backwardly directed.
(b) 5 to 7 pair of gills for respiration but without operculum (i.e., gill cover).
(c) Air bladder is absent so they have to swim constantly to avoid sinking.
(d) In males, the pelvie fins claspers are absent.

173. Select the total number of organism which posses two chambered heart and are poikilothermal.
Scoliodon, Pristis, Clarias, Betta, Pterophyllum, Echinus, Devil Fish, Cuttle fish, Sea lily, Hyla, Labeo, catla, Torpedo, Trygon
(a) 7 (b) 9 (c) 11 (d) 13

174. Select the difference which is wrongly written:

Cartilaginous fish		**Bony fishes**
(a) Operculum is absent	–	Operculum is present
(b) Fertilization is internal	–	Fertilization is external
(c) Posses 5–7 pair of gills	–	Posses 4 pair of gills
(d) Mostly oviparous	–	Mostly viviparous

175. Which fish possess poison sting?
(a) Scoliodon (dog fish) (b) Trygon
(c) Torpedo (d) Pristis (saw fish)

176. Which fish possess electric organs?
(a) Scoliodon (dog fish) (b) Trygon
(c) Torpedo (d) Pristis (saw fish)

177. Males possess claspers in pelvic fins in class _____
(a) Cyclostomata (b) Chondrichthyes (c) Osteicthyes (d) Amphibia

178. Select the correct matching:
(a) Petromyzon – Hagfish
(b) Myxine – Lamprey
(c) Carcharodon – Great white shark
(d) Trygon – Torpedo

179. (1) Stream-lined body
(2) Both marine and fresh water
(3) Mouth is terminal
(4) Caudal fin homocercal
(5) 4 pair of gills with operculum
Which class has the above characters?
(a) Cyclostomata (b) Chondrichthyes (c) Osteichthyes (d) Amphibia

180. Osteicthyes possess which kind of scales?
(a) Placoid (b) Cycloid (c) Ctenoid (d) Both (b) and (c)

181. External fertilization is found in
(a) Sting ray (b) Flying fish (c) Saw fish (d) Dog fish

182. Select the total number of bony fishes from the following:
Exocoetus, Hippocampus, Labeo, Catla, Clarias, Betta, Pterophyllum, Trygon, Torpedo, Pristis, Scolidon, Carcharodon.
(a) 6 (b) 7 (c) 8 (d) 12

183. Air bladder which regulates buoyancy is present in
(a) Cyclostomata (b) Cartilaginous fish (c) Bony fishes (d) Amphibians

184. Select the correct matching:
(a) Betta – Fighting fish
(b) Hippocampus – Flying fish
(c) Pterophyllum – Fighting fish
(d) Clarias – Labeo

185. Select the incorrect matching:
(a) Scoliodon – Dog fish
(b) Pterophyllum – Angel fish
(c) Clarias – Magur
(d) Trygon – Torpedo

186. Select the correct matching:
(a) Cyclostomata – gills (6–15 pairs)
(b) Chondrichthyes – gills (5–7 pairs)
(c) Osteichthyes – gills (4 pairs)
(d) All are correct

187. Which of the following is a marine bony fish?
(a) Exocoetus (flying fish) (b) Hippocampus (sea-horse)
(c) Both (a) and (b) (d) Saw fish (pristis)

188. Which of the following is a fresh water bony fish?
(a) Labeo (rohu) (b) Catla (katla) (c) Clarias (magur) (d) All of these

189. Which of the following is a fresh water cartilaginous fish?
(a) Scoliodon (dog fish) (b) Trygon (sting ray)
(c) Torpedo (electric ray) (d) None of these

190. The name 'amphibian' indicates that they can live in
(a) Aquatic habitat (b) Terrestrial habitat
(c) Both (a) and (b) (d) Aerial habitat

191. Amphibian belong to super class
(a) Pisces (b) Agnatha (c) Gnathostomata (d) Tetrapoda

192. The following features belong to which class?
(1) Body is divisible into head and trunks, tail may be present in some.
(2) Skin is moist and act as respiratory organ.
(3) External skeleton is absent.
(4) Eye have eyelids.
(a) Cyclostomata (b) Amphibia (c) Reptilia (d) Osteichthyes

193. Respiration in adult frog is by
(a) Buccopharyngeal cavity (b) Skin
(c) Lungs (d) All of these

194. Respiration in tadpole larva is by
(a) Gills (b) Lungs (c) Skin (d) All of these

195. Which of the following tract open into a common chamber cloaca in amphibians?
(a) Alimentary canal (b) Urinary tract
(c) Reproductive tract (d) All of these

196. Which type of dentition is found in amphibian?
(a) Homodont (b) Thecodont (c) Heterodont (d) Monophyodont

197. Three chambered heart, cold blooded, external fertilization and indirect development is seen in
(a) Labeo (b) Salpa (c) Frog (d) Myxine

198. Skin is moist and a tympanum representing ear is found in
(a) Hyla (b) Frog (c) Ichthyophis (d) All of these

199. Select the correct matching:

Column I		**Column II**
A. Bufo	–	1. Salamander
B. Frog	–	2. Rana
C. Hyla	–	3. Limbless amphibian
D. Salamandra	–	4. Tree frog
E. Ichthyophis	–	5. Toad

(a) A–2, B–5, C–4, D–1, E–3
(b) A–5, B–2, C–4, D–1, E–3
(c) A–2, B–4, C–5, D–1, E–3
(d) A–5, B–4, C–2, D–1, E–3

200. Limbless amphibian is
(a) Frog (b) Tree frog (c) Ichthyophis (d) Bufo

201. First class of vertebrate, which are fully adopted for terrestrial life is
(a) Amphibia (b) Reptilia (c) Aves (d) Mammals

202. Reptilia means
(a) Flying mode of locomotion (b) Swim mode of locomotion
(c) Saltation mode of locomotion (d) Creeping or crawling mode of locomotion

203. Which of the following is incorrect about reptilia?
(a) Body is covered by dry and cornified skin, epidermal scales or scutes.
(b) Body is divisible into head, neck, trunk and tail.
(c) Heart is usually three chambered.
(d) Respiration occur through lungs and skin.

204. Four chambered heart is present in all except
(a) Crocodilus (b) Alligator (c) Corvus (d) Calotes

205. Which of the following shed their scales as skin cast?
(a) Snakes (b) Lizards (c) Both (a) and (b) (d) Testudo

206. Sexes is separate, internal fertilization, oviparous and direct development is seen in case of
(a) Chelone (b) Testudo (c) Bangarus (d) All of these

207. Cloaca is seen in case of
(a) Amphibia (b) Reptiles (c) Aves (d) All of these

208. Select the incorrect matching:
(a) Chelone – Turtle
(b) Testudo – Tortoise
(c) Chameleon – Tree lizard
(d) Calotes – Wall lizard

209. Select the incorrect matching:
(a) Naja – Cobra
(b) Krait – Bangarus
(c) Vipera – Viper
(d) Hemidactylus – Garden lizard

210. Select the total number of lizards from the following:
Chelone, calotes, chameleon, crocodylus, hemidactylus, columba, neophron
(a) 2 (b) 3 (c) 4 (d) 5

211. Which of the following is a poisonous snake?
(a) Cobra (b) Krait (c) Viper (d) All of these

212. Limbless reptile is
(a) Chameleon (b) Crocodile (c) Chelone (d) Snake

213. In birds
The forelimbs are modified into _(1)_
Jaw is modified into _(2)_
Bones are _(3)_
Heart is _(4)_

Fill in the blanks correctly:
(a) Wings, beak, solid, 3 chambered
(b) Wings, beak, pneumatic, 4 chambered
(c) Claws, beak, pneumatic, 3 chambered
(d) Wings, beak, solid, incompletely 4 chambered

214. The first vertebrate which are warm-blooded
(a) Reptilia (b) Amphibian (c) Birds (d) Mammals

215. The aves have additional chamber in digestive tract and of which ____ is for food storage and ____ for food grinding.
(a) crop, gizzard (b) gizzard, crop
(c) crop, pharynx (d) pharynx, gizzard

216. All are flying birds from the following except
(a) Corvus (b) Columba (c) Psittacula (d) Aptenodytes

217. Pneumatic bones are present in
(a) Corvus (b) Neophron (vulture)
(c) Pavo (peacock) (d) All of these

218. Which of the following is incorrect about birds?
(a) Air sacs is connected to lungs which help in respiration.
(b) Hind limb posses scales and are modified for walking, swimming or clasping.
(c) Separate sexes, internal fertilization, oviparous and direct development.
(d) Endoskeleton consists of feathers, scales, beak and claws.

219. Mammalia means organism which possess
(a) Exoskeleton (b) Endoskeleton of bone
(c) Mammary gland (d) Two pair of limbs

220. The following features belong to
(1) Exoskeleton include hairs on body, horns and nail.
(2) Pinna is present.
(3) Heart is four chambered.
(4) Warm-blooded (homoiotherm).
(5) Thecodont and heterodont teeth.
(a) Reptilians (b) Aves
(c) Mammals (d) Amphibians

221. Mammals are adapted for
(a) Walking and running (c) Climbing and burrowing
(c) Swimming and flying (d) Any of the above

222. Mammals are mostly
(a) Viviparous (b) Oviparous (c) Ovoviviparous (d) All of these

223. Oviparous mammal is
(a) Canis (dog) (b) Felis (cat)
(c) Pteropus (flying fox (d) Ornithorhynchus (platypus)

224. Select the incorrect matching:
(a) Kangaroo – Macropus
(b) Blue whale – Balaenoptera
(c) Monkey – Macaca
(d) Elephas – Camel

225. Find out the incorrect matching:
(a) Reptiles – Chelone, Testudo, Chameleon
(b) Aves – Psittacula, Aptenodytes, Neophron
(c) Mammals – Elephas, Rattus, Delphinus
(d) Amphibian – Naja, bangarus, Calotes

226. Aquatic mammal is
(a) Panthera tigris (b) Balaenoptera (c) Pteropus (d) Macropus

227. Which of the following is a 'rat'?
(a) Felis (b) Canis (c) Camelus (d) Rattus

228. Which of the following mammal have aerial adaptation?
(a) Felis (b) Canis (c) Bat (d) Macropus

229. The basic fundamental feature which enables us to broadly classify the animal kingdom are
(a) Level of organisation, symmetry (b) Cell organization, coelom
(c) Segmentation of notochord (d) All the above

230. Select the total number of correct statement from the following:
(1) Coelenterates have tentacles and bear cnidoblasts.
(2) Ctenophores are marine animals with comb plates.
(3) Annelids are metamerically segmented animals with a true coelom.
(4) The echinoderm posses water vascular system.
(5) Hemichordates are a small group of worm like marine animals characterized by cylindrical body with proboscis, collar and trunk.
(a) 2 (b) 3 (c) 4 (d) 5

231. The most primitive chordates and are ectopariste on fishes belongs to the class
(a) Chondrichthyes (b) Amphibia (c) Cyclostomata (d) Osteichthyes

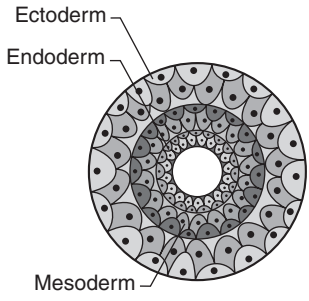
232. Select the incorrect matching: [A: Phylum, B: Segmentation, C: Circulatory system, D: Distinctive features] [A: Absent, P: Present]

	A	B	C	D
(a)	Ctenophore	A	A	Comb plates for locomotion
(b)	Aschelminthes	A	P	Often worm shaped, elongated
(c)	Annelid	P	P	Body segmentation like rings
(d)	Arthropoda	P	P	Jointed appendages

233. The below figure shows which type of symmetry

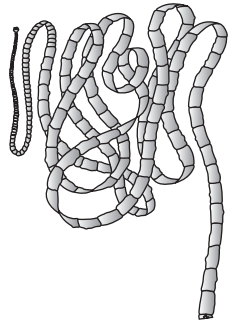
(a) Bilateral (b) Radial (c) Biradial (d) Asymmetry

234. The below diagram shows ____ symmetry, which is also found in the following group of organism



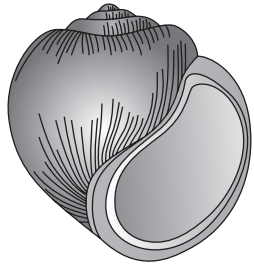
(a) Adamsia, Asterias, Aplysia
(b) Salpa, Hyla, Calotes
(c) Taenia, Ctenoplana, Antedon
(d) Doliolum, Gorgonia, Sycon

235. The excretory organ present in the organism given in figure is



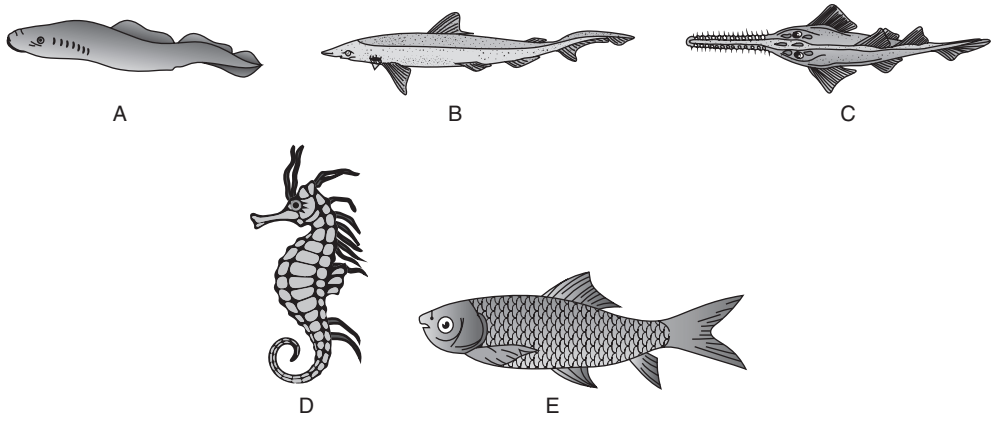
(a) Rennet cells
(b) Protonephridia or flame cells
(c) Malpighian tubules
(d) Kidney

236. All the features are present in the organism which is shown below in the diagram except



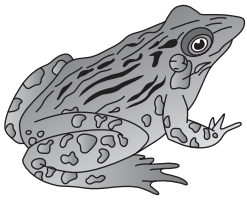
(a) It belongs to the second largest animal phylum.
(b) Body is segmented and covered by calcareous shell.
(c) Triploblastic, coelomate
(d) Mantle cavity is present

237. Find out the total number of organism given in following figure that belongs to marine habitat:



(a) 1 (b) 3 (c) 4 (d) 5

238. Organism given in figure is respire by



(a) Lungs (b) Skin
(c) Buccopharyngeal cavity (d) All

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion .
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

239. **Assertion:** A closed circulatory system is found in annelids.
Reason: Annelids posses true coelom.

240. **Assertion:** Fertilization in sponge is internal.
Reason: Sponges are aquatic organisms.

241. **Assertion:** The skeleton of sponges is made up of spicules.
Reason: Composition of spicules help in classification of sponges.

242. **Assertion:** Acraniata is a group of organisms which do not have distinct cranium.
Reason: It includes small marine forms without head.

243. **Assertion:** Cold blooded animals do not have fat layer.
Reason: Cold blooded animals use their fat for metabolic process during hibernation.

244. **Assertion:** Cyclostomes are marine but migrate for spawning to fresh water.
Reason: Larvae of cyclostome is metamorphosed in marine water.

245. **Assertion:** Sponges belong to Porifera.
Reason: Sponges have canal system.

246. **Assertion:** A shark can stay at a desired level in water without swimming.
Reason: It has a buoyancy-regulating organ called as the swim bladder.

247. **Assertion:** Birds have one ovary.
Reason: This reduces the body weight for flight.

248. **Assertion:** Plasmodium vivax is responsible for malaria.
Reason: Malaria is caused by polluted water.

249. **Assertion:** Birds are warm blooded.
Reason: Birds are able to maintain a constant body temperature.

250. **Assertion:** Systematics is the branch of biology that deals with classification of living organisms.
Reason: The aim of classification is to group the organisms.

251. **Assertion:** All birds, except the ones like koel (cuckoo) build nests for retiring and taking rest during night time (day time for nocturnal).
Reason: Koel lays its eggs in the nests of tailor bird.

252. **Assertion:** Bats and whales are classified as mammals.
Reason: Bats and whales have four-chambered heart.

253. **Assertion:** Tapeworm, roundworm and pinworm are endoparasites of human intestine.
Reason: Improperly cooked food is the source of all intestinal infections.

254. **Assertion:** The duck-billed Platypus and the spiny ant-eater, both are egg-laying animals yet they are grouped under mammals.
Reason: Both of them have seven cervical vertebrae and 12 pairs of cranial nerves.

255. **Assertion:** Coelenterates are triploblastic.
Reason: Coelenterates contain mesoderm in between ectoderm and endoderm.

256. **Assertion:** Digestive system of platyhelminthes is incomplete.
Reason: They have single opening to outside of the body, serve as both mouth as well as anus.

257. **Assertion:** Coelenterates, Ctenophores and adult Echinoderms are said to be radial symmetrical.
Reason: Their body can be dived into two equal halves in any plane passing through central axis of the body.

258. **Assertion:** Obelia shows metagenesis.
Reason: Obelia is polymorphic organism.

259. **Assertion:** Metagenesis in Obelia is equivalent to alternation of generation in plant
Reason: Polyp is haploid and medusa phase is diploid in Obelia

260. **Assertion:** Ascidia belong to sub - phylum urochordata.
Reason: Notochord is present in tail of larva stage.

261. **Assertion:** Fertilisation in bony fishes is usually external.
Reason: In males in bony fishes pelvic fins bear claspers.

262. **Assertion:** Birds have pneumatic bones.
Reason: This reduce weight for flight

263. **Assertion:** Snake shed their scale as skin cast.
Reason: It allow continue growth of snake.

264. **Assertion:** All vertebrates are chordates.
Reason: Vertebrates posses notochord during the embryonic period.

265. **Assertion:** Most sponge's body are said to be asymmetrical.
Reason: Body of most sponge can't be divided into two equal half by any plane pass through the centre of body.

266. **Assertion:** Aschelminthes are pseudocoelomate.
Reason: Body cavity in these organisms is not lined with mesoderm.

267. **Assertion:** Porifera to Echinoderms are non-chordates.
Reason: Notochord is not formed during embryonic development in these animals.

268. **Assertion:** Coelenterates are called cnidarians.
Reason: They possess cnidoblasts on tentacles and the body.

269. **Assertion:** Bioluminescence is well marked in ctenophores.
Reason: All ctenophores are exclusively marine.

270. **Assertion:** Annelids shows metameric segmentation.
Reason: Body of annelids divided externally as well as internally.

271. **Assertion:** Platyhelminthes are known as flat worms.
Reason: Platyhelminthes have laterally compressed body.

272. **Assertion:** In amphibian skin is generally moist.
Reason: They shows cutaneous respiration.

273. **Assertion:** All mammals are viviparous.
Reason: All mammals show external fertilisation.

PREVIOUS YEAR QUESTIONS

1. The crocodile and penguin are similar to whale and dogfish in which one of the following features?

[AIPMT MAINS 2010]

(a) It possess a solid single stranded central nervous system.
(b) Lay eggs and guard them till they hatch.
(c) Possess bony skeleton.
(d) Have gill slits at some stage.

2. One example of animals having a single opening to the outside that serves both as mouth as well as anus is

[AIPMT PRE 2010]

(a) Octopus (b) Asterias (c) Ascidia (d) Fasciola

3. Which one of the following statements about all the four of Spongilla, leech, dolphin and penguin is correct?

[AIPMT PRE 2010]

(a) Penguin is homoiothermic while the remaining three are poikilothermic.
(b) Leech is a fresh water form while all others are marine.
(c) Spongilla has special collared cells called choanocytes, not found in the remaining three.
(d) All are bilaterally symmetrical.

4. Which one of the following kinds of animals are triploblastic?

[AIPMT PRE 2010]

(a) Flat worms (b) Sponges (c) Ctenophores (d) Corals

5. Which one of the following statements about certain given animals is correct?

[AIPMT PRE 2010]

(a) Round worms (Aschelminthes) are pseudocoelomates
(b) Molluscs are acoelomates
(c) Insects are pseudocoelomates
(d) Flat worms (Platyhelminthes) are coelomates

6. Which one of the following statements is totally wrong about the occurrence of notochord, while the other three are correct?

[AIPMT MAINS 2011]

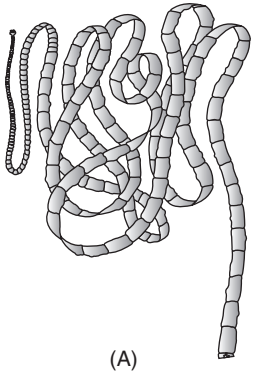
(a) It is present only in larval tail in ascidian.
(b) It is replaced by a vertebral column in adult frog.
(c) It is absent throughout life in humans from the very beginning.
(d) It is present throughout life in Amphioxus.

7. Frogs differ from humans in possessing

[AIPMT MAINS 2011]

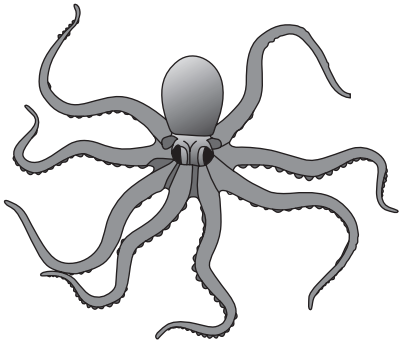
(a) Paired cerebral hemispheres (b) Hepatic portal system
(c) Nucleated red blood cells (d) Thyroid as well as parathyroid

8. The figures (A-D) show four animals. Select the correct option with respect to a common characteristic of two of these animals.

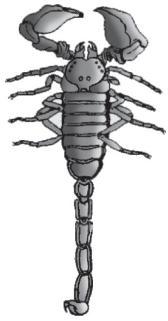


(A)

(B)



(C)



(D)

[AIPMT MAINS 2011]

(a) A and D respire mainly through body wall
(b) B and C show radial symmetry
(c) A and B have cnidoblasts for self-defence
(d) C and D have a true coelom

9. Which one of the following have the highest number of species in nature?

[AIPMT PRE 2011]

(a) Insects (b) Birds
(c) Angiosperms (d) Fungi

10. What will you look for to identify the sex of the following?

[AIPMT PRE 2011]

(a) Male frog – A copulatory pad on the first digit of the hind limb
(b) Female cockroach – Anal cerci
(c) Male shark – Claspers borne on pelvic fin
(d) Female ascaris – Sharply curved posterior end

11. In which one of the following the genus name, its two characters and its class/phylum are correctly matched?

[AIPMT PRE 2011]

Genus	Two characters	Class/phylum
(a) Salamander	(1) A tympanum represents ear (2) Fertilization is external	Amphibian
(b) Pteropus	(1) Skin possesses hair (2) Oviparous	Mammalian
(c) Aurelia	(1) Cnidoblast (2) Organ level of organization	Coelenterate
(d) Ascaris	(1) Body segmented (2) Males and females distinct	Annelid

12. Which one of the following animals is correctly matched with its particular named taxonomic category?

[AIPMT PRE 2011]

(a) Cuttlefish – Mollusca, a class
(b) Humans – Primata, the family
(c) Housefly – Musca, an order
(d) Tiger – tigris, the species

13. Which one of the following groups of animals is correctly matched with its one characteristic feature without even a single exception?

[AIPMT PRE 2011]

(a) Chordate – Possess a mouth provided with an upper and a lower jaw
(b) Chondrichthyes – Possess cartilaginous endoskeleton
(c) Mammalian – Give birth to young ones
(d) Reptilian – Possess 3 chambered heart with one incompletely divided ventricle

14. Which one of the following categories of animals is correctly described with no single exception in it?

[AIPMT MAINS 2012]

(a) All bony fishes have four pairs of gills and an operculum on each side.
(b) All sponges are marine and have collared cells.
(c) All mammals are viviparous and possess diaphragm for breathing.
(d) All reptiles possess scales, have a three chambered heart and are cold blooded (poikilothermal).

15. Which one of the following pairs of animals are similar to each other pertaining to the feature stated against them?

[AIPMT MAINS 2012]

(a) Garden lizard and crocodile – Three chambered heart
(b) Ascaris and ancylostoma – Metameric segmentation
(c) Sea horse and flying fish – Cold blooded (poikilothermal)
(d) Pteropus and ornithorhyncus – Viviparity

16. In which one of the following, the genus name, its two characters and its phylum are not correctly matched, whereas the remaining three are correct?

[AIPMT PRE 2012]

Genus name	**Two characters**	**Phylum**
(a) Pila	(1) Body is segmented (2) Mouth with radula	Mollusca
(b) Asterias	(1) Spiny skinned (2) Water vascular system	Echinodermata
(c) Sycon	(1) Pore bearing (2) Canal system	Porifera
(d) Periplaneta	(1) Jointed appendages (2) Chitinous exoskeleton	Arthropoda

17. Match the name of the animal (column I), with one characteristics (column II), and the phylum/class (column III) to which it belongs:

[AIPMT 2013]

Column-I	Column-II	Column-III
(a) Petromyzon	Ectoparasite	Cyclostomata
(b) Icthyophis	Terrestrial	Reptilian
(c) Limulus	Body covered by chitinous exoskeleton	Pisces
(d) Adamsia	Radially symmetrical	Porifera

18. Which of the following are correctly matched with respect to their taxonomic classification?

[AIPMT 2013]

(a) Flying fish, cattle fish, silverfish, Pisces
(b) Centipede, millipede, spider, scorpion Insecta
(c) House fly, butterfly, tsetse fly, silverfish Insecta
(d) Spiny anteato, sea urchin, sea cucumber echinodermata

19. Which group of animals belong to the same phylum?

[AIPMT 2013]

(a) Malarial parasite, Amoeba, Mosquito
(b) Earthworm, Pinworm, Tapeworm
(c) Prawn, Scorpion, Locusta
(d) Sponge, Sea anemone, Starfish

20. One of the representatives of Phylum Arthropoda is

[AIPMT 2013]

(a) Cuttlefish (b) Silverfish
(c) Pufferfish (d) Flying fish

21. Select the Taxon mentioned that represent both marine and fresh water species:

[AIPMT 2014]

(a) Echinoderms (b) Ctenophora
(c) Cephalochordata (d) Cnidaria

22. Which one of the following living organisms completely lack a cell wall?

[AIPMT 2014]

(a) Cyanobacteria (b) Sea fan (Gorgonia)
(c) Saccharomyces (d) Blue-green algae

23. Planaria posses high capacity of

[AIPMT 2014]

(a) Metamorphosis (b) Regeneration
(c) Alternation of generation (d) Bioluminescence

24. A marine cartilaginous fish that can produce electric current is

[AIPMT 2014]

(a) Pristis (b) Torpedo
(c) Trygon (d) Scoliodon

25. Which of the following represents the correct combination without any exception?
[AIPMT 2015]

	Characteristics	Class
(a)	Mammary gland, hair on body pinnate two pairs of limbs.	Mammalian
(b)	Mouth ventral, gills without operculum skin with placoid scales; persistent notochord.	Chondrichthyes
(c)	Sucking and circular mouth laws absent integument without scales; paired appendages.	Cyclostomata
(d)	Body covered with feathers, skin most and glandular, fore limbs than wings; lungs with air sacs.	Aves

26. Which of the following animals is not viviparous? [AIPMT 2015]
(a) Flying fox (Bat) (b) Elephant (c) Platypus (d) Whale

27. Metagenesis refers to
[RE-AIPMT 2015]

(a) Alternation of generation between asexual and sexual phases of an organism.
(b) Occurrence of a drastic change in form during post-embryonic development.
(c) Presence of a segmented body and parthenogenetic mode of reproduction.
(d) Presence of different morphic forms.

28. A jawless fish, which lays eggs in fresh water and whose ammocoetes larvae after metamorphosis return to the ocean is
[RE-AIPMT 2015]

(a) Myxine (b) Neomyxine
(c) Petromyzon (d) Eptatretus

29. Body having meshwork of cells, internal cavities lined with food filtering flagellated cells and indirect developments are the characteristics of phylum
[RE-AIPMT 2015]

(a) Porifera (b) Mollusca
(c) Protozoa (d) Coelenterata

30. Which of the following features is not present in the Phylum – Arthropoda?
[NEET - I, 2016]

(a) Chitinous exoskeleton (b) Metameric segmentation
(c) Parapodia (d) Jointed appendages

31. Which of the following characteristic features always holds true for the corresponding group of animals? [NEET - I, 2016]

(a) Cartilaginous endoskeleton – Chondrichthyes
(b) Viviparous – Mammalia
(c) Possess a mouth with an upper and a lower jaw – Chordata
(d) 3-chambered heart with one incompletely divided ventricle. – Reptilia

32. Which one of the following characteristics is not shared by birds and mammals?
[NEET - I, 2016]

(a) Ossified endoskeleton
(b) Breathing using lungs
(c) Viviparity
(d) Warm blooded nature

33. Choose the correct statement [NEET - II, 2016]
(a) All cyclostomes do not possess jaws and paired fins
(b) All reptiles have a three-chambered heart.
(c) All pisces have gills covered by an operculum
(d) All mammals are viviparous

NCERT EXEMPLAR QUESTIONS

1. In some animal groups, the body is found divided into compartments with at least some organs/organ repeated. This characteristic feature is named as
(a) Segmentation (b) Metamerism (c) Metagenesis (d) Metamorphosis

2. Given below are types of cells present in some animals. Each one is specialized to perform a single function except
(a) Choanocytes (b) Interstitial cells (c) Gastrodermal cells (d) Nematocytes

3. Which one of the following sets of animals share a four chambered heart?
(a) Amphibians, Reptiles, Birds
(b) Crocodiles, Birds, Mammals
(c) Crocodiles, Lizards, Turtles
(d) Lizards, Mammals, Birds

4. Which of the following pairs of animals has non-glandular skin?
(a) Snake and Frog
(b) Chameleon and Turtle
(c) Frog and Pigeon
(d) Crocodile and Tiger

5. Birds and mammals share one of the following characteristics as a common feature
(a) Pigmented skin
(b) Alimentary canal with some modification
(c) Viviparity
(d) Warm blooded nature

6. Which one of the following sets of animals belongs to a single taxonomic group?
(a) Cuttlefish, Jellyfish, Silverfish, Dogfish, Starfish
(b) Bat, Pigeon, Butterfly
(c) Monkey, Chimpanzee, Man
(d) Silkworm, Tapeworm, Earthworm

7. Which one of the following statements is incorrect?
(a) Mesoglea is present in between ectoderm and endoderm in Obelia.
(b) Radial symmetry is found in Asterias.
(c) Fasciola is a pseudocoelomate animal.
(d) Taenia is a triploblastic animal.

8. Which of the following statements is incorrect?
(a) In cockroaches and prawns, the excretion of waste material occurs through malpighian tubules.
(b) In ctenophores, locomotion is mediated by comb plates.
(c) In Fasciola, flame cells take part in excretion.
(d) Earthworms are hermaphrodite and yet cross fertilization takes place among them.

9. Which one of the following is oviparous?
(a) Platypus (b) Flying fox (Bat)
(c) Elephant (d) Whale

10. Which one of the following is not a poisonous snake?
(a) Cobra (b) Viper
(c) Python (d) Krait

11. Match the following list of animals with their level of organization.

	Division of Labour		**Animal**
a.	Organ level	i.	Pheritima
b.	Cellular aggregate level	ii.	Fasciola
c.	Tissue level	iii.	Spongilla
d.	Organ system level	iv.	Obelia

Choose the correct match showing the division of labour with animal example.
(a) (i)–(b), (ii)–(c), (iii)–(d) and (iv)–(a)
(b) (i)–(b), (ii)–(d), (iii)–(c) and (iv)–(a)
(c) (i)–(d), (ii)–(a), (iii)–(b) and (iv)–(c)
(d) (i)–(a), (ii)–(d), (iii)–(c) and (iv)–(b)

12. Body cavity is the cavity present between body wall and gut wall. In some animals the body cavity is not lined by mesoderm. Such animals are called
(a) Acoelomate (b) Pseudocoelomate
(c) Coelomate (d) Haemocoelomate

13. Match the column A with column B and choose the correct option.

	Column A		**Column B**
a.	Porifera	i.	Canal system
b.	Aschelminthes	ii.	Water–vascular system
c.	Annelida	iii.	Muscular Pharynx
d.	Arthropoda	iv.	Jointed appendages
e.	Echinodermata	v.	Metameres

(a) (a)–(ii), (b)–(iii), (c)–(v), (d)–(iv), (e)–(i)
(b) (a)–(ii), (b)–(v), (c)–(iii), (d)–(iv), (e)–(i)
(c) (a)–(i), (b)–(iii), (c)–(v), (d)–(iv), (e)–(ii)
(d) (a)–(i), (b)–(v), (c)–(iii), (d)–(iv), (e)–(ii)

Answer Keys

Practice Questions

1. (d)	2. (d)	3. (c)	4. (d)	5. (d)	6. (c)	7. (d)	8. (d)	9. (d)	10. (a)
11. (d)	12. (d)	13. (a)	14. (b)	15. (d)	16. (b)	17. (c)	18. (a)	19. (b)	20. (d)
21. (d)	22. (d)	23. (b)	24. (b)	25. (b)	26. (c)	27. (d)	28. (c)	29. (a)	30. (a)
31. (d)	32. (b)	33. (c)	34. (a)	35. (a)	36. (b)	37. (b)	38. (b)	39. (c)	40. (d)
41. (d)	42. (a)	43. (d)	44. (a)	45. (d)	46. (b)	47. (b)	48. (d)	49. (c)	50. (d)
51. (c)	52. (c)	53. (d)	54. (d)	55. (b)	56. (a)	57. (c)	58. (c)	59. (c)	60. (b)
61. (b)	62. (a)	63. (c)	64. (b)	65. (c)	66. (c)	67. (c)	68. (d)	69. (c)	70. (a)
71. (d)	72. (d)	73. (a)	74. (d)	75. (b)	76. (b)	77. (a)	78. (d)	79. (d)	80. (d)
81. (c)	82. (d)	83. (b)	84. (c)	85. (b)	86. (b)	87. (d)	88. (d)	89. (c)	90. (d)
91. (c)	92. (b)	93. (a)	94. (d)	95. (c)	96. (c)	97. (b)	98. (c)	99. (c)	100. (d)
101. (c)	102. (c)	103. (d)	104. (d)	105. (c)	106. (c)	107. (d)	108. (d)	109. (a)	110. (b)
111. (d)	112. (d)	113. (c)	114. (b)	115. (c)	116. (d)	117. (c)	118. (a)	119. (d)	120. (c)
121. (d)	122. (d)	123. (b)	124. (d)	125. (a)	126. (c)	127. (c)	128. (c)	129. (c)	130. (d)
131. (c)	132. (c)	133. (d)	134. (d)	135. (d)	136. (c)	137. (d)	138. (d)	139. (b)	140. (c)
141. (d)	142. (a)	143. (d)	144. (d)	145. (c)	146. (a)	147. (b)	148. (c)	149. (d)	150. (d)
151. (d)	152. (c)	153. (c)	154. (d)	155. (c)	156. (b)	157. (c)	158. (a)	159. (c)	160. (d)
161. (d)	162. (d)	163. (d)	164. (d)	165. (c)	166. (d)	167. (a)	168. (b)	169. (a)	170. (b)
171. (a)	172. (d)	173. (b)	174. (d)	175. (b)	176. (c)	177. (b)	178. (c)	179. (c)	180. (d)
181. (b)	182. (b)	183. (c)	184. (a)	185. (d)	186. (d)	187. (c)	188. (d)	189. (d)	190. (c)
191. (d)	192. (b)	193. (d)	194. (a)	195. (d)	196. (a)	197. (c)	198. (d)	199. (b)	200. (c)
201. (b)	202. (d)	203. (d)	204. (d)	205. (c)	206. (d)	207. (d)	208. (d)	209. (d)	210. (b)
211. (d)	212. (d)	213. (b)	214. (c)	215. (a)	216. (d)	217. (d)	218. (d)	219. (c)	220. (c)
221. (d)	222. (a)	223. (d)	224. (d)	225. (d)	226. (b)	227. (d)	228. (c)	229. (d)	230. (d)
231. (c)	232. (b)	233. (b)	234. (b)	235. (b)	236. (b)	237. (c)	238. (d)		

Assertion and Reason Questions

239. (b)	240. (b)	241. (b)	242. (b)	243. (b)	244. (c)	245. (b)	246. (d)	247. (a)	248. (c)
249. (a)	250. (b)	251. (b)	252. (b)	253. (b)	254. (a)	255. (d)	256. (a)	257. (a)	258. (a)
259. (d)	260. (a)	261. (d)	262. (a)	263. (a)	264. (a)	265. (a)	266. (a)	267. (a)	268. (a)
269. (b)	270. (a)	271. (c)	272. (a)	273. (d)					

Previous Year Questions

1. (d)	2. (d)	3. (c)	4. (a)	5. (a)	6. (c)	7. (c)	8. (d)	9. (a)	10. (c)
11. (a)	12. (d)	13. (b)	14. (a)	15. (c)	16. (a)	17. (a)	18. (c)	19. (c)	20. (b)
21. (d)	22. (b)	23. (b)	24. (b)	25. (b)	26. (c)	27. (a)	28. (c)	29. (a)	30. (c)
31. (a)	32. (c)	33. (a)							

NCERT Exemplar Questions

1. (b)	2. (b)	3. (b)	4. (b)	5. (d)	6. (c)	7. (c)	8. (a)	9. (a)	10. (c)
11. (c)	12. (b)	13. (c)							

Unit II

Structural Organization in Plants and Animals

Students Note

Unit II includes morphology and anatomy of living organism, mainly higher plants and animals. In this unit, the chapter on plant morphology is the most important chapter and demands special attention. It should be studied in more detail then the rest of the chapters in this book because of the variety of questions (for example, how many of the following have marginal type of placentation and then with the given examples, you have to find out the numbers of plants having that type of placentation) that can be prepared. Hence, pay careful attention to all the questions of this unit. You should also focus a lot on diagram of family, placentaion and aestivation. For structural organization and anatomy of plant, this book is more than sufficient. and by solving the questions present in this book, you should have excellent command on these chapters.

This page is intentionally left blank.

CHAPTER

5

Plant Morphology

PRACTICE QUESTIONS

The Root

1. Angiosperms are characterized by the presence of
(a) Roots and stem (b) Leaf and flowers (c) Fruit (d) All of these

2. In majority of dicot, the direct elongation of the radicle leads to the formation of
(a) Primary root (b) Secondary root (c) Tertiary root (d) None of these

3. The primary root and its branches constitute
(a) Fibrous root system (b) Tap root system
(c) Both (a) and (b) (d) None of these

4. In wheat (monocot)
(a) Primary root is short lived
(b) Primary root replaced by fibrous roots
(c) Fibrous roots arises from the base of stem
(d) All are correct

5. Adventitious roots are found in
(a) Grass (b) Monestra (c) Banyan tree (d) All of these

6. Adventitious roots arise from part other than
(a) Hypocotyl (b) Epicotyl (c) Plumule (d) Radicle

7. Functions of root are
(a) Absorption of water and mineral from soil
(b) Anchoring of plant in soil
(c) Storage of food material and synthesis of plant growth regulator
(d) All of these

8. What is the number of regions in which a root is divided?
(a) 1 (b) 2 (c) 3 (d) 4

9. Root is covered at the apex by a thimble-like structure called
(a) Root cap (b) Radicle (c) Coleorhiza (d) Coleoptile

10. The root region is arranged proximal to distal part in the following manner
(a) Zone of cell elongation– Zone of cell maturation – Zone of cell division
(b) Zone of cell division – Zone of cell elongation – Zone of cell maturation
(c) Zone of cell maturation– Zone of cell elongation – Zone of cell division
(d) Zone of cell maturation – Zone of cell division – Zone of cell elongation

11. Root hairs arise from
(a) Zone of cell division (b) Zone of cell elongation
(c) One of cell maturation (d) All of these

12. Find out the incorrect statement:
(a) Root hair absorbs water and mineral from the soil.
(b) Root increases in length due to region of elongation.
(c) Meristematic region have thin walled cell with dense cytoplasm.
(d) Root cannot synthesize plant growth regulators.

13. Which of the following is an exception for the modification of the tap root?
(a) Carrot (b) Turnip (c) Sweet potato (d) All of these

14. Prop or pillar roots are found in
(a) Carrot (b) Sweet potato (c) Banyan tree (d) Maize

15. Maize and sugarcane contain
(a) Storage root (b) Stilt root
(c) Pneumatophores (d) Prop roots

16. Find out the incorrect statement:
(a) Sweet potato has root modification for storage of food.
(b) Still root arises from lower nodes of the stem.
(c) Rizophora posses pneumatophores.
(d) Pneumatophores are meant for anaerobic respiration.

The Stem

17. Which of the following is incorrect of stem?
(a) It is developed from the plumule of embryo of a germinating seed.
(b) It bears nodes and internodes.
(c) It bears only terminal bud not axillary bud.
(d) Its main function is spreading of branches and bear leaves, flowers and fruits.

18. Functions of stem are
(a) Conduct water, mineral and photosynthates.
(b) Some perform storage food, support and protection.
(c) Some perform function of vegetative propagation.
(d) All of these

19. Young stems are generally
(a) Woody (b) Dark brown in color
(c) Green and photosynthetic (d) All of these

20. Underground stem stores food in the following except
(a) Zaminkand (b) Colocasia (c) Ginger (d) Sugarcane

21. Which stem act as an organ of perennation?
(a) Potato (b) Ginger (c) Colocasia (d) All of these

22. Which of the following is a gourd?
(a) Cucumber (b) Pumpkins (c) Watermelon (d) All of these

23. Which of the following is correct about gourds?
(a) Stem tendril develops from apical bud.
(b) Stem tendril are slender and spirally coiled.
(c) Stem tendril doesn't help in climbing.
(d) Stem tendril develops from radicle.

24. Select the incorrect matching:
(a) Thorn – Citrus, Bougainvillea
(b) Flattened stem – Opuntia
(c) Underground stem – Turmeric
(d) Stem tendril – Colocasia

25. The lateral branches original from basal and underground portion of the main stem, grow horizontally beneath the soil and then come out obliquely upward giving rise to leafy shoots seen in case of
(a) Banana (b) Pineapple (c) Chrysanthemum (d) All of these

26. A slender lateral branch arises from the base of the main axis and after growing aerially for sometime arch downward to touch the ground seen in case of
(a) Mint (b) Jasmine (c) Pistia (d) Both (a) and (b)

27. A lateral branch with short internodes and each node bearing a rosette of leaves and a tuft of roots are found in aquatic plants like
(a) Pistia (b) Eichhornia (c) Wolffia (d) Both (a) and (b)

28. Select the correct statement from the following:
A. Fleshy cylindrical stem in Euphorbia carry out photosynthesis.
B. Pistia and eichhornia are example of offset.
C. Underground stem of grass and strawberry spread to new niche and when older part die new plants are formed.
D. Thorns are woody, straight and pointed.
(a) A and B only (b) B and D only (c) B and C only (d) All of these

29. The most important vegetative organ for photosynthesis is
(a) Stem (b) Leaf (c) Root (d) All of these

The Leaf

30. Which of the following is correct about leaf?
(a) It has originated from root apical meristem.
(b) It is arranged in basipetal order.
(c) It arises from axillary bud.
(d) It bears a bud in its axil.

31. Which of the following is incorrect about leaf?
(a) It is arranged in acropetal order
(b) It develops from node
(c) It is generally flattened in shape
(d) It is arranged in basipetal order

32. Typical leaf consist of
(a) Petiole (b) Leaf base (c) Lamina (d) All of these

33. The leaf is attached to the stem by the leaf base and may bear two lateral small leaf like structure called
(a) Leaflet (b) Lamina (c) Stipule (d) Leaf blade

34. Select the correct statement from the following:
A. In monocot leaf, the base expands into a sheath covering the stem partially or wholly.
B. In all leguminous plants, the leaf base may become swollen, which is called the pulvinus.
C. The lamina or leaf blade is the green expanded part of the leaf with veins and veinlets.
D. Veins provide rigidity to leaf blade.
(a) A and B only (b) C and D only (c) All except B (d) All except D

35. Leaf can be differentiated by
(a) Shape (b) Margin and apex (c) Surface (d) All of these

36. Long thin _____ petiole allows the leaf blade to flutter in wind, thereby cooling of the leaf and bringing _____ air to leaf surfaces.
(a) Hard, fresh (b) Flexible, fresh (c) Hard, fresh (d) Rigid, fresh

37. The arrangement of arteries and arterioles in the lamina of leaf is termed as
(a) Venation (b) Phyllotaxy (c) Inflorescence (d) None of these

38. Which of the following is correct about venation?
A. Parallel venation is generally found in monocot.
B. Parallel venation is generally found in dicot.
C. Reticulate venation is generally found in monocot.
D. Reticulate venation is generally found in dicot.
(a) A and D only (b) B and C only (c) B and D only (d) A and C only

39. Bud is present in axil
(a) Simple leaf (b) Compound leaf (c) Leaflet (d) Both (a) and (b)

40. Pinnately compound leaf found in
(a) Lemon (b) Bombax (c) Desmodium (d) Neem

41. Palmately compound leaf is found in
(a) Neem (b) Rose (c) Silk cotton (d) Mimosa pudica

42. Find out the correct matching:
A. Palmately compound leaves – Leaf let attached to common axis rachis
B. Phyllotaxy – Pattern of arrangement of leaves on stemor branch
C. Pinnately compound leaves – Leaflet attached to a common point i.e. at the tip of petiole
D. Venation – Arrangement of veins and veinlets in the lamina of leaf
(a) A and B only (b) B and C only (c) C and D only (d) B and D only

43. Phyllotaxy is usually of three types, namely,
(a) Alternate (b) Whorled (c) Opposite (d) All of these

44. Select the correct matching:

Column I	**Column II**	**Column II**
A. Alternate	X. Single leaf arises at each node	1. China Rose, mustard, sunflower
B. Whorled	Y. More than 2 leaf arises at node	2. Alstonia
C. Opposite	Z. Pair of leaf arises at node	3. Calotropis and guava

(a) A–X–1, B–Y–2, C–Z–3 (b) A–Y–3, B–Z–2, C–X–1
(c) A–Y–3, B–Z–1, C–Y–2 (d) A–Z–3, B–Y–2, C–X–1

45. Which of the following posses alternate phyllotaxy except?
(a) Mustard (b) China rose (c) Sunflower (d) Calotropis

46. In which plant the leaves are small and short-lived. The petiole in these plant expand, become green and synthesize food, such petiole is known as phyllode?
(a) Sweat pea (b) Clematis (c) Australian acacia (d) Eichhornia

47. Select the incorrect matching:
(a) Leaf into tendril – Pea
(b) Leaf into spine – Cacti
(c) Fleshy leaf – Onion and garlic
(d) Whorled phyllotaxy – Calotropis

48. Which of the following pair represent insectivorous plant?
(a) Pitcher plant, australian acacia
(b) Venus fly trap, calotropis
(c) Pitcher plant, venus fly trap
(d) Silk cotton, neem

49. In pitcher plant, the pitcher is modified into
(a) Root (b) Stem (c) Leaf (d) Flower

50. In floral meristem
(a) Internode does not elongate
(b) Axis get condensed
(c) The apex produced different kinds of floral appendages laterally at successive nodes instead of leaves.
(d) All of these

The Inflorescence

51. The arrangement of flowers on the floral axis is termed as
(a) Phyllotaxy (b) Aestivation (c) Inflorescence (d) Placentation

52. In cymose the type of inflorescence is
A. Main axis terminates into flower.
B. Flower born in basipetal order.
C. Main axis not terminates into flower.
D. Flower born in acropetal order.
(a) A and B only (b) C and D only (c) A and C only (d) B and C only

53. In racemose type of inflorescence,
A. Main axis terminates into flower.
B. Flower born in basipetal order.
C. Main axis not terminates into flower.
D. Flower born in acropetal order.
(a) A and B only (b) C and D only (c) A and C only (d) B and C only

The Flower

54. Which of the following is correct about flower?
A. Reproductive unit in angiosperm.
B. Calyx and corolla are reproductive organs.
C. Typical flower has four kinds of whorls.
D. Whorls arranged successively on thalamus or receptacle.
(a) All except C (b) All except D (c) All except B (d) All except A

55. Select the incorrect matching:

A. Actinomorphic – When flower can be divided into two equal radial halves in any radial plane passing through the centre.

B. Zygomorphic – When flower can be divided into two similar halves only in one particular vertical plane.

C. Asymmetric – When flower cannot be divided into two similar halves by any vertical plane passing through centre.

D. All are correct

56. Asymmetric flower is found in

(a) Pea (b) Datura (c) Bean (d) Canna

57. How many of the following contains zygomorphic flower?

Pea, Gulmohur, Bean, Cassia, Mustard, Datura, Chilli, Sesbania, Lupin, Muliathi

(a) 6 (b) 7 (c) 4 (d) 8

58. The reduced leaf found at the base of the pedicel is known as

(a) Leaflet (b) Stipule (c) Bract (d) Calyx

59. Based on the position of calyx, the corolla and androecium in respect of the ovary on thalamus, the flower is of how many types

(a) 1 (b) 2 (c) 3 (d) 4

60. Select the correct matching:

Column I	Column II	Column III
1. Hypogynous	A. Gynoecium occupies the highest position	X. Mustard, Brinjal, China rose
2. Epigynous	B. Gynoecium is situated in the centre	Y. Plum, peach, rose
3. Perigynous	C. Margin of thalamus grows upward enclosing ovary completely	Z. Guava, cucumber, ray florets of sunflower

(a) 1–A–X, 2–B–Y, 3–C–Z (b) 1–A–X, 2–C–Z, 3–B–Y

(c) 1–B–Y, 2–A–X, 3–C–Z (d) 1–A–X, 2–B–Z, 3–C–Y

61. Which flower posses superior ovary?

(a) Mustard (b) China rose (c) Brinjal (d) All of these

62. Select the correct matching:

(a) Gamosepalous – Sepal is united (b) Polysepalous – Sepals are free

(c) Gamopetalous – Petals are united (d) All of these

63. The shape of corolla may be

(a) Tubular (b) Funnel-shaped (c) Bell-shaped (d) All of these

64. The mode of arrangement of sepals or petals in floral bud with respect to its other members of the same whorl are known as

(a) Phyllotaxy (b) Inflorescence (c) Aestivation (d) Hibernation

65. Sepals or petals in a whorl just touch one another at the margin, without overlapping is found in

(a) China rose (b) Pea (c) Cassia (d) Calotropis

66. Twisted aestivation is found in all except

(a) Cotton (b) China rose (c) Lady's finger (d) Gulmohar

67. If the margins or sepals or petals overlap one another but not in any particular direction is known as _____ aestivation.
(a) Vexillary (b) Twisted (c) Imbricate (d) Gulmohar

68. Which is false for vexillary or papilionaceous aestivation?
(a) Two smallest anterior petals are known as keel.
(b) Two lateral petals are known as wing.
(c) The largest standard petal is posterior.
(d) The largest standard petal is anterior and overlaps wing.

69. Select the correct matching:

Aestivation	–	**Example**
(a) Valvate	–	Cassia
(b) Twisted	–	China rose, ladyfinger, calotropis
(c) Imbricate	–	Cassia and Gulmohar
(d) Vexillary	–	Pea, Bean, Aloe, Tulip

70. Stamen consists of
(a) Stalk or filament (b) Stigma (c) Anther (d) Both (a) and (c)

71. Anther usually posses
(a) One sac (b) Two sacs (c) Three sacs (d) Four sacs

72. A sterile stamen is called
(a) Monadelphous (b) Epipetalous (c) Epiphyllous (d) Staminode

73. Epiphyllous stamens are found in
(a) Sunn hemp (b) Ashwagandha (c) Mustard (d) Lily

74. Epipetalous stamens are found in
(a) Trifolium (b) Brinjal (c) Asparagus (d) Indigofera

75. The stamens are united into one bunch (Monoadelphous) condition is found in
(a) Pea (b) Citrus (c) Arhar (d) China rose

76. Diadelphous condition is found in
(a) Citrus (b) Pea (c) China rose (d) Tomato

77. A carpet consists of
(a) Stigma (b) Ovary (c) Style (d) All of these

78. Which of the following is incorrect about carpet?
(a) Ovary is enlarged basal portion (b) Stigma is usually at tip of style
(c) Style is elongated tube over ovary (d) Style is the receptive surface for pollen grains

79. Apocarpous condition is found in
(a) Mustard (b) Tomato (c) Lotus (d) All of these

80. Syncarpous condition is found in
(a) Mustard (b) Lotus (c) Rose (d) All of these

81. After fertilization
(a) Ovule develops into seed (b) Ovary matures to fruit
(c) Ovary wall changes to fruit wall (d) All of these

82. Arrangement of ovules within the ovary is known as
(a) Placentation (b) Aestivation (c) Fragmentation (d) Hibernation

83. Match the column:

Column I	–	**Column II**
A. Marginal	–	1. Pea
B. Parietal	–	2. Mustard and argemone
C. Axile	–	3. Dianthus and primrose
D. Central and free central	–	4. China rose, tomato, lemon
E. Basal	–	5. Sunflower and marigold

(a) A–1, B–2, C–4, D–3, E–5 (b) A–2, B–1, C–3, D–4, E–5
(c) A–4, B–1, C–3, D–5, E–4 (d) A–5, B–2, C–4, D–2, E–3

84. Ovary is one-chambered but it becomes two chambered due to the formation of false septum is found in
(a) Argemone and mustard (b) Dianthus and primrose
(c) Rose and tomato (d) Pea

85. A placentation in which ovule are born on central axis and septa are absent, is found in
(a) Argemone and mustard (b) Dianthus and primrose
(c) Rose and tomato (d) Pea

86. A placentation, in which placenta develops at the base of ovary and a single ovule is attached, is found in
(a) Argemone and mustard (b) Dianthus and primrose
(c) Rose and tomato (d) Sunflower and marigold

The Fruit

87. Fruit is
(a) The resultant ripened ovary (b) Formed generally after fertilization
(c) A characteristic feature of flowing plant (d) All of these

88. What is the name of the pericarp when it is thick and fleshy?
(a) Epicarp (b) Mesocarp (c) Endocarp (d) All of these

89. In which fruit the mesocarp is fibrous?
(a) Mango (b) Coconut (c) Both (a) and (b) (d) None of these

90. Which is the edible part in mango?
(a) Thin epicarp (b) Fleshy mesocarp
(c) Stony hard endocarp (d) All of these

91. In coconut and mango, the fruit is known as
(a) Legume (b) Pod (c) Drupe (d) Samara

92. If fruit is developed without fertilization of the ovary, it is called
(a) Parthenocarpic fruit (b) Apomictic fruit
(c) Fleshly fruit (d) Polyembryonic fruit

93. Mango is developed from
(a) Monocarpellary inferior ovary (b) Monocarpellary superior ovary
(c) Multicarpellary inferior ovary (d) Multicarpellary superior ovary

The Seed

94. Seed is made up of
(a) Seed coat (b) Embryo (c) Both (a) and (b) (d) None of these

95. Embryo is made up of
(a) A radicle (b) Embryonal axis
(c) One or two cotyledons (d) All of these

96. The following are monocots except
(a) Wheat (b) Maize (c) Sugarcane (d) Gram

97. The following are dicots except
(a) Bean (b) Gram (c) Pea (d) Maize

98. Which of the following is correct about dicot seed?
A Micropyle is present above the hilum.
B. At the ends of embryonal axis the radicle and plumule is present.
C. Seed coat has 3 layers.
D. Cotyledons are generally without food reserve.
(a) A and B only (b) B and C only (c) C and D only (d) A and D only

99. Following are the non-endospermic seed except
(a) Bean (b) Gram (c) Pea (d) Castor

100. Which layer is called aleurone layer?
(a) Protein (b) Carbohydrate (c) Lipid (d) All of these

101. The plumule and radical in monocot seed are enclosed in sheaths which are called _____ and _____ respectively.
(a) Coleoptile and scutellum (b) Scutellum and coleorhiza
(c) Coleoptile and coleorhiza (d) Coleorhiza and coleoptile

102. Select the incorrect statement among the following:
A. Monocot seeds are generally endospermic.
B. In maize, the seed coat is membranous and is generally fused with fruit wall.
C. In monocot seed, the single large shield shape cotyledon is known as scutellum.
D. In orchids, the seeds are non-endospermic.
(a) A and B only (b) C only (c) D only (d) None of these

103. Which family is known as the 'potato' family?
(a) Fabaceae (b) Solanaceae
(c) Liliaceae (d) Cruciferae (Brassicaceae)

Technical Description of Flowering Plant

104. Find out the correct matching:

A. Br	–	1. Bracteate
B. K	–	2. Calyx
C. C	–	3. Corolla
D. A	–	4. Gynoecium
E. G	–	5. Androecium
F. $\underline{G}$	–	6. Superior ovary
G. ♂	–	7. Male
H. ⚥	–	8. Bisexual
I. ⊕	–	9. Actinomorphic

J. % – 10. Zygomorphic
K. ♀ – 11. Female

(a) 1–B, 2–C, 3–E, 4–K, 5–A, 6–J, 7–I, 8–F, 9–H, 10–D, 11–G
(b) 1–C, 2–A, 3–B, 4–E, 5–D, 6–G, 7–I, 8–H, 9–F, 10–J, 11–K
(c) 1–K, 2–J, 3–I, 4–H, 5–G, 6–F, 7–D, 8–E, 9–C, 10–B, 11–A
(d) 1–A, 2–B, 3–C, 4–E, 5–D, 6–F, 7–G, 8–H, 9–I, 10–J, 11–K

105. The stem of fabaceae are
(a) Erect or climber.
(b) Herbaceous rarely woody, aerial, erect, cylindrical, branched solid.
(c) Herbaceous with underground bulb/corms/rhizomes
(d) All of these

106. Find out from the following the total number of plants with stipulate leaves.
Gram, Arhar, Moong, Sesbania, Lupin, Muliathi, Soyabean, Tomato, Brinjal, Belladona, Petunia, Tobacco, Tulip, Aloe, Colchicine, Asparagus, Chilli, Ground nuts, Indigofera, Sunhemp
(a) 7 (b) 10 (c) 15 (d) 20

107. Select the incorrect pair:
(a) Indigofera – Sepals five (Gamosepalous), corolla (Vexillary aestivation)
(b) Brinjal – Sepals five united (persistent, valvate aestivation) Petals five united (valvate aestivation)
(c) Asparagus – Sepals three often united into tube (valvate aestivation)
(d) Colchicine – Perianth present tepals six (valvate aestivation)

108. Select from the following the total number of plant showing tricarpellary gynoceium.
Gram, Arhar, Moong, Sesbania, Lupin, Muliathi, Soyabean, Tomato, Brinjal, Belladona, Petunia, Tobacco, Tulip, Aloe, Colchicine, Asparagus, Chilli, Ground nuts, Indigofera, Sunhemp
(a) 7 (b) 10 (c) 4 (d) 6

109. Select from the flowing the total number of plant having epipetalous stamens.
Gram, Arhar, Moong, Sesbania, Lupin, Muliathi, Soyabean, Tomato, Brinjal, Belladona, Petunia, Tobacco, Tulip, Aloe, Colchicine, Asparagus, Chilli, Ground nuts, Indigofera, Sunhemp
(a) 7 (b) 6 (c) 8 (d) 10

110. The fruit of Liliaceae is mainly
(a) Drupe (b) Ovary (c) Legume (d) Capsule

111. Which is correct for the gynoecium of Liliaceae?
(a) Tricarpellary, syncarpous, superior ovary, trilocular with many ovule, axile placenation.
(b) Bicarpellary, syncarpous, superior ovary, bilocular, swollen placenta with many ovule.
(c) Superior ovary, monocarpellary, unilocular with many ovules.
(d) Tricarpellary, inferior ovary, syncarpous, trilocular with many ovules, axile placentation.

112. Select from the following the total number of plant showing axile placentation.
Dianthus, primrose, china rose, tomato, lemon, tulip, aloe, asparagus, cholchicine, trifolium, lupin, arhar
(a) 6 (b) 7 (c) 8 (d) 9

113. Select the incorrect matching:
(a) Ornamental – Tulip, gloriosa, lupin, sweet pea, petunia
(b) Medicine – Muliathi, belladonna, aloe
(c) Fodder – Sesbania, trifolium
(d) Edible oil – Soyabean, groundnut, colchicine

114. Select from the following the total number of plant having non-endospermic seed.
Gram, Arhar, Moong, Sesbania, Lupin, Muliathi, Soyabean, Tomato, Brinjal, Belladona, Petunia, Tobacco, Tulip, Aloe, Colchicine, Asparagus, Chilli, Ground nuts, Indigofera, Sunhemp
(a) 10 (b) 15 (c) 20 (d) 6

115. Diadelphous condition is seen in all except
(a) Soyabean (b) Lupin (c) Brassica rapa (d) China rose

116. Inflorescence in makoi is
(a) Racemose (b) Cymose (c) Catkin (d) None of these

117. Zygomorphic flower is found in
(a) Aloe (b) Potato (c) Sesbania (d) Ashwagandha

118. Botanical name of onion is
(a) Allium sativum (b) Solanum melogena
(c) Allium cepa (d) Brassica rapa

119. Which of the following is correct about chilli?
(a) Gamosepalous (C), gamopetalous (K), epipetalous stamen, superior ovary.
(b) Gamosepalous (C), stamen five, superior ovary.
(c) Gamosepalous (C), polypetalous (K), diadelphous (A), superior ovary.
(d) Polyseplous (C), gamopetalous (K), epipetalous stamen, superior ovary.

120. 'Lily' family stands for
(a) Solanaceae (b) Liliaceae (c) Fabaceae (d) Brassicaeae

121. Select the correct matching:
(a) Vegetable – Colchicine (b) Medicine – Tulip
(c) Ornamental – Asparagus (d) Medicine – Belladonna, ashwagandha

122. The floral formula of Brassicaceae is
(a) $\oplus ♂♀ K_{2-2}C_4A_{2+4}\underline{G}_{(2)}$ (b) $\oplus ♂♀ K_{2+2}C_4A_{2+4}\underline{G}_{(2)}$
(c) $\oplus ♂♀ K_{2+(2)}C_4A_{2-4}\underline{G}_{(2)}$ (d) $\oplus ♂♀ K_{2+2}C_{(4)}A_{2+4}\underline{G}_2$

123. Select the dye from the following:
(a) Sesbania (b) Sunhemp (c) Lupin (d) Indigofera

124. Monocarpellary condition is found in
(a) Groundnut (b) Petunia (c) Lily (d) Allium cepa

125. The floral formula of Liliaceae is
(a) $\oplus ♂♀ P_{3+3}A_{3+3}\underline{G}_{(3)}$ (b) $\oplus ♂♀ P_{3-3}A_{3+3}\underline{G}_{(3)}$
(c) $P_{3+3}A_{3+3}\underline{G}_{(3)}\oplus$ (d) $\oplus ♂♀ P_{3+3}A_{3+3}G_{(3)}$

126. Which of the following is a source of medicine?
(a) Petunia (b) Asparagus (c) Gloriosa (d) Aloe

127. Floral formula of solanaceae is
(a) $\oplus ⚥\ \overparen{C_{(5)}\ A_{(5)}}\underline{G}_{(2)}K_{(5)}$
(b) $\oplus ⚥\ K_{(5)}\overparen{C_{(5)}\ A_{(5)}}\underline{G}_{(2)}$
(c) $\oplus ⚥\ K_{(5)}\overparen{C_{(5)}\ A_{(5)}}G_{(2)}$
(d) $\oplus ⚥\ K_{(5)}\overparen{C_{(5)}\ A_{(5)}}G_{(2)}$

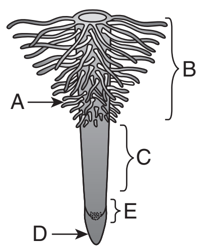
128. The floral formula of fabaceae is
(a) $\oplus ⚥\ K_{(5)}C_{1+2+(2)}A_{(9)+1}\underline{G}_1$
(b) $\oplus ⚥\ K_{(5)}C_{1+2-(2)}A_{(9)+1}G_1$
(c) $\oplus ⚥\ K_{(5)}C_{1+2}A_{9+1}G_1$
(d) $\oplus ⚥\ K_{(5)}C_{1+2+2}A_{(9)-1}G_1$

129. Select the incorrect statement for liliaceae from the following:
(a) Bisexual, zygomorphic flower
(b) Bisexual, actinomorphic flower
(c) Leaves are mostly basal, exstipulate with parallel venation
(d) Tepal shows valvate aestivation

130. Tomato, Brinjal and potato belongs to the family called
(a) Brassicaceae (b) Solanaceae (c) Liliaceae (d) Fabaceae

131. The botanical name of makoi is
(a) Solanum tuberosum
(b) Solanum melongena
(c) Solanum lycopersicum
(d) Solanum nigrum

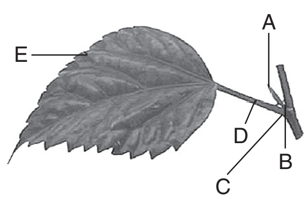
132. What indicates A to E in the below figure.



(a) A–Region of maturation, B–Root cap, C–Region of meristematic activity, D–Root hair, E–Region of elongation
(b) A–Root hair, B–Region of maturation, C–Region of elongation, D–Root cap, E–Region of meristematic activity
(c) A–Root cap, B–Region of maturation, C–Region of elongation, D–Root hair, E–Region of meristemetic activity
(d) A–Region of meristematic activity, B–Region of elongation, C–Region of maturation, D–Root hair, E–Root cap

Diagram Based Questions

133. Identify the parts of A to E in the below figure?

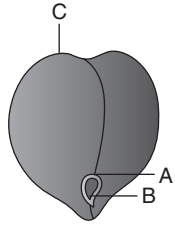


(a) A–Leaf base, B–Petiole, C–Stipule, D–Lamina, E–Axillary bud
(b) A–Stipule, B–Axillary bud, C–Leaf base, D–Petiole, E–Lamina
(c) A–Lamina, B–Stipule, C–Petiole, D–Leaf base, E–Axillary bud
(d) A–Stipule, B–Leaf base, C–Axillary bud, D–Lamina, E–Petiole

134. What indicates A to E in the below figure.

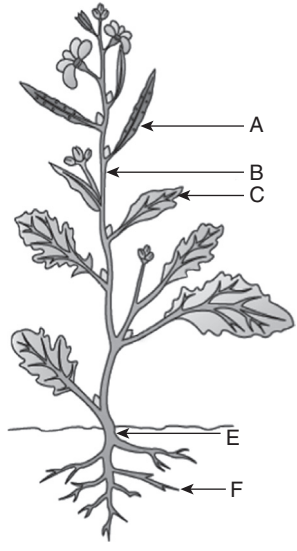
(a) A–Gynoecium, B–Calyx, C–Corolla, D–Pedicel, E–Androecium
(b) A–Corolla, B–Calyx, C–Gynoecium, D–Androecium, E–Pedicel
(c) A–Androecium, B–Gynoecium, C–Corolla, D–Calyx, E–Pedicel
(d) A–Calyx, B–Gynoecium, C–Pedicel, D–Androecium, E–Corolla

135. Identify the A to C in dicotyledonous seed.



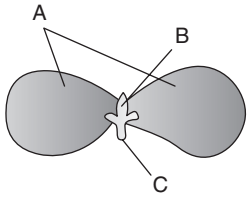
(a) A–Hilum, B–Micropyle, C–Seed coat
(b) A–Seed coat, B–Hilum, C–Micropyle
(c) A–Micropyle, B–Seed coat, C–Hilum
(d) A–Micropyle, B–Hilum, C–Seed coat

136. Identify the A to F in this figure.



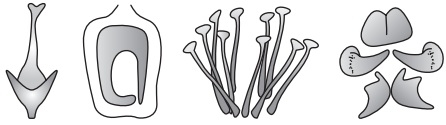
(a) A–Stem, B–Secondary root, C–Bud, D–Primary root, E–Leaf, F–Fruit
(b) A–Fruit, B–Stem, C–Leaf, D–Bud, E–Primary root, F–Secondary root
(c) A–Bud, B–leaf, C–Primary root, D–Fruits, E–Secondary root, F–Stem
(d) A–Fruit, B–Leaf, C–Stem, D–Bud, E–Secondary root, F–Primary root

137. Identify the A, B and C in this figure.



(a) A–Plumule, B–Cotyledon, C–Radicle
(b) A–Radicle, B–Cotyledon, C–Plumule
(c) A–Cotyledon, B–Plumule, C–Radicle
(d) A–Radicle, B–Plumule, C–Cotyledon

138. Identify the A to D in this figure.



(a) A–Petals, B–Carpel, C–Basal, D–Androecium
(b) A–Androecium, B–Basal, C–Carpel, D–Petals
(c) A–Basal, B–Androecium, C–Petals, D–Carpel
(d) A–Carpel, B–Basal, C–Androecium, D–Petals

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion .
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

139. **Assertion:** Old root hairs are replaced by new ones.
Reason: Outer cells of root gives rise to root hairs.

140. **Assertion:** Adventitious roots develop from any part of plant.
Reason: In such plants, the tap root is not developed.

141. **Assertion:** Generally,the dicotyledonous plants have tap roots while monocotyledonous plants having fibrous roots.
Reason: The roots in some plants get modified for storage of food, mechanical support and respiration.

142. **Assertion:** Assimilatory roots can photosynthesize.
Reason: Asimilatory roots possess chlorophyll.

143. **Assertion:** Epiphytes are called space parasites.
Reason: Epiphytic roots possess velamen tissue.

144. **Assertion:** The flower is modified shoot meant for sexual reproduction.
Reason: Flowers are arranged in different types of inflorescence.

145. **Assertion:** The plumule enclosed in sheath are called coleoptile.
Reason: The radicle enclosed in sheath are called coleorhiza.

146. **Assertion:** In plants such as bean,gram and pea seeds are called non-endospermous.
Reason: The endosperm inis not present in mature seeds of above plants.

147. **Assertion:** Sucker is an underground stem.
Reason: Sucker stem never comes above the ground.

148. **Assertion:** In mango and coconut , the fruit is known as drupe.
Reason: The fruit develope in above plant are monocarpellary superior ovary and are one seeded.

149. **Assertion:** Actinomorphic flowers show radial symmetry.
Reason: Zygomorphic flowers have bilateral symmetry.

150. **Assertion:** Maize is an albuminous seed.
Reason: Endosperm is completely absorbed by its growing embryo.

151. **Assertion:** Pneumatophores are respiratory roots.
Reason: Pneumatophores help to get oxygen for respiration

152. **Assertion:** Petals are usually bright coloured
Reason: Petals attract insect for pollination.

153. **Assertion:** Thorns are found in plants such as citrus and bougainvillea.
Reason: Thorns protect plant from grazing animals

154. **Assertion:** Phylloclade (flattened stem of plant like opuntia) helps the plant to grow in dry habitats.
Reason: Very low transpiration occurs from stems.

155. **Assertion:** Parallel venation is the characteristics of most of monocots.
Reason: In parallel venation veins run parallel to each other with in a leaf lamina.

156. **Assertion:** Phyllode in *Australian acacia* is a flattened petiole not stem.
Reason: Phyllode doesn't contain nodes and internodes.

157. **Assertion:** Leaves are modified into spines in Cacti.
Reason: It protect plant from grazing animals and excessive transpiration

158. **Assertion:** The ovary is binocular in family *Brassicaceae*
Reason: True septum called replum develops between two parietal placentas in member of family Brassicaceae.

159. **Assertion:** Banana is seedless fruit.
Reason: Banana is developed by parthenocarpy.

160. **Assertion:** Flower is zygomorphic in family *Fabaceae*
Reason: Corolla shows vexillary aestivation.

161. **Assertion:** Maize has stilt roots.
Reason: They give additional support and allow better absorption of water and mineral salts

162. **Assertion:** Stem bears nodes and internodes
Reason: Stem is always aerial.

163. **Assertion:** Calyx and corolla are accessory organs of the flower.
Reason: They do not directly involve in sexual reproduction.

164. **Assertion:** In hypogynous flower ovary is always inferior.
Reason: Parts of flower in hypogynous condition arises above ovary.

165. **Assertion:** Vexillary aestivation is known as *papilionaceous* aestivation
Reason: It is found in family *papilionaceae*

166. **Assertion:** Formation of phyllode is a mechanism to reduce transpiration.
Reason: It is vertically placed and has fewer stomata

167. **Assertion:** In China rose stamens said to be monadelphous.
Reason: In China rose fusion of filament of stamens forms a single group.

168. **Assertion:** In tetradynamous condition stamens are of unequal length.
Reason: In didynamous condition all stamens are of equal length.

169. **Assertion:** Custard apple is example of aggregate fruit
Reason: It is developed from flower having polycarpellary apocarpous gynoecium.

PREVIOUS YEAR QUESTIONS

1. Which one of the following is a xerophytic plant in which the stem is modified into the flat green and succulent structure?

[AIPMT MAINS 2010]

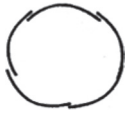
(a) Opuntia (b) Casuarina (c) Hydrilla (d) Acacia

2. Aestivation of petals in the flower of cotton is correctly shown in

[AIPMT MAINS 2010]

(a) 

(b) 

(c) 

(d) 

3. The correct floral formula of soyabean is

[AIPMT MAINS 2010]

(a) $\oplus ⚥ K_{(5)} C_{1+(2)+2} A_{(9)+1} \underline{G}_1$
(b) $\oplus ⚥ K_5 C_{1+(2)+2} A_{(9)+1} \underline{G}_1$
(c) $\oplus ⚥ K_{(5)} C_{1+2+(2)} A_{(9)+1} \underline{G}_1$
(d) $\oplus ⚥ K_{(5)} C_{1+2+(2)} A_{1+(9)} \underline{G}_1$

4. Consider the following four statements (A), (B), (C) and (D) and select the right option for two correct statements.

Statements:

(A) In vexillary aestivation, the large posterior petal is called standard, two lateral ones are wings and two small anterior petals are termed keel.
(B) The floral formula for liliaceae is $\oplus ⚥ P_{3+3} A_{3+3} \underline{G}_3$
(C) In pea flower, the stamens are monadelphous.
(D) The floral formula for Solanaceae is $\oplus ⚥ K_{(3)} C_{(3)} A_{(4)} \underline{G}_{(2)}$

The correct statements are

[AIPMT MAINS 2010]

(a) (A) and (C) (b) (A) and (B) (c) (B) and (C) (d) (C) and (D)

5. In unilocular ovary with a single ovule, the placentation is

[AIPMT PRE 2010]

(a) Marginal (b) Basal (c) Free central (d) Axile

6. Keel is the characteristic of the flowers of

[AIPMT PRE 2010]

(a) Gulmohar (b) Cassia (c) Calotropis (d) Bean

7. Ovary is half-inferior in the flowers of

[AIPMT PRE 2010]

(a) Guava (b) Plum (c) Brinjal (d) Cucumber

8. The technical term used for the androecium in a flower of China rose (Hibiscus rosa sinensis) is

[AIPMT PRE 2010]

(a) Monadelphous
(b) Diadelphous
(c) Polyandrous
(d) Polyadelphous

9. Coiling of garden pea tendrils around any support is an example of

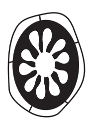
[AIPMT PRE 2010]

(a) Thigmotaxis
(b) Thigmonasty
(c) Thigmotropism
(d) Thermotaxis

10. Which one of the following figures represents the placentation in dianthus?

[AIPMT MAINS 2011]

(a) 

(b) 

(c) 

(d) 

11. Whorled, simple leaves with reticulate venation are present in

[AIPMT MAINS 2011]

(a) Calotropis (b) Neem
(c) China rose (d) Alstonia

12. Which one of the following statements is correct?

[AIPMT PRE 2011]

(a) Seeds of orchids have oil-rich endosperm.
(b) Placentation in primrose is basal.
(c) Flower of tulip is a modified shoot.
(d) In tomato, the fruit is a capsule.

13. The 'Eyes' of the potato tuber are:

[AIPMT PRE 2011]

(a) Flower buds (b) Shoot buds
(c) Axillary buds (d) Root buds

14. Flowers are zygomorphic in

[AIPMT PRE 2011]

(a) Gulmohar (b) Tomato
(c) Datura (d) Mustard

15. A drupe is developed in

[AIPMT PRE 2011]

(a) Wheat (b) Pea
(c) Tomato (d) Mango

16. Which one of the following is wrongly matched?

[AIPMT PRE 2011]

(a) Puccinia - Smut
(b) Root - Exarch protoxylem
(c) Cassia - Imbricate aestivation
(d) Root pressure - Guttation

17. The ovary is half inferior in flowers of

[AIPMT PRE 2011]

(a) Cucumber (b) Cotton
(c) Guava (d) Peach

18. The correct floral formula of chilli is:

(a) $\oplus \male\female K_{(5)}\overset{\curvearrowleft}{C}_{(5)}A_5G_{(2)}$ (b) $\oplus \male\female K_{(5)}C_{(5)}A_{(5)}G_2$

(c) $\oplus \male\female K_5\overset{\curvearrowleft}{C}_5\ A_{(5)}G_2$ (d) $\oplus \male\female K_{(5)}C_5A_5G_{(2)}$

[AIPMT PRE 2011]

19. How many plants in the list given below have composite fruits that develop from an inflorescence?
Walnut, poppy, radish, fig, pineapple, apple, tomato, mulberry.

[AIPMT PRE 2012]

(a) Four (b) Five
(c) Two (d) Three

20. How many plants in the list given below have marginal placentation?
Mustard, Gram, Tulip, Asparagus, Arhar, Sun hemp, Chilli, Colchicine, Onion, Moong, Pea, Tobacco, Lupin

[AIPMT MAINS 2012]

(a) Five (b) Six (c) Three (d) Four

21. Which one of the following organisms is correctly matched with its three characteristics?

[AIPMT MAINS 2012]

(a) Tomato: Twisted aestivation, Axile placentation, Berry
(b) Onion: Bulb, Imbricate aestivation, Axile placentation
(c) Maize: C_3 pathway, Closed vascular bundles, Scutellum
(d) Pea: C_3 pathway, Endospermic seed, Vaxillary aestivation

22. Cymose inflorescence is present in

[AIPMT PRE 2012]

(a) Solanum (b) Sesbania
(c) Trifolium (d) Brassica

23. Phyllode is present in

[AIPMT PRE 2012]

(a) Asparagus (b) Euphorbia
(c) Australian Acacia (d) Opuntia

24. Placentation in tomato and lemon is

[AIPMT PRE 2012]

(a) Parietal (b) Free central
(c) Marginal (d) Axile

25. Vexillary aestivation is a characteristic of the family

[AIPMT PRE 2012]

(a) Fabaceae (b) Asteraceae
(c) Solanaceae (d) Brassicaceae

26. Among bitter gourd, mustard, brinjal, pumpkin, china rose, lupin, cucumber, sunhemp, gram, guava, bean, chilli, plum, petunia, tomato, rose, withania, potato, onion, aloe and tulip, how many plants have hypogynous flower?

[AIPMT 2013]

(a) Six (b) Ten
(c) Fifteen (d) Eighteen

27. In China rose the flowers are

[AIPMT 2013]

(a) Actinomorphic, hypogynous with twisted aestivation.
(b) Actinomorphic, epigynous with valvate aestivation.
(c) Zygomorphic, hypogynous with imbricate aestivation.
(d) Zygomorphic, egigynous with twisted aestivation.

28. Seed coat is not thin, but membranous in

[AIPMT 2013]

(a) Maize (b) Coconut
(c) Groundnut (d) Gram

29. Placenta and pericarp are both edible portions in [AIPMT 2014]

(a) Apple (b) Banana
(c) Tomato (d) Potato

30. When the margins of sepals or petals overlap one another without any particular direction, the condition is termed as [AIPMT 2014]

(a) Vexillary (b) Imbricate
(c) Twisted (d) Valvate

31. Which one of the following statements is correct? [AIPMT 2014]

(a) The seed in grasses is not endospermic.
(b) Mango is a parthenocarpic fruit.
(c) A proteinaceous aleurone layer is present in maize grain.
(d) A sterile pistil is called a staminode.

32. An example of edible underground stem is [AIPMT 2014]

(a) Carrot (b) Groundnut
(c) Sweet potato (d) Potato

33. An aggregate fruit is one which develops from [AIPMT 2014]

(a) Multicarpellary syncarpous gynoecium
(b) Multicarpellary apocarpous gynoecium
(c) Complete inflorescence
(d) Multicarpellary superior ovary

34. $\oplus ⚥ K_{(5)} \overparen{C_{(5)} A_{(5)}} \underline{G}_{(2)}$ is the floral formula of [AIPMT 2015]

(a) Alium (b) Serbia
(c) Petunia (d) Brassica

35. Keel is the characteristic feature flower of [AIPMT 2015]

(a) Tulip (b) Indigofera
(c) Aloe (d) Tomato

36. Perigynous flowers are found in [AIPMT 2015]

(a) Guava (b) Cucumber
(c) China rose (d) Rose

37. A hilum is a scar on the [AIPMT 2015]

(a) Seed, where funicle was attached. (b) Fruit, where it was attached to pedicel.
(c) Fruit, where style was present. (d) Seed, where micropyle was present.

38. Among china rose, mustard, brinjal, potato, guava, cucumber, onion and tulip, how many plants have superior ovary? [RE-AIPMT 2015]

(a) Six (b) Three
(c) Four (d) Four

39. The wheat grain has an embryo with one large, shield-shaped cotyledon known as [RE-AIPMT 2015]

(a) Coleorrhiza (b) Scutellum
(c) Coleoptile (d) Epiblast

40. Axile placentation is present in [RE-AIPMT 2015]

(a) Lemon (b) Pea
(c) Argemone (d) Dianthus

41. Flowers are unisexual in [RE-AIPMT 2015]

(a) Cucumber (b) China rose
(c) Onion (d) Pea

42. The standard petal of a papilionaceous corolla is also called: [NEET - I, 2016]

(a) Carina (b) Pappus
(c) Vexillum (d) Corona

43. Tricarpellary, syncarpous gynoecium is found in flowers of: [NEET - I, 2016]

(a) Liliaceae (b) Solanaceae
(c) Fabaceae (d) Poaceae

44. Which of the following is not a stem modification? [NEET - I, 2016]

(a) Pitcher of Nepenthes (b) Thorns of citrus
(c) Tendrils of cucumber (d) Flattened structures of Opuntia

45. Cotyledon of maize grain is called: [NEET - I, 2016]

(a) Plumule (b) Coleorhiza
(c) Coleoptile (d) Scutellum

46. Stems modified into flat green organs performing the functions of leaves are known as: [NEET - I, 2016]

(a) Cladodes (b) Phyllodes
(c) Phylloclade's (d) Scales

47. The term 'polyadelphous' is related to [NEET - II, 2016]

(a) Androecium (b) Corolla
(c) Calyx (d) Gynoecium

48. How many plants among Indigofera, Sesbania, Salvia, Allium, Aloe, Mustard, Groundnut, radish, gram and turnip have stamen with different lengths in their flowers? [NEET - II, 2016]

(a) Four (b) Five
(c) Six (d) Three

49. Radial symmetry is founding the flowers of [NEET - II, 2016]

(a) Trifolium (b) Pisum
(c) Cassia (d) Brassica

50. Free-central placentation is found in [NEET - II, 2016]

(a) Argemone (b) Brassica
(c) Citrus (d) Dianthus

NCERT EXEMPLAR QUESTIONS

1. Rearrange the following zones as seen in the root in vertical section and choose the correct option.

(a) Root hair zone
(b) Zone of meristem
(c) Rootcap zone
(d) Zone of maturation
(e) Zone of elongation

(a) c, b, e, a, d
(b) a, b, c, d, e
(c) d, e, a, c, b
(d) e, d, c, b, a

2. In an inflorescence where flowers are borne laterally in an acropetal succession, the position of the youngest floral bud shall be

(a) Proximal
(b) Distal
(c) Intercalary
(d) Anywhere

3. The mature seeds of plants such as gram and pea, possess no endosperm, because

(a) These plants are not angiosperms.
(b) There is no double fertilization in them.
(c) Endosperm is not formed in them.
(d) Endosperm gets used up by the developing embryo during seed development.

4. Roots developed from parts of the plant other than radicle are called

(a) Tap roots
(b) Fibrous roots
(c) Adventitious roots
(d) Nodular roots

5. Venation is a term used to describe the pattern of arrangement of

(a) Floral organs
(b) Flowers in inflorescence
(c) Veins and veinlets in a lamina
(d) All of them

6. Endosperm, a product of double fertilization in angiosperms is absent in the seeds of

(a) Gram
(b) Orchids
(c) Maize
(d) Castor

7. Many pulses of daily use belong to one of the families below (tick the correct answer)

(a) *Solanaceae*
(b) *Fabaceae*
(c) *Liliaceae*
(d) *Poaceae*

8. The placenta is attached to the developing seed near the

(a) Testa
(b) Hilum
(c) Micropyle
(d) Chalaza

9. Which of the following plants is used to extract the blue dye?

(a) Trifolium
(b) Indigofera
(c) Lupin
(d) Cassia

10. Match the followings and choose the correct option.

Group A	**Group B**
(a) Aleurone layer	(i) Without fertilization
(b) Parthenocarpic fruit	(ii) Nutrition
(c) Ovule	(iii) Double fertilization
(d) Endosperm	(iv) Seed

Options:
(a) (a)–(i), (b)–(ii), (c)–(iii), (d)–(iv)
(b) (a)–(ii), (b)–(i), (c)–(iv), (d)–(iii)
(c) (a)–(iv), (b)–(ii), (c)–(i), (d)–(iii)
(d) (a)–(ii), (b)–(iv), (c)–(i), (d)–(iii)

Answer Keys

Practice Questions

1. (d)	2. (a)	3. (b)	4. (d)	5. (d)	6. (d)	7. (d)	8. (c)	9. (a)	10. (c)
11. (c)	12. (d)	13. (c)	14. (c)	15. (b)	16. (d)	17. (c)	18. (d)	19. (c)	20. (d)
21. (d)	22. (d)	23. (b)	24. (d)	25. (d)	26. (d)	27. (d)	28. (d)	29. (b)	30. (d)
31. (d)	32. (d)	33. (c)	34. (c)	35. (d)	36. (b)	37. (d)	38. (a)	39. (d)	40. (d)
41. (c)	42. (d)	43. (d)	44. (a)	45. (d)	46. (c)	47. (d)	48. (c)	49. (c)	50. (d)
51. (c)	52. (a)	53. (b)	54. (c)	55. (d)	56. (d)	57. (b)	58. (c)	59. (c)	60. (b)
61. (d)	62. (d)	63. (d)	64. (c)	65. (d)	66. (d)	67. (c)	68. (d)	69. (c)	70. (d)
71. (d)	72. (d)	73. (d)	74. (b)	75. (d)	76. (b)	77. (d)	78. (d)	79. (c)	80. (a)
81. (d)	82. (a)	83. (a)	84. (a)	85. (b)	86. (d)	87. (d)	88. (d)	89. (b)	90. (b)
91. (c)	92. (a)	93. (b)	94. (c)	95. (d)	96. (d)	97. (d)	98. (a)	99. (d)	100. (a)
101. (c)	102. (d)	103. (b)	104. (d)	105. (a)	106. (a)	107. (c)	108. (c)	109. (b)	110. (d)
111. (a)	112. (b)	113. (d)	114. (a)	115. (d)	116. (b)	117. (c)	118. (c)	119. (a)	120. (b)
121. (d)	122. (b)	123. (d)	124. (a)	125. (a)	126. (d)	127. (b)	128. (a)	129. (a)	130. (b)
131. (d)	132. (b)	133. (b)	134. (c)	135. (a)	136. (b)	137. (c)	138. (d)		

Assertion and Reason Questions

139. (b)	140. (c)	141. (c)	142. (a)	143. (b)	144. (b)	145. (b)	146. (a)	147. (c)	148. (b)
149. (b)	150. (c)	151. (a)	152. (a)	153. (a)	154. (a)	155. (b)	156. (a)	157. (a)	158. (c)
159. (a)	160. (a)	161. (a)	162. (c)	163. (a)	164. (d)	165. (a)	166. (a)	167. (a)	168. (c)
169. (a)									

Previous Year Questions

1. (a)	2. (d)	3. (b)	4. (b)	5. (b)	6. (d)	7. (b)	8. (a)	9. (c)	10. (b)
11. (d)	12. (c)	13. (c)	14. (a)	15. (d)	16. (a)	17. (d)	18. (a)	19. (d)	20. (b)
21. (b)	22. (a)	23. (c)	24. (d)	25. (a)	26. (c)	27. (a)	28. (a)	29. (c)	30. (b)
31. (c)	32. (d)	33. (b)	34. (c)	35. (b)	36. (d)	37. (a)	38. (a)	39. (b)	40. (a)
41. (a)	42. (c)	43. (a)	44. (a)	45. (d)	46. (c)	47. (a)	48. (a)	49. (d)	50. (d)

NCERT Exemplar Questions

1. (a)	2. (b)	3. (d)	4. (c)	5. (c)	6. (b)	7. (b)	8. (b)	9. (b)	10. (b)

This page is intentionally left blank.

CHAPTER

6

Anatomy of Flowering Plants

PRACTICE QUESTIONS

The Tissues

1. The branch of biology deals with internal structure of plants is called
(a) Morphology (b) Physiology (c) Anatomy (d) Biochemistry

2. Find out the incorrect statement:
(a) Monocot and dicot are anatomically different.
(b) Internal structures also show adaptations to diverse environment.
(c) The basic unit of plant is made up of cells.
(d) Different organs of plants are similar in their internal structure.

3. A tissue is a group of cells having a
(a) Common origin and always a common function.
(b) Common origin and always a different function.
(c) Common origin and usually a common function.
(d) Different origin and a different function.

4. Depending on whether the cells being formed are capable of dividing or not, the plant tissues are classified into how many types?
(a) 1 (b) 2 (c) 3 (d) 4

5. Find the example of primary meristem.
(a) Apical meristem (b) Intercalary meristem
(c) Lateral meristem (d) Both (a) and (b)

6. Apical meristem is present at
(a) Root and shoot apex (b) Place between mature tissue
(c) Vascular cambium (d) Cork cambium

7. Axillary bud is
(a) Present in axil of leaf (b) Capable of forming branch
(c) Capable of forming flower (d) All of these

8. Which tissue occurs in grasses and regenerate parts removed by the grazing herbivores?
(a) Apical meristem (b) Lateral meristem
(c) Intercalary meristem (d) All of these

9. The meristem that occurs in the mature regions of roots and shoots of many plants, particularly those that produce woody axis and appear later than primary meristem, is called
(a) Intercalary meristem (b) Apical meristem
(c) Secondary or lateral meristem (d) All the above

10. Find the example of lateral meristem.
(a) Fascicular cambium (b) Interfascicular cambium
(c) Cork-cambium (d) All of these

11. The newly-formed cells from primary and secondary meristem, which becomes structurally and functionally specialized and lose the ability to divide are known as
(a) Permanent cells (b) Mature cells
(c) Both (a) and (b) (d) None of these

12. During the formation of the primary plant body, the specific regions of the apical meristem produces
(a) Dermal tissues (b) Ground tissues (c) Vascular tissues (d) All of these

13. Permanent tissues, which have all cell similar in structure and function are called
(a) Complex tissues (b) Simple tissues
(c) Meristematic tissues (d) All of these

14. Permanent tissues, which have many different types of cells are called
(a) Complex tissues (b) Simple tissues
(c) Meristematic tissues (d) All of these

15. Which tissue is the most abundant in plant organ?
(a) Parenchyma (b) Collenchyma
(c) Sclerenchyma (d) Sclereids

16. The following features belong to
I. Cells are generally isodiametric. They may be spherical, oval, round, polygonal, or elongated in shape.
II. Cells have thin wall and are made up of cellulose.
III. Cells may be closely packed or may have intercellular spaces.
IV. Tissue perform various kind of functions like photosynthesis, storage and secretion.
(a) Collenchyma (b) Parenchyma (c) Xylem (d) Sclerenchyma

17. The following features belong to
I. Cells are thick at corner due to the deposition of cellulose, hemicelluloses and pectin.
II. Cells may contain chloroplast and gets assimilated.
III. Intercellular spaces are absent.
IV. Provide mechanical support to growing parts of the plant such as young stem and petiole of leaf.
(a) Collenchyma (b) Parenchyma (c) Xylem (d) Sclerenchyma

18. Which simple tissue is characterized by pits?
(a) Collenchyma (b) Parenchyma
(c) Sclerenchyma (d) All of these

19. _____ are spherical, oval, cylindrical, highly thickened dead cell with very narrow cavities.
(a) Sieve tube (b) Companion cell (c) Fibres (d) Sclereids

20. Secondary thickening in collenchyma is of
(a) Cellulose (b) Hemicellulose (c) Pectin (d) All of these

21. On what basis we classify sclerenchyma into fibres or sclereids?
(a) Structure (b) Origin (c) Development (d) All of these

22. Sclereids are present in the pulp of
(a) Guava (b) Pear (c) Sapodilla (d) All of these

23. Sclereids are present in
(a) Fruit wall of nuts (b) Seed coat of legumes
(c) Leaves of tea (d) All of these

24. Which tissue is usually dead and without protoplast?
(a) Parenchyma (b) Collenchyma (c) Sclerenchyma (d) All of these

25. The collenchyma tissue is characterized by
(a) Elongated cells with thickness at the corners.
(b) Isodiametric cells with deposits of cellulose and pectin at the corners.
(c) Elongated cells with deposits of cellulose and pectin all over the wall.
(d) Isodiametric cells with thickness all over the cell wall.

26. In which way collenchyma differs from sclerenchyma?
(a) Retaining protoplasm at maturity (b) Having thick walls
(c) Having wide lumen (d) Being meristematic

27. Walls of sclerenchyma are
(a) Rigid (b) Lignified (c) Pectinized (d) Suberized

28. Collenchyma differs from parenchyma in having
(a) Living protoplasm (b) Cellulose walls
(c) Vacuoles (d) Pectin deposits at corners

29. Which of the following are simple tissues?
(a) Parenchyma, xylem and phloem
(b) Parenchyma, collenchyma and sclerenchyma
(c) Parenchyma, xylem and collenchymas
(d) Parenchyma, xylem and sclerenchyma

30. What is the most common type of permanent tissue found in almost all plants?
(a) Sclerenchyma (b) Collenchyma
(c) Parenchyma (d) Xylem

31. Which of the following tissues gives tensile strength against bending and swaying?
(a) Parenchyma (b) Collenchyma (c) Sclereids (d) All of these

32. A simple mechanical tissue devoid of lignin is
(a) Parenchyma (b) Collenchymas (c) Sclerenchyma (d) Chlorenchyma

33. The primary plant body is made up of
(a) Meristematic tissues (b) Simple tissues
(c) Complex tissues (d) All the above

34. Hard lignified thick-walled long and pointed cells of a plant are
(a) Parenchyma (b) Sclerenchyma fibers
(c) Collenchymas (d) Sclereids

35. A thick-walled lignified simple mechanical tissue is
(a) Parenchyma (b) Collenchymas (c) Sclerenchyma (d) Chlorenchyma

36. How many types of cells are present in complex tissue?
(a) More than one (b) More than three
(c) One type (d) Three type

37. The functions of xylem are
(a) Conduct water from root to stem and leaves
(b) Conduct mineral from root to stem and leaves
(c) Provide mechanical strength to plant
(d) All of these

38. Xylem is composed of how many different elements?
(a) 1 (b) 2 (c) 3 (d) 4

39. Gymnosperm lacks _____ in their xylem.
(a) Tracheids (b) Vessels
(c) Xylem fibres (d) Xylem parenchyma

40. Select the correct matching:

Column I		**Column II**
A. Tracheids	–	1. Elongated and tube like cells with thick and lignified wall and tapering ends.
B. Vessels	–	2. Tube like structure made up of many cells, each cell with lignified wall and large central cavity.
C. Xylem fibre	–	3. Highly thickened walls and obliterated central humans.
D. Xylem parenchyma	–	4. Living cell with thin cell wall made up of cellulose.

(a) A–2, B–1, C–3, D–4 (b) A–3, B–1, C–2, D–4
(c) A–1, B–2, C–3, D–4 (d) A–3, B–2, C–1, D–4

41. Xylem parenchyma stores
(a) Starch (b) Fat (c) Tannins (d) All of these

42. Phloem parenchyma stores
(a) Resins (b) Latex (c) Mucilage (d) All of these

43. Select the incorrect statement from the following:
(a) Vessel members are interconnected through perforations in their common walls.
(b) Presence of vessel is a characteristic feature of angiosperms.
(c) Radial conduction of water takes place by the ray parenchymatous cells.
(d) Tracheids, vessel, xylem sclerenchyma and parenchyma are without protoplast.

44. Protoplast is absent in all except
(a) Tracheids (b) Vessels
(c) Xylem sclerenchyma (d) Xylem parenchyma

45. The primary xylem elements formed are called _____ and the secondary xylem formed is called _____.
(a) protoxylem, protoxylem (b) metaxylem, metaxylem
(c) protoxylem, metaxylem (d) metaxylem, protoxylem

46. In stem
(a) Protoxylem lies towards pith (centre)
(b) Metaxylem lies towards periphery of the organs
(c) Endarch arrangement is present
(d) All the above

47. In root
(a) Endarch arrangement is present
(b) Exarch arrangement is present
(c) Protoxylem lies towards the centre
(d) Metaxylem lies towards the periphery

48. Phloem transports
(a) Water (b) Mineral (c) Food materials (d) All of these

49. How many elements are composed in phloem in angiosperm?
(a) 1 (b) 2 (c) 3 (d) 4

50. Phloem is composed of all except
(a) Sieve tube elements
(b) Companion cells
(c) Phloem parenchyma and sclerenchyma
(d) Vessels

51. Gymnosperm posses
(a) Sieve tubes
(b) Companion cells
(c) Albuminous cell and sieve cells
(d) All of these

52. Select the incorrect statement from the following:
(a) End walls of sieve tube have sieve plates.
(b) Sieve tube and companion cells are connected by pit present between common longitudinal wall.
(c) Companion cells are specialized parenchymatous cells having nucleus which controls the function of sieve tubes
(d) Phloem parenchyma is present in most of the monocots.

53. The following are live components of phloem except
(a) Sieve tube
(b) Companion cell
(c) Phloem parenchyma
(d) Phloem fibre (bast fibre)

54. The following are dead components of xylem except
(a) Tracheids
(b) Vessels
(c) Xylem sclerenchyma (wood fibres)
(d) Xylem parenchyma

55. Select the correct statement from the following:
(a) Companion cells help in maintaining pressure gradients in the sieve tubes.
(b) Phloem parenchyma stores food material.
(c) Bast fibres are generally absent in the primary phloem but are found in secondary phloem.
(d) All of these

56. Following are the features of phloem fibres except
(a) Pointed apices (b) More elongated (c) Branched (d) Unbranched

57. Phloem fibre, which is commercially used is actually
(a) Jute (b) Flax (c) Hemp (d) All of these

58. Select the incorrect matching:
(a) Protophloem – Narrow sieve tubes
(b) Metaphloem – Bigger sieve tubes
(c) Gymnosperm – Albuminous cells and sieve cells
(d) Gymnosperm – Vessels in xylem

59. A mature sieve tube differs from vessel in
(a) Being nearly dead (b) Lacking cytoplasm
(c) Lacking a functional nucleus (d) Absence of lignified walls

60. In pteridophyta and gymnosperms, which cells are present in place of companion cell?
(a) Sclereids (b) Albuminous cells
(c) Idioblasts (d) None of these

61. Both vessels and companion cells are absent in
(a) Angiosperms (b) Pteridophyta (c) Gymnosperms (d) Both (b) and (c)

62. The only plant cells without nuclei among the following are
(a) Cambium cells (b) Cells of pericycle
(c) Xylem parenchyma (d) Sieve tubes

63. Vessels differ from tracheids
(a) In being derived from single cell
(b) In having vertical rows of cells with cross walls dissolved
(c) In being alive
(d) In helping in the conduction of water

64. Companion cells are usually seen associated with
(a) Fibres (b) Vessels (c) Tracheids (d) Sieve tubes

65. Sieve tubes are better suited for translocation because they
(a) Possess broader lumen and perforated cross walls
(b) Are broader than long
(c) Possess bordered pits
(d) Possess no end walls

66. Lignified cell wall is the characteristic feature of
(a) Phloem cells (b) Epidermal cells
(c) Cambial cells (d) Xylem cells

67. The chief function of sieve tube is
(a) To translocate the organic materials manufactured in the leaves
(b) To conduct minerals
(c) To transport water from root to leaves
(d) To help the plant in forming wood

68. The function of storage is performed by
(a) Parenchyma (b) Sclerenchyma (c) Phloem (d) All of these

69. Which is present in the vascular bundles of gymnosperms?
(a) Tracheids (b) Vessels (c) Companion cells (d) All of these

70. How many types of tissue systems are present in plant depending on their structure and function?
(a) 1 (b) 2 (c) 3 (d) 4

The Tissue System

71. Tissue system include
(a) Epidermal tissue system
(b) Ground tissue system or fundamental tissue system
(c) Vascular tissue system
(d) All the above

72. Epidermal tissue system is made up of
(a) Epidermal cells (b) Stomata
(c) Epidermal appendages (d) All of these

73. Which of the following is epidermal appendage?
(a) Trichome (b) Guard cell (c) Sclereid (d) Subsidiary cell

74. Select T/F (True/False).
(a) Epidermis is usually single-layered.
(b) Epidermal cells are parenchymatous cell with abundant cytoplasm.
(c) Vessel members of xylem are interconnected through perforation in their common walls.
(d) Sclerenchyma provides mechanical support to organs.
(a) TTTT (b) TFFT (c) TFTT (d) FFTT

75. The epidermis is generally covered with a waxy thick layer called the _____ which prevents the loss of water.
(a) Suberin (b) Tunicin (c) Cuticle (d) Chitin

76. Which of the following is true about stomata?
(a) Formed by guard cells
(b) Regulate the process of transpiration and gaseous exchange
(c) Mainly present on epidermis of leaves
(d) All of these

77. Which of the following is true about guard cells?
(a) Outer wall is thin
(b) Inner wall (towards stomatal pore) is thick
(c) Bean-shaped in dicots and dumb-bell-shaped in grasses
(d) All of these

78. Which of the following cell posses chloroplast?
(a) Mesophyll cells of leaf (b) Guard cells
(c) Sometimes in cells of collenhcyma (d) All of these

79. Stomatal apparatus consists of
(a) Subsidiary cells (b) Guard cells
(c) Stomatal aperture (d) All of these

80. Stem hairs are
(a) Unicellular (b) Acellular (c) Multicellular (d) Any of them

81. Trichomes are
(a) Epidermal hair of stem (b) Either soft or stiff
(c) Branched or unbranched (d) All of these

82. Select the incorrect statement from the following:
(a) Trichomes help in preventing water loss due to transpiration
(b) Cuticle prevents loss of water
(c) Cuticle is absent in roots
(d) Epidermis is made up of elongated, loosely arranged cell, which forms continuous layer

83. Ground tissue is made up of
(a) Parenchyma (b) Collenchyma (c) Sclerenchyma (d) All of these

84. Parenchymatous cells are usually present in
(a) Cortex, pericycle (b) Pith and medullary rays
(c) Primary stem and roots (d) All of these

85. Thin-walled chloroplast containing mesophyll cells are present in
(a) Root (b) Stem (c) Leaf (d) All of these

86. Vascular system consists of
(a) Simple tissue (b) Complex tissue (c) Xylem (d) Phloem

87. Closed vascular bundle is present in
(a) Monocot (b) Dicot (c) Both (a) and (b) (d) None of these

88. Conjoint vascular bundle is present in
(a) Monocot stem (b) Dicot stem (c) Leaf (d) All of these

89. A root hair is formed by
(a) Epidermal cell (b) Endodermal cell (c) Cortical cell (d) Pericycle cell

90. Epidermal outgrowths are known as
(a) Stomata (b) Leaves (c) Trichomes (d) Flower buds

91. Vascular bundles having xylem and phloem which lie at the same radius is termed as
(a) Concentric (b) Radial (c) Collateral (d) Amphicribral

92. Which of the following would not secrete a cuticle?
(a) Root epidermis (b) Leaf epidermis (c) Xerophytes (d) Stem epidermis

93. Which one of the following is a type of tissue system?
(a) Parenchyma (b) Sclerenchyma (c) Vascular (d) All of these

94. Root hairs are
(a) Acellular (b) Unicellular
(c) Multicellular (d) Multicellular and unicellular

95. Vascular bundles of roots are
(a) Conjoint (b) Concentric (c) Bicollateral (d) Radial

96. Radial vascular bundle can be seen in
(a) Leaf (b) Dicot root (c) Stem (d) Flower

97. When xylem and phloem are separated by a strip of cambium it is called
(a) Collateral and open (b) Collateral and closed
(c) Bicollateral and open (d) Concentric and closed

98. Vascular bundle is closed when
(a) Cambium is present (b) Cambium is absent
(c) Pericycle is absent (d) None of these

99. The following features belong to which option?
I. Cortex is made up of several layers of thin-walled parenchyma cells with intercellular spaces.
II. Endoderm is made up of single layer of barrel-shaped cells without any intercellular spaces.
III. Few layers of thick-walled parenchymatous cell forms pericycle.
IV. Pith is small or inconspicuous.
V. Conjuctive tissue present is 2 to 4 xylem and phloem patches.
(a) Dicot root (b) Dicot stem (c) Monocot root (d) Monocot stem

100. Stele is made up of (in dicot root)
(a) Pericycle (b) Vascular bundle (c) Pith (d) All of these

101. Outside to inside the layer of monocot root are
(a) Endodermis – Epidermis – Cortex – Pith–Vascular bundle–Pericycle
(b) Pith–Epidermis–Endodermis–Cortex–Pericycle–Vascular bundle
(c) Epidermis–Cortex–Endodermis–Pericycle–Vascular bundle–Pith
(d) Pericycle–Vascular bundle–Cortex–Pith–Epidermis–Endodermis

102. The following features belong to which option?
I. Epidermis may bear trachoma and few stomata.
II. Cortex is divided into three sub-zones.
III. Hypodermis is made up of collenchymas starch sheath.
IV. Pericycle above phloem is in the form of semilunar patches of sclerenchyma.
(a) Dicot root (b) Dicot stem
(c) Monocot root (d) Monocot stem

103. Select the incorrect statement among the following:
(a) Ring arrangement of vascular bundle is a characteristic of dicot stem.
(b) Phloem parenchyma is absent in monocot stem.
(c) Monocots have sclerenchymatous hypodermis.
(d) In monocot, peripheral, vascular bundle, which are generally large and centrally located are small and water containing cavities are present within the vascular bundle.

104. Which of the following is correct about dorsiventral leaf?
(a) The veins vary in thickness in the reticulate venation.
(b) Palisade parenchyma is abaxially placed.
(c) Abaxial surface bears no stomata.
(d) The size of vascular bundles are independent on the size of veins.

105. Which of the following is incorrect about isobilateral leaf?
(a) Stomata is present on both surfaces
(b) Undifferentiated mesophyll
(c) Nearly the same size of vascular bundle is present all over leaf
(d) It is a monocot leaf

Secondary Growth

106. The growth of the roots and stems in length with the help of apical meristem is called
(a) Secondary growth (b) Primary growth
(c) Both (a) and (b) (d) None of these

107. Dicot plant exhibits an increase in girth. It is an example of
(a) Secondary growth (b) Primary growth
(c) Both (a) and (b) (d) None of these

108. Cells of cambium present between primary xylem and primary phloem forms
(a) Interfascicular cambium
(b) Intrafascicular cambium (fascicular cambium)
(c) Cork cambium
(d) None of these

109. Vascular cambium is formed by
I. Interfascicular cambium
II. Intrafascicular cambium.
III. Cork cambium
(a) I and III only (b) II and III only (c) I, II and III only (d) I and II only

110. Cambium wing forms cells towards
(a) Inner side of ring (b) Outer side of ring
(c) Both side of ring (d) They do not form cells

111. The vascular cambium activity is
(a) More on inner side than outer (b) More on outer side than inner
(c) Equal on outer and inner side (d) None of these

112. The following will not happen during secondary growth by cambium ring:
(a) Secondary xylem produced is more than secondary phloem.
(b) Primary and secondary phloem is crushed due to continued formation and accumulation of secondary xylem.
(c) Primary xylem remains more or less intact in or around centre.
(d) The cells cut off towards pith mature into secondary phloem and cells cut off towards periphery mature into secondary xylem.

113. During secondary growth all occur except
(a) Secondary medullar rays forms (b) Phloem crushed
(c) Primary phloem forms (d) Secondary xylem forms

114. The activity of cambium is under control of
(a) Physiological factor (b) Environmental factor
(c) Both (a) and (b) (d) None

115. Select the total number of correct statements from the following:
(1) In spring season cambium is active and produces a large number of xylary elements having vessels with wider lumen.
(2) The spring wood is also known as early wood.
(3) In winter, the cambium is less active and forms few xylary elements having narrow vessels this is called autumn wood or late wood.

(4) The spring wood is lighter in colour and has lower density.
(5) Autumn wood is darker and has higher density.
(6) Annual ring (autumn wood and spring wood) used to estimate the age of plant.
(a) 3 (b) 4 (c) 5 (d) 6

116. In older trees, the greater part of secondary xylem is dark brown due to the deposition of
(a) Tannins and resins (b) Oil and gums
(c) Aromatic substance and essential oil (d) All of these

117. The dark brown deposition of organic compound in heartwood will make it
(a) Hard (b) Durable
(c) Resistant to microbes and pest (d) All of these

118. Heartwood contains
(a) Live lignified element (b) Dead highly lignified element
(c) Live non-lignified element (d) Dead non-lignified elements

119. The function of heartwood is
(a) Conduction of water (b) Conduction of mineral
(c) Conduction of food (d) Mechanical support

120. Peripheral region of secondary xylem, which is light in color is known as
(a) Heartwood (duramen) (b) Sapwood (alburnum)
(c) Spring wood (d) Autumn wood

121. The cells of secondary cortex are
(a) Parenchymatous (b) Sclerenchymatous
(c) Collenchymatous (d) Meristems

122. Bark refers to
(a) Periderm (b) Secondary phloem
(c) Both (a) and (b) (d) None of these

123. At certain region, the phellogen cuts off closely arranged parenchymatous cells on the outer side instead of cork cells. These parenchymatous cells soon rupture epidermis, forming a lens-shaped opening called
(a) Hydathodes (b) Stomata (c) Lenticels (d) None of these

124. Which of the following is correct about lenticels?
(a) It is present in most of the woody trees (b) It helps in gaseous exchange
(c) It is formed by the activity of phellogen (d) All of these

125. In dicot root, the vascular cambium is
(a) Completely primary in origin (b) Partly primary and partly secondary
(c) Completely secondary in origin (d) None of these

126. Initially formed cambium in dicot root is
(a) Circular (b) Rectangular (c) Oval (d) Wavy

127. Secondary growth occur in
(a) Dicot root (b) Dicot stem
(c) Stem and root of gymnosperm (d) All of these

128. Which of the following is incorrect?
(a) Wood is actually a secondary xylem.
(b) Different type of woods are found on basis of their composition and time of production.
(c) Monocot and dicot show marked variation in their internal structure.
(d) Increase in girth of dicot stem by vascular cambium only.

129. Main functions of plant tissues are
(a) Assimilation of food and its storage
(b) Transportation of water, mineral and photosynthates
(c) Mechanical support
(d) All of these

130. Cambium causes growth in
(a) Circumference (b) Width (diameter)
(c) Leaves (d) Length

131. The function of cork cambium (phellogen) is to produce
(a) Cork and secondary cortex (b) Secondary xylem and secondary phloem
(c) Cork (d) Secondary cortex and phloem

132. Other names of secondary cortex, cork cambium and cork are
(a) Phellem, phelloderm and phellogen
(b) Phellogen, phellem and phelloderm
(c) Phelloderm, phellogen and phellem
(d) Phellogen, phelloderm and phellem

133. In dicot roots, the vascular cambium is derived from
(a) Epidermis (b) Hypodermis (c) Cortex (d) Pericycle

134. Periderm is made up of
(a) Phellem (b) Phellogen (c) Phelloderm (d) All of these

135. Cork cells are
(a) Dead (b) Photosynthetic
(c) Elongated and participates in movement (d) Meristematic

136. Annual rings are distinct in plants growing in
(a) Tropical regions (b) Arctic region
(c) Grasslands (d) Temperate region

137. Xylem, which is functional in a dicot tree is
(a) Spring wood (b) Sap wood (c) Autumn wood (d) Heart wood

138. External protective tissues of plants (of dicot stem are)
(a) Cork and pericycle (b) Cortex and epidermis
(c) Pericycle and cortex (d) Epidermis and cork

139. Cork cambium is a
(a) Secondary meristem (b) Apical meristem
(c) Intercalary meristem (d) Primary meristem

140. Cambium, which produces cork is known as
(a) Phelloderm (b) Phellogen (c) Periblem (d) Periderm

141. Dendrochronology is the study of
(a) Height of a tree
(b) Diameter of a tree
(c) Age of a tree by counting the number of annual rings in the main stem
(d) None of these

142. The tissue made up of thin-walled rectangular cells responsible for the secondary growth is
(a) Cortex (b) Xylem (c) Cambium (d) Pith

143. In old dicot stems, a major part of the wood is filled up with tannins, resins, gums, etc. This part of wood is called
(a) Hard wood (b) Heart wood (c) Sap wood (d) Soft wood

144. Lenticel develops through the activity of
(a) Vascular cambium (b) Dermatogens
(c) Phellogen (d) Intercalary meristem

145. The waxy substance associated with cell walls of cork cells are impervious to water because of the presence of _____, which gets deposited on cork cells
(a) Cutin (b) Suberin (c) Lignin (d) Hemicellulose

146. Growth rings determines the
(a) Age (b) Length
(c) Breadth (d) Number of branches of a plant

147. Lenticels are formed in bark, which are
(a) Aerating pores (b) Made up of phloem
(c) Made up of xylem (d) Found in monocot plants

148. Heart wood or duramen is the
(a) Outer region of secondary xylem (b) Inner region of secondary xylem
(c) Outer region of secondary phloem (d) Inner region of secondary phloem

149. The bark of tree comprises of
(a) All the tissues outside the vascular cambium
(b) All the tissues outside the cork cambium
(c) Only the cork
(d) The cork and secondary cortex

150. The layer of cells between endodermis and vascular bundles is called
(a) Epidermis (b) Pericycle (c) Hypodermis (d) Pith

151. Bulliform or motor cells are present in
(a) Dicot stem (b) Upper epidermis of dicot leaves
(c) Lower epidermis of monocot leaves (d) Upper epidermis of monocot leaves

152. Exarch and polyarch vascular bundles occur in
(a) Monocot stem (b) Monocot root (c) Dicot stem (d) Dicot root

153. In root, the xylem is
(a) Mesarch
(b) Exarch
(c) Placed at different places in different plants
(d) Endarch

154. In monocot leaf
(a) Bulliform cells are absent from the epidermis
(b) Veins form a network
(c) Mesophyll is well differentiated into these parts
(d) Mesophyll is not differentiated into palisade and spongy parenchyma

155. In dicot root
(a) Vascular bundles are scattered and with cambium
(b) Vascular bundles are arranged in a ring and have cambium
(c) Xylem and phloem are radially arranged
(d) Xylem is always endarch

156. Well-developed pith is found in
(a) Monocot stem and dicot root (b) Monocot and dicot stems
(c) Dicot stem and dicot root (d) Dicot stem and monocot root

157. The correct situation of mesophyll in isobilateral grass leaf is shown by
(a) Palisade towards adaxial surface (b) Palisade towards abaxial surface
(c) Undifferentiated mesophyll (d) Palisade along both the surface

158. Monocot root differs from dicot root in having
(a) Open vascular bundles (b) Scattered vascular bundles
(c) Well-developed pith (d) Radially arranged vascular bundles

159. Vascular bundles are scattered in
(a) Bryophytes (b) Dicot root (c) Dicot stem (d) Monocot stem

160. Generally hypodermis in monocots is composed of
(a) Parenchyma (b) Sclerenchyma
(c) Collenchymas (d) Chlorenchyma

161. The polyarch condition is seen in
(a) Monocot stem (b) Monocot root
(c) Dicot root (d) Dicot stem

162. Which of the following is not a characteristic feature of the anatomy of dicotyledonous root?
(a) Radial vascular bundles (b) Secondary growth
(c) Pith is little or absent (d) Conjoint collateral

163. Endodermis of dicot stem is also called
(a) Bundle sheath (b) Starch sheath (c) Mesophyll (d) Pith

164. The cell layer located at the periphery in the cross-section of the root is called
(a) Endodermis (b) Epiblema (c) Pericycle (d) Xylem

165. Exarch xylem is found in
(a) Root (b) Stem (c) Leaf (d) Rachis

166. Two to four xylem bundle are found in
(a) Monocot root (b) Monocot stem (c) Dicot stem (d) Dicot root

167. Collenchymatous hypodermis is characteristics of
(a) Dicot stem (b) Monocot stem
(c) Monocot as well as dicot stem (d) Hydrophytes

168. Vascular bundles in dicot stem are
(a) Conjoint and collateral (b) Conjoint and closed
(c) Conjoint, collateral and open (d) Collateral and open

169. Cortex and pith are not distinguished in
(a) Dicot stem (b) Monocot stem
(c) Dicot root (d) Monocot root

170. In a dorsiventral leaf, the location of palisade tissue and phloem are known as
(a) Abaxial and abaxial (b) Adaxial and abaxial
(c) Adaxial and adaxial (d) Abaxial and adaxial

171. Which of the following is seen in a monocot root?
(a) Large pith (b) Vascular cambium
(c) Endarch xylem (d) Medullary ray

172. With respect to which factor, the pericycle of a root differs from that of the stem?
(a) Sclerenchymatous in root and collenchymatous in stem.
(b) Collenchymatous in root and parenchymatous in stem.
(c) Parenchymatous in root and sclerenchymatous in stem.
(d) Parenchymatous in root and collenchymatous in stem.

173. Collenchyma generally occurs
(a) In scattered dicot roots
(b) In a ring in monocot roots
(c) In patches under epidermis in dicot stem
(d) All the above

174. Phloem parenchyma is absent in
(a) Dicot root (b) Dicot leaf
(c) Monocot stem (d) Dicot stem

175. Collenchyma tissue is present in
(a) Dicot stem (b) Monocot stem
(c) Dicot root (d) Flowers

176. The vascular bundles in the stem of monocots are typically
(a) Collateral (b) Bicollateral
(c) Concentric (d) Radial

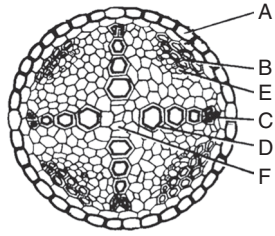
177. Sclerenchymatous sheath is present in vascular bundles of
(a) Monocot root (b) Dicot root
(c) Dicot stem (d) Monocot stem

178. In monocot roots which types of vascular bundles are found?
(a) Collateral, conjoint and closed
(b) Radial vascular bundle with exarch xylem
(c) Bicollateral, conjoint and closed
(d) Radial vascular bundle with endarch xylem

179. Lateral roots arise from
(a) Pericycle (b) Pith (c) Stem (d) Root

180. In dicot roots, the cells of which region show casparian strips?
(a) Cambium (b) Endodermis (c) Pericycle (d) Hypodermis

181. In the diagram of T.S. of Stele of Dicot Root, the different parts have been indicated by alphabets. Choose the answer in which these alphabets correctly match with the parts they indicate.



(a) A – Endodermis, B – Conjunctive tissue, C – Metaxylem, D – Protoxylem, E – Phloem, F – Pith
(b) A – Endodermis, B – Pith, C – Protoxylem, D – Metaxylem, E – Protoxylem, F – Conjuctive tissue
(c) A – Pericycle, B – Conjuctive tissue, C – Metaxylem, D – Protoxylem, F – Endodermis
(d) A – Endodermis, B – Conjuctive tissue, C – Protoxylem, D – Metaxylem, E – Phloem, F – Pith

182. In grasses,
(a) Certain adaxial epidermal cells along the veins modify themselves into large, empty, colourless cells. These are called bulliform cells.
(b) When the bulliform cells in the leaves absorb water and are turgid, the leaf surface is exposed.
(c) When bulliform cells are flaccid due to water stress, they make the leaves curl inwards to minimize the water loss.
(d) All are correct

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion .
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

183. **Assertion:** All tissues lying inside vascular cambium are called as bark.
Reason: Bark is made up of phellogen, phellem and phelloderm lying inside secondary phloem.

184. **Assertion:** Stomata are absent in submerged hydrophytes.
Reason: Respiration occurs by means of air chambers in submerged plants.

185. **Assertion:** Cambium is a lateral meristem and cause growth in width.
Reason: Cambium is made up of fusiform and ray initials in stem.

186. **Assertion:** Higher plants have meristematic regions for indefinite growth.
Reason: Higher plants have root and shoot apices.

187. **Assertion:** In collateral vascular bundles, the phloem is situated towards inner side.
Reason: In monocot stem, cambium is present.

188. **Assertion:** Thick cuticle is mostly present in disease resistant plants.
Reason: Disease causing agents cannot grow on cuticle and cannot invade the cuticle.

189. **Assertion:** Quiescent centre is found in the centre of the root apex.
Reason: It consists of actively dividing cells.

190. **Assertion:** Permanent tissue is composed of mature cells.
Reason: Meristematic tissue is a group of actively dividing cells.

191. **Assertion:** Intercalary meristem increases the length of plant like apical meristems.
Reason: Intercalary meristem originates from the apical meristems.

192. **Assertion:** The lenticel is meant for gaseous exchange.
Reason: Lenticel checks for excessive evaporation of water.

193. **Assertion:** Xerophytic leaves may contain stomatal crypts or sunken stomata.
Reason: Spongy parenchyma is more in xerophytic leaves.

194. **Assertion:** Isobilateral leaves are amphistomatic.
Reason: Mesophyll is not differentiated into palisade and spongy.

195. **Assertion:** Trichomes helps in preventing water loss due to transpiration.
Reason: On the stem, the epidermal hairs are called trichomes.

196. **Assertion:** Growth rings are also called as annual rings.
Reason: Generally the growth ring is formed in each year.

197. **Assertion:** Heartwood is more durable than the sapwood.
Reason: Heartwood contains organic compound like tannins, resins, oil, gumsaromatic substances and essential oils make it hard and more durable.

198. **Assertion:** Sugarcane shows Kranz anatomy.
Reason: In diocot leaves, the bundle sheath cells lack chloroplasts.

199. **Assertion:** Tracheids are dead cells.
Reason: Tracheids have lignified cell wall.

200. **Assertion:** Xylem provides mechanical strength to plant parts.
Reason: Xylem conducts water and mineral from root to stems and leaves.

201. **Assertion:** Stomata regulate the process of transpiration and gaseous exchange
Reason: Stomata are present in the cortex of stem

202. **Assertion:** Secondary growth won't occur in monocot stem.
Reason: Vascular bundles are closed in monocot stem.

203. **Assertion:** Vessels become dead at maturity
Reason: Initially cell possesses living protoplasm but due to lignin deposition in wall along with other thickening material they become dead.

204. **Assertion:** Cork cambium and vascular cambium are lateral meristem.
Reason: Both are involved in secondary growth of plant by addition of cells in lateral direction of main axis.

205. **Assertion:** Intrafascicular cambium is primary lateral meristem.
Reason: It is found in lateral side of plant main axis and derived from meristem of embryo.

206. **Assertion:** Aerenchyma found in aquatic plant.
Reason: It contains air cavities and provides buoyancy to aquatic plant.

207. **Assertion:** Collenchyma provides mechanical strength as well as elasticity.
Reason: Wall thickening in collenchymas is not uniform.

208. **Assertion:** Apical and intercalary meristems are primary meristem.
Reason: Both appear early in life and contribute to the formation of primary plant body.

209. **Assertion:** Lateral meristems are generally referred as secondary meristem.
Reason: These are responsible for production of secondary tissue.

210. **Assertion:** Parenchyma is simple tissue
Reason: It is made of only one type of cell.

211. **Assertion:** Xylem is complex tissue
Reason: Xylem is made up of more than one type of cells

212. **Assertion:** Sieve tube member and companion cells are called sister cells
Reason: Both derived from same mother cells and death of one results in death of other as well.

213. **Assertion:** Function of sieve tubes is controlled by nucleus of companion cells.
Reason: Companion cells help in maintaining the pressure gradient in sieve tubes.

214. **Assertion:** Cuticle prevent loss of water from epidermis
Reason: Cuticle is made up of waxy thick layer and cover epidermis

215. **Assertion:** Vascular bundle of dicot stem said to be open
Reason: Such vascular bundle contain cambium which possess ability to form secondary xylem and phloem tissue

216. **Assertion:** In dicot stem endodermis is referred as starch sheath
Reason: Cells of endodermis are rich in starch grains.

217. **Assertion:** Bulliform cells in grasses use to minimise water loss under water stem condition.
Reason: They are flaccid due to water stress and make the leaf curl inside thus minimise surface area for transpiration.

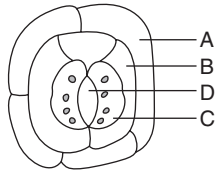
PREVIOUS YEAR QUESTIONS

1. Kranz anatomy is one of the characteristics of the leaves of

[AIPMT MAINS 2010]

(a) Potato (b) Wheat
(c) Sugarcane (d) Mustard

2. Give below is the diagram of a stomatal apparatus. In which of the following, all the four parts labelled as A, B, C, D are correctly identified?



[AIPMT MAINS 2010]

(a) A: Subsidiary cell, B: Epidermal cell, C: Guard cell, D: Stomatal aperture
(b) A: Guard cell, B: Stomatal aperature, C: Subsidiary cell, D: Epidermal cell
(c) A: Epidermal cell, B: Guard cell, C: Stomatal aperture, D: Subsidiary cell
(d) A: Epidermal cell, B: Subsidiary cell, C: Guard cell, D: Stomatal aperture

3. The chief water conducting elements of xylem in gymnosperms are

[AIPMT PRE 2010]

(a) Vessels
(b) Fibres
(c) Transfusion tissue
(d) Tracheids

4. Which one of the following is not a lateral meristem?

[AIPMT PRE 2010]

(a) Intrafascicular cambium
(b) Interfascicular cambium
(c) Phellogen
(d) Intercalary meristem

5. Heartwood differs from sapwood in

[AIPMT PRE 2010]

(a) Presence of rays and fibres
(b) Absence of vessels and parenchyma
(c) Having dead and non-conducting elements
(d) Being susceptible to pests and pathogens

6. Some vascular bundles are described as open because these

[AIPMT MAINS 2011]

(a) Are surrounded by pericycle but no endodermis.
(b) Are capable of producing secondary xylem and phloem.
(c) Possess conjunctive tissue between xylem and phloem.
(d) Are not surrounded by pericycle.

7. In Kranz anatomy, the bundle sheath cells have

[AIPMT MAINS 2011]

(a) Thin walls, many intercellular spaces and no chloroplasts.
(b) Thick walls, no intercellular spaces and large number of chloroplasts.
(c) Thin walls, no intercellular spaces and several chloroplasts.
(d) Thick walls, many intercellular spaces and few chloroplasts.

8. Ground tissue includes:

[AIPMT PRE 2011]

(a) All tissues except epidermis and vascular bundles
(b) Epidermis and cortex
(c) All tissues internal to endodermis
(d) All tissues external to endodermis

9. In land plants, the guard cells differ from other epidermal cells in having [AIPMT PRE 2011]

(a) Mitochondria (b) Endoplasmic reticulum
(c) Chloroplasts (d) Cytoskeleton

10. The cork cambium, cork and secondary cortex are collectively called [AIPMT PRE 2011]

(a) Phellogen (b) Periderm
(c) Phellem (d) Phelloderm

11. As compared to a dicot root, a monocot root has [AIPMT MAINS 2012]

(a) Many xylem bundles
(b) Inconspicuous annual rings
(c) Relatively thicker periderm
(d) More abundant secondary xylem

12. The common bottle cork is a product of [AIPMT PRE 2012]

(a) Dermatogen (b) Phellogen
(c) Xylem (d) Vascular Cambium

13. Closed vascular bundles lack [AIPMT PRE 2012]

(a) Ground tissue (b) Conjunctive tissue
(c) Cambium (d) Pith

14. Water containing cavities in vascular bundles are found in [AIPMT PRE 2012]

(a) Sunflower (b) Maize
(c) Cycas (d) Pinus

15. Gymnosperms are also called soft wood spermatophytes because they lack [AIPMT PRE 2012]

(a) Cambium (b) Phloem fibres
(c) Thick walled tracheids (d) Xylem fibres

16. Interfascicular cambium develops from the cells of [AIPMT 2013]

(a) Medullary rays (b) Xylem parenchyma
(c) Endodermis (d) Pericycle

17. Lenticels are involved in: [AIPMT 2013]

(a) Transpiration (b) Gaseous exchange
(c) Food transport (d) Photosynthesis

18. Age of a tree can be estimated by: [AIPMT 2013]

(a) Its height and girth (b) Biomass
(c) Number of annual rings (d) Diameter of its heartwood

19. You are given a fairly old piece of dicot stem and a dicot root. Which of the following anatomical structures will you use to distinguish between the two?

[AIPMT 2014]

(a) Secondary xylem (b) Secondary phloem
(c) Protoxylem (d) Cortical cells

20. Tracheids differ from other tracheary element in:

[AIPMT 2014]

(a) Having casparian strips (b) Being imperforate
(c) Lacking nucleus (d) Being lignified

21. Vascular bundles in monocotyledons are considered closed because:

[AIPMT 2015]

(a) A bundle sheath surrounds each bundles
(b) Cambium is absent
(c) There are no vessels with perforations
(d) Xylem is surrounded all around by phloem

22. A major characteristic of the monocot root is the presence of:

[AIPMT 2015]

(a) Open vascular bundles
(b) Scattered vascular bundles
(c) Vasculature without cambium
(d) Xylem along the radius

23. Read the different components from (a) to (d) in the list given below and tell the correct order of the components with reference to their arrangement from outer side to inner side in a woody dicot stem:

(a) Secondary cortex (b) Wood
(c) Secondary cortex (d) Phellem

The correct order is:

[RE-AIPMT 2015]

(a) (A), (b), (d), (c) (b) (d), (a), (c), (b)
(c) (d), (c), (a), (b) (d) (c), (d), (b), (a)

24. Specialized epidermal cells surrounding the guard cells are called: [NEET - I, 2016]

(a) Complementary cells (b) Subsidiary cells
(c) Bulliform cells (d) Lenticels

25. Cortex is the region found between: [NEET - II, 2016]

(a) Pericycle and endodermis
(b) Endodermis and pith
(c) Endodermis and vascular bundle
(d) Epidermis and stele

26. The balloon-shaped structures called tyloses [NEET - II, 2016]

(a) Characterize the sapwood
(b) Arte extensions of xylem parenchyma cells into vessels
(c) Are linked to the ascent of sap through xylem vessels
(d) Originate in the lumen of vessels

NCERT EXEMPLAR QUESTIONS

1. A transverse section of stem is stained first with safranin and then with fast green following the usual schedule of double staining for the preparation of a permanent slide. What would be the colour of the stained xylem and phloem?

(a) Red and green (b) Green and red
(c) Orange and yellow (d) Purple and orange

2. Match the followings and choose the correct option from below.

(a) Meristem	(i) Photosynthesis, storage
(b) Parenchyma	(ii) Mechanical support
(c) Collenchyma	(iii) Actively dividing cells
(d) Sclerenchyma	(iv) Stomata
(e) Epidermal tissue	(v) Sclereids

Options:

(a) (a)–(i), (b)–(iii), (c)–(v), (d)–(ii), (e)–(iv)
(b) (a)–(iii), (b)–(i), (c)–(ii), (d)–(iv), (e)–(v)
(c) (a)–(ii), (b)–(iv), (c)–(v), (d)–(i), (e)–(iii)
(d) (a)–(v), (b)–(iv), (c)–(iii), (d)–(ii), (e)–(i).

3. Match the followings and choose the correct option from below

(a) Cuticle	(i) Guard cells
(b) Bulliform cells	(ii) Single layer
(c) Stomata	(iii) Waxy layer
(d) Epidermis	(iv) Empty colourless cell

Options:

(a) (a)–(iii), (b)–(iv), (c)–(i), (d)–(ii)
(b) (a)–(i), (b)–(ii), (c)–(iii), (d)–(iv)
(c) (a)–(iii), (b)–(ii), (c)–(iv), (d)–(i)
(d) (a)–(iii), (b)–(ii), (c)–(i), (d)–(iv).

4. Identify the tissue system from among the following

(a) Parenchyma (b) Xylem
(c) Epidermis (d) Phloem

5. Cells of this tissue are living and show angular wall thickening. They also provide mechanical support. The tissue is

(a) Xylem (b) Sclerenchyma
(c) Collenchyma (d) Epidermis

6. The epiblema of roots is equivalent to

(a) Pericycle (b) Endodermis (c) Epidermis (d) Stele

7. A conjoint and open vascular bundle will be observed in the transverse section of

(a) Monocot root (b) Monocot stem
(c) Dicot root (d) Dicot stem

8. Interfascicular cambium and cork cambium are formed due to
(a) Cell division (b) Cell differentiation
(c) Cells dedifferentiation (d) Redifferentiation

9. Phellogen and phellem respectively denotes the
(a) Cork and cork cambium (b) Cork cambium and cork
(c) Secondary cortex and cork (d) Cork and secondary cortex

10. In which of the following pairs of parts of a flowering plant is epidermis absent?
(a) Root tip and shoot tip (b) Shoot bud and floral bud
(c) Ovule and seed (d) Petiole and pedicel

11. How many shoot apical meristems are likely to be present in a twig of a plant possessing 4 branches and 26 leaves?
(a) 26 (b) 1
(c) 5 (d) 30

12. A piece of wood having no vessels (tracheae) must belong to
(a) Teak (b) Mango
(c) Pine (d) Palm.

13. A plant tissue, when stained, showed the presence of hemicellulose and pectin in the cell wall of its cells. The tissue represents
(a) Collenchyma (b) Sclerenchyma
(c) Xylem (d) Meristem.

14. In conifers, the fibres are likely to be absent in
(a) Secondary phloem (b) Secondary Xylem
(c) Primary phloem (d) Leaves.

15. When we peel the skin of a potato tuber, we remove
(a) Periderm (b) Epidermis
(c) Cuticle (d) Sapwood

16. A vesselless piece of stem possessing prominent sieve tubes would belong to
(a) Pinus (b) Eucalyptus
(c) Grass (d) *Trochodendron*

17. Which one of the following cell types always divides by anticlinal cell division?
(a) Fusiform initial cells (b) Root cap
(c) Protoderm (d) Phellogen

18. What is the fate of primary xylem in a dicot root showing extensive secondary growth?
(a) It is retained in the centre of the axis. (b) It gets crushed.
(c) May or may not get crushed. (d) It gets surrounded by primary phloem.

Answer Keys

Practice Questions

1. (c)	2. (d)	3. (c)	4. (b)	5. (d)	6. (a)	7. (d)	8. (c)	9. (c)	10. (d)
11. (c)	12. (d)	13. (b)	14. (a)	15. (a)	16. (b)	17. (a)	18. (c)	19. (d)	20. (d)
21. (d)	22. (d)	23. (d)	24. (c)	25. (b)	26. (a)	27. (b)	28. (d)	29. (b)	30. (c)
31. (b)	32. (b)	33. (d)	34. (b)	35. (c)	36. (a)	37. (d)	38. (d)	39. (b)	40. (c)
41. (d)	42. (d)	43. (d)	44. (d)	45. (c)	46. (d)	47. (b)	48. (c)	49. (d)	50. (d)
51. (c)	52. (d)	53. (d)	54. (d)	55. (d)	56. (c)	57. (d)	58. (d)	59. (d)	60. (b)
61. (d)	62. (d)	63. (b)	64. (d)	65. (a)	66. (d)	67. (a)	68. (a)	69. (a)	70. (c)
71. (d)	72. (d)	73. (a)	74. (c)	75. (c)	76. (d)	77. (d)	78. (d)	79. (d)	80. (c)
81. (d)	82. (d)	83. (d)	84. (d)	85. (c)	86. (b)	87. (a)	88. (d)	89. (a)	90. (c)
91. (c)	92. (a)	93. (c)	94. (b)	95. (d)	96. (b)	97. (a)	98. (b)	99. (a)	100. (d)
101. (c)	102. (b)	103. (d)	104. (a)	105. (c)	106. (b)	107. (a)	108. (b)	109. (d)	110. (c)
111. (a)	112. (d)	113. (c)	114. (c)	115. (d)	116. (d)	117. (d)	118. (b)	119. (d)	120. (b)
121. (a)	122. (c)	123. (c)	124. (d)	125. (c)	126. (d)	127. (d)	128. (d)	129. (d)	130. (b)
131. (a)	132. (c)	133. (d)	134. (d)	135. (a)	136. (d)	137. (b)	138. (d)	139. (a)	140. (b)
141. (c)	142. (c)	143. (b)	144. (c)	145. (b)	146. (a)	147. (a)	148. (b)	149. (a)	150. (b)
151. (d)	152. (b)	153. (b)	154. (d)	155. (c)	156. (d)	157. (c)	158. (c)	159. (d)	160. (b)
161. (b)	162. (d)	163. (b)	164. (b)	165. (a)	166. (d)	167. (a)	168. (c)	169. (b)	170. (b)
171. (a)	172. (c)	173. (c)	174. (c)	175. (a)	176. (a)	177. (d)	178. (b)	179. (a)	180. (b)
181. (d)	182. (d)								

Assertion and Reason Questions

183. (d)	184. (b)	185. (b)	186. (a)	187. (d)	188. (a)	189. (c)	190. (a)	191. (a)	192. (b)
193. (c)	194. (b)	195. (b)	196. (a)	197. (a)	198. (c)	199. (a)	200. (b)	201. (c)	202. (a)
203. (a)	204. (a)	205. (a)	206. (a)	207. (a)	208. (a)	209. (a)	210. (a)	211. (a)	212. (a)
213. (b)	214. (a)	215. (a)	216. (a)	217. (a)					

Previous Year Questions

1. (c)	2. (d)	3. (d)	4. (d)	5. (c)	6. (b)	7. (b)	8. (a)	9. (c)	10. (b)
11. (a)	12. (b)	13. (c)	14. (b)	15. (c)	16. (a)	17. (b)	18. (c)	19. (c)	20. (b)
21. (b)	22. (c)	23. (b)	24. (b)	25. (d)	26. (b)				

NCERT Exemplar Questions

1. (a)	2. (b)	3. (a)	4. (a)	5. (c)	6. (c)	7. (d)	8. (c)	9. (b)	10. (a)
11. (c)	12. (c)	13. (a)	14. (b)	15. (a)	16. (d)	17. (c)	18. (a)		

CHAPTER

7

Structural Organization in Animals

PRACTICE QUESTIONS

Animal Tissue

1. What do you call an organization of group of similar cells along with intercellular substances?
(a) Organ (b) System (c) Tissue (d) Cell membrane

2. To establish a system of organ system what kind of interaction occurs to form a common function?
(a) Physical (b) Chemical (c) Both (d) Symbiotic

3. Which of the following is correct for epithelial tissue?
(a) It is present only as inner lining (b) It is present only as outer lining
(c) Contains very less intracellular matrix (d) All of these

4. Which of the following contains simple epithelium as their lining?
(a) Ducts (b) Tubes (c) Both (a) and (b) (d) Skin of mouth

5. Which of the following tissue has a free surface?
(a) Connective tissue (b) Muscular tissue (c) Epithelial tissue (d) Neural tissue

6. Which of the following is not a simple epithelium?
(a) Squamous (b) Cuboidal (c) Columnar (d) None of these

7. Which of the following sites contain squamous epithelium as its living?
(a) Blood vessel (b) Air sac in lungs (c) Nasal cavity (d) Both (a) and (b)

8. Secretion and absorption is done by what kind of epithelium?
(a) Squamous epithelium (b) Cuboidal epithelium
(c) Columnar epithelium (d) Ciliated columnar epithelium

9. Which of the following epithelium is irregularly shaped?
(a) Squamous epithelium (b) Cuboidal epithelium
(c) Columnar epithelium (d) Ciliated columnar epithelium

10. Cuboidal epithelium can be found in
(a) Distal convoluted tubule (b) Proximal convoluted tubule
(c) Henle's loop (d) Both (a) and (b)

11. In columnar epithelium, where is nucleus located?
(a) At the base (b) In the middle
(c) At the top (d) No nucleus is present

12. If the cuboidal epithelium turns out to have microvilli on it, what will it be called?
(a) Ciliated columnar epithelium (b) Pseudo ciliated epithelium
(c) Both (a) and (b) (d) Ciliated epithelium

13. Where is columnar epithelium found?
(a) Lining of intestine (b) Outer wall of stomach
(c) Proximal convoluted tubule (d) All of these

14. Where is ciliated epithelium found?
(a) Bronchioles (b) Fallopian tubes (c) Both (a) and (b) (d) Lungs

15. Cuboidal or columnar epithelium which is specialized for secretion are called _____.
(a) Ciliated epithelium (b) Glandular epithelium
(c) Both (a) and (b) (d) None

16. Which of the following is unicellular glandular epithelium?
(a) Salivary gland (b) Islets of langer han's
(c) Goblet cells (d) All of these

17. Which of the following is not secreted by exocrine glands?
(a) Earwax (b) Oil (c) Milk (d) None of these

18. Whose products are called hormone and where are they secreted?
(a) Exocrine, blood (b) Endocrine, blood
(c) Exocrine, lymph (d) Endocrine, fluid bathing the gland

19. Which of the following functions of compound epithelium is minimal?
(a) Protection (b) Secretion (c) Absorption (d) Both (b) and (c)

20. Where we will not find the compound epithelium?
(a) Dry skin surface (b) Moist surface of mouth
(c) Pharynx (d) Pancreas

21. What is the function of tight junction?
(a) Protects from bacterial infection (b) Stop substance leaking across the tissue
(c) Both (a) and (b) (d) Elasticity to the tissue

22. What is the function of Adhering junction?
(a) Cementing to keep neighbouring cells together
(b) Give rigidity to tissue
(c) Stop leaking substance across the tissue
(d) All of these

23. Which of the following junctions facilitate the cells to communicate with each other by connecting the cytoplasm of adjoining cells?
(a) Tight junction (b) Adhering junction
(c) Gap junction (d) Both (b) and (c)

24. Big molecules can be transported to the neighbouring cell by which of the following junction?
(a) Adhering junction (b) Gap junction
(c) Both (a) and (b) (d) Not possible for big molecules

25. Which tissue links and supports other tissues/organs of the body?
(a) Epithelial tissue (b) Connective tissue (c) Neural tissue (d) All of these

26. In which of the following connective tissues, the elastin fibres are absent?
(a) Bone (b) Cartilage (c) Blood (d) Both (a) and (b)

27. The matrix or ground substance in connective tissues are made up of _____ .
(a) Thick proteins (b) Elastin fibres
(c) Modified polysaccharides (d) Modified triglycerides

28. Which of the following possess semi-fluid ground substance?
(a) Aerolar tissue (b) Adipose tissue (c) Blood (d) Both (a) and (b)

29. Which of the following is not a part of aerolar tissue?
(a) Fibroblasts (b) Mast cells (c) Fibro clasts (d) All of these

30. Where is the excess unused nutrition stored in our body?
(a) Aerolar tissue (b) Adipose tissue (c) Both (a) and (b) (d) Blood

31. In which tissue, the fibres and fibroblasts are completely packed?
(a) Dense regular connective tissue (b) Dense irregular connective tissue
(c) Both (a) and (b) (d) Cartilage

32. Which structures are joined by tendons?
(a) Skeletal muscles to bones (b) Skeletal muscles to ligaments
(c) Both (a) and (b) (d) Bones to ligaments

33. Which of the following tissue is not present in skin?
(a) Epithelial tissue (b) Dense connective (c) Aerolar tissue (d) All of these

34. Which of the following is/are example of dense connective tissue?
(a) Tendon (b) Cartilage (c) Ligament (d) All of these

35. What kind of tissue is goblet cells?
(a) Epithelial tissue (b) Connective tissue (c) Neural tissue (d) All of these

36. Which portion of cartilage provides it with solidity, pliability and resistance to compression?
(a) Collagen fibres (b) Calcium content
(c) Intracellular material (d) Chondrocytes

37. What provides bone with hard and non-pliable properties?
(a) Collagen fibres (b) Calcium salts (c) Both (a) and (b) (d) None of these

38. Where are osteocytes located?
(a) Entire bone (b) In lacunae (c) Both (a) and (b) (d) None of these

39. Which of the following is not true?
(a) Limb bones are long bones.
(b) The function of long bones is weight bearing and bringing out movement.
(c) Bone marrows in all such long bones are site of blood cells production.
(d) All of these

40. What is the main function of blood?
(a) Protection of body (b) Transport of various substances
(c) pH buffering (d) Maintaining osmolarity balance

41. The long cylindrical fibres that form a muscle is made up of_____ .
(a) Tinofibriles (b) Collagen fibres (c) Fibroblasts (d) Myofibrils

42. When muscle cells receive stimulus, they get _____ .
(a) Shortened (b) Lengthened (c) Elongated (d) All of these

43. Muscular movement are intended to _____ .
(a) Move the body to adjust to changes in environment
(b) Maintain the position of various body parts
(c) Both (a) and (b)
(d) None of these

44. Which of the following is a typical skeletal muscle?
(a) Biceps (b) Triceps (c) Both (a) and (b) (d) None of these

45. The sheath enclosing the several bundles of muscle fibres is _____ tissue.
(a) epithelial (b) connective (c) both (d) neural

46. Which of the following is a fusiform muscle?
(a) Cardiac muscle (b) Smooth muscle (c) Both (a) and (b) (d) Skeletal muscle

47. Smooth muscles are held together by _____ .
(a) Connective tissue (b) Cell junctions (c) Epithelial tissue (d) None of these

48. Where can we find smooth muscles?
(a) Artery (b) Vein (c) Stomach (d) All of these

49. Fusion of what sticks the cardiac muscles together?
(a) Cell junctions (b) Plasma membranes
(c) Intercalated disc (d) All of these

50. Intercalated discs in cardiac muscles provide _____ .
(a) Tight junctions (b) Communication junction
(c) Flexible junction (d) All of these

51. Which of the following is not true for intercalated discs?
(a) Found only in heart
(b) All the fusion points form intercalated disc
(c) One stimulus is enough for multiple muscle
(d) None of these

52. Which of the following are excitable cells?
(a) Muscle cells (b) Neural cells (c) Both (a) and (b) (d) None of these

53. Which of the following cells are found in neural tissue?
(a) Neuron (b) Neuroglia (c) Both (a) and (b) (d) None of these

54. What is the function of Neuroglia?
(a) Protect and support neurons (b) Act as intracellular matrix
(c) Both (a) and (b) (d) None of these

55. The electrical disturbance generated in neurons travels through _____ .
(a) Neuroglial cell (b) Cytoplasm
(c) Plasma membrane (d) All of these

56. What kind of action can be caused by neurons?
(a) Stimulatory (b) Inhibitory (c) Both (a) and (b) (d) Excitatory

Organ and Organ System

57. What is the importance of organized organ system?
(a) Optimum efficiency of cells (b) Coordinated activity of cells
(c) Both (a) and (b) (d) None of these

58. Heart contains which of the following kind of tissue?
(a) Epithelial tissue (b) Cardiac muscular tissue
(c) Connective tissue (d) All of these

59. What is discernable trend?
(a) Complexity of organ system (b) Evolutionary trend
(c) Inheritance trend (d) All of these

60. What do you call the study of form or externally visible features?
(a) Physiology (b) Morphology (c) Anthropology (d) None of these

61. What do you call the study of morphology of internal organs in the animals?
(a) Physiology (b) Anatomy
(c) Internal morphology (d) None of these

62. Earthworm can be traced by faecal deposits. What are they called?
(a) Worm deposits (b) Worm castings (c) Both (a) and (b) (d) None of these

63. Which of the following type are of Indian earthworms?
(a) Pheretima (b) Lumbricus (c) Lumbricoidus (d) Both (a) and (b)

64. Size of cockroach ranges from
(a) ¼" to 3" (b) 1 to 3" (c) 2 to 3" (d) ¼" to ¾"

65. Cockroach is
(a) Omnivores (b) Nocturnal (c) Cursorial (d) All of these

66. Which one is correct about cockroach?
(a) Generally brown and black color (b) Pest and vectors of several disease
(c) Found in damp places (d) All of these

67. Zoological name of cockroach is
(a) Periplaneta *americana* (b) Pheretima posthuma
(c) Rana tigrina (d) Maja maja

68 In each segment the exoskeleton has hardened plates in cockroach known as
(a) Sclerites (b) Sternum (c) Carapace (d) All of these

69 Body of cockroach is segmented and divisible into three distinct region known as
(a) Head (b) Thorax (c) Abdomen (4) All of these

70. The head of cockroach is formed by fusion of how many segments
(a) 4 (b) 5 (c) 6 (d) 8

71. The cockroach has which type of mouth parts?
(a) Biting and chewing type (b) Siphoning type
(c) Sponging type (d) All of these

72. How many filamentous Malpighian tubules are found in cockroach?
(a) 100 to 150 (b) 50 to 100 (c) 150 to 200 (d) 200 to 250

73. A ring of 6 to 8 blind tubules that are present at the junction of foregut and midgut in cockroach is known as
(a) Hepatic caecae (b) Gastric caecae
(c) Both (a) and (b) (d) Malpighian tubules

74. The midgut of cockroach contains
(a) Ileum (b) Colon (c) Rectum (d) All of these

75. Heamolymph of cockroach consists of
(a) Plasma (b) Haemocyte
(c) Both (a) and (b) (d) None of these

76. Alary muscles are found in
(a) Frog (b) Earthworm
(c) Cockroach (d) Hookworm

77. How many pairs of spiracles is present on the surface of cockroach?
(a) 5 pairs (b) 15 pairs (c) 10 pairs (d) 20 pairs

78. In cockroach which of the following organ helps in excretion?
(a) Fat body (b) Nephrocyte
(c) Urecose gland (d) All of these

79. How many ganglia lies in thorax and in the abdomen of cockroach?
(a) 3 and 6 (b) 6 and 3 (c) 2 and 1 (d) 1 and 2

80. If the head of cockroach is cut off, it will live for as long as
(a) 2 weeks (b) 1 week (c) 3 weeks (d) 4 weeks

81. Mosaic vision means
(a) More sensitivity and less resolution (b) More sensitivity and more resolution
(c) Less sensitivity and less resolution (d) Less sensitivity and more resolution

82. A pair of testes in cockroach lies in
(a) 2 to 4 abdominal segment (b) 4 to 6 abdominal segment
(c) 4 to 7 abdominal segment (d) 6 to 8 abdominal segment

83. External genitalia in cockroach is represented by
(a) Male gonophysis (b) Phallomere
(c) Ejaculatory duct (d) Both (a) and (b)

84. Each ovary in cockroach is made up of how many ovarian tubules or ovarioles
(a) 6 (b) 4 (c) 8 (d) 10

85. Match the column:

Column I		**Column II**
1. Pair of spermatheca	–	A. 2 to 6th segment (Abdominal)
2. Ovary	–	B. 6th segment (Abdominal)
3. Mushroom shaped accessory reproductive gland	–	C. 6 to 7th segment (Abdominal)
4. Anal cerci	–	D. 10th segment

(a) 1–B, 2–A, 3–C, 4–D (b) 1–C, 2–B, 3–D, 4–A
(c) 1–D, 2–C, 3–A, 4–B (d) 1–A, 2–D, 3–B, 4–C

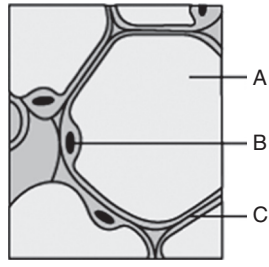
86. How many oothecae is produced by female cockroach?
(a) 9 to 10 (b) 14 to 16 (c) 13 (d) 1 to 2

87. The nymph of cockroach is grown by moulting for about _____ times to reach the adult form.
(a) 12 (b) 11 (c) 13 (d) 10

88. Which one of the following is incorrect statement about cockroach?
(a) They are pest because they destroy food and contaminate it with their smelly excreta.
(b) All species have economic importance.
(c) Development in Periplanta Americana is paurometabolus type.
(d) Next to last nymphal stage has wing pads.

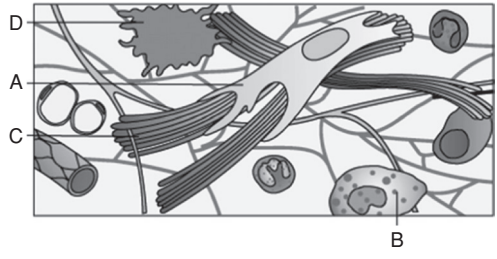
89. Which one of the following is the correct statement about cockroach?
(a) Anal style is present only in male cockroach.
(b) Anal cerci are present only in female cockroach.
(c) Each eye consists of about 1000 hexagonal ommatidia.
(d) Each oothecae contain 12 to 14 eggs.

90. What indicates A to C in the below given figure?



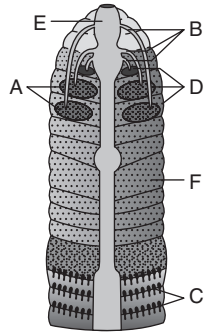
(a) A–Nucleus, B–Fat storage area, C–Plasma membrane
(b) A–Fat storage area, B–Nucleus, C–Plasma membrane
(c) A–Plasma membrane, B–Fat storage area, C–Nucleus
(d) A–Plasma membrane, B–Nucleus, C–Fat storage area

91. Identify A to D given in the figure.



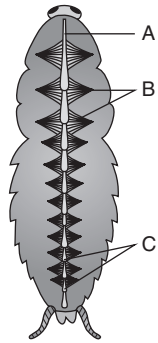
(a) A–Collagen fibres, B–Macrophage, C–Mast cell, D–Fibroblast
(b) A–Macrophage, B–Fibroblast, C–Mast cell, D–Collagen fibres
(c) A–Mast cell, B–Collagen fobres, C–Macrophage, D–Fibroblast
(d) A–Fibroblast, B–Mast cell, C–Collagen fibres, D–Macrophage

92. Identify A, B, C, D, E and F given in the figure.



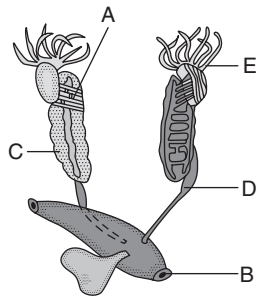
(a) A–Blood glands, B–Ducts of pharyngeal nephridia, C–Septal nephridia, D–Tufts of pharyngeal nephridia, E–Buccal cavity, F–Ingergumentary nephridia
(b) A–Ingergumentary nephridia, B–Blood glands, C–Tufts of pharyngeal nephridia, D–Buccal cavity, E–Septal nephridia, F–Ducts of pharyngeal nephridia
(c) A–Ducts of pharyngeal nephridia, B–Ingergumentary nephridia, C–Blood gland, D–Septal nephridia, E–Buccal cavity, F–Tufts of pharyngeal nephridia
(d) A–Blood glands, B–Septal nephridia, C–Buccal cavity, D–Ducts of pharngeal nephridia, E–Ingergumentary nephridia, F–Tufts of pharyngeal nephridia

93. Identify A, B and C given in the figure.



(a) A–Chambers of heart, B–Anterior aorta, C–Alary muscles
(b) A–Alary muscles, B–Chembers of heart, C–Anerior aorta
(c) A–Anterior aorta, B–Chambers of heart, C–Alary muscles
(d) A–Anterior aorta, B–Alary muscles, C–Chambers of heart

94. Identify the A, B, C, D and E in this figure.



(a) A–Vasa efferentia, B–Cloacal aperture, C–Adrenal gland, D–Urino genital duct, E–Fat bodies
(b) A–Urini genital duct, B–Vasa efferentia, C–Fat bodies, D–Clocal aperture, E–Adrenal gland
(c) A–Adrenal gland, B–Urino genital duct, C–Cloacal aperture, D–Vasa efferentia, E–Fat bodies
(d) A–Fat bodies, B–Adrenal gland, C–Cloacal aperture, D–Vasa efferentia, E–Urino genital duct

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

95. **Assertion:** Ciliated epithelium mainly present in the inner surface of hollow organs like bronchioles and fallopian tube.
Reason: Cilia are microvilli.

96. **Assertion:** Muscle fibres are said to be contractile in nature.
Reason: Cells of muscle tissues can shorten forcefully and again return to the relaxed state.

97. **Assertion:** Gap junctions facilitate the cells to communicate with each other.
Reason: Gap junction connects the cytoplasm of adjoining cells .

98. **Assertion:** Smooth muscle fibres appear to be striated.
Reason: This is due to regular alternate arrangement of thick and thin filaments in Skeletal muscle fibres.

99. **Assertion:** Non-striated muscles are said to be voluntary in nature.
Reason: Non-striated muscles can be moved according to will.

100. **Assertion:** Intercalated discs are important regions of cardiac muscle cells.
Reason: Intercalated discs function as communication junction for muscle contraction waves.

101. **Assertion:** Neurons are said to possess the property of excitability.
Reason: Neurons can get excited by a given stimulus.

102. **Assertion:** Extracellular materials help in separation of cells.
Reason: Cell junctions are formed by extra cellular materials.

103. **Assertion:** Epithelial tissues protect the under lying and over lying tissues.
Reason: Materials are exchanged at the surfaces across the epithelial tissues.

104. **Assertion:** The cells of columnar epithelium in absorptive surfaces often bears microvilli on their free ends.
Reason: Microvilli on their free ends.

105. **Assertion:** Ciliated epithelium helps in the movement of particles.
Reason: Cilia helps in the movement.

106. **Assertion:** Extracellular materials are important for cells.
Reason: Intercellular materials surround the cells and bind them together.

107. **Assertion:** Urinary bladder can considerably expand to accommodate urine.
Reason: It is lined by stretchable transitional epithelium.

108. **Assertion:** Head of cockroach shows great mobility in all direction
Reason: Cockroach possess flexible neck

109. **Assertion:** Cockroach is uricotelic
Reason: Fat bodies, nephrocyte and urecose glands help in excretion in cockroach

110. **Assertion:** Cockroach possesses mosaic vision.
Reason: Eye of cockroach contains several ommatidia.

111. **Assertion:** Development in *P. americana* is paurometabolous type.
Reason: Development in cockroach occurs through nymphal stage.

112. **Assertion:** Sperm glue together and form spermatophores in vas deferens in cockroach.
Reason: Sperm stores in vas deferens in cockroach

113. **Assertion:** Cockroach is pest.
Reason: Cockroach destroys food and contaminates it with their excreta.

114. **Assertion:** Cockroach is monoecious.
Reason: Male and female sex organ is present in single organism.

115. **Assertion:** Earthworm possess moist body surface
Reason: Earthworm respire through body surface

116. **Assertion:** Earthworm known as friend of farmers
Reason: They make soil porous which helps in respiration and penetration of the developing plant roots.

117. **Assertion:** Development of earthworm is direct type.
Reason: There is no larva stage in development.

118. **Assertion:** Cockroaches are harmful to humans.
Reason: They are vector of several diseases.

119. **Assertion:** If head of cockroach is cut off, it will still live for as long as one week.
Reason: Head contain a bit of a nervous system.

120. **Assertion:** Frogs shows hibernation and aestivation
Reason: This protect frog from extreme heat and cold respectively.

121. **Assertion:** Frogs are said to be cold blooded.
Reason: Their body temperature varies with the temperature of environment.

122. **Assertion:** Frog shows sexual dimorphism
Reason: Male frog can be distinguished from female by presence of vocal sacs

123. **Assertion:** Frog maintain ecological balance
Reason: Frog serves as important link in flood web and food chain in the ecosystem.

124. **Assertion:** Frogs are beneficial to humans
Reason: Frogs eat insect and protect our crops

125. **Assertion:** Cardiac muscle cell contract as a unit
Reason: Communication junction (intercalated disc) present between the adjacent cells.

126. **Assertion:** Blood is connective tissue
Reason: In blood, cells use to secrete fibres of structural proteins called collagen or elastin.

127. **Assertion:** Cells of Adipose tissue are specialised to store carbohydrates
Reason: Excess of fat which is not used immediately converted in carbohydrates and is stored in this tissue.

128. **Assertion:** Tendons are used to attach bone to bone
Reason: Ligaments are used to attach muscle to bone.

PREVIOUS YEAR QUESTIONS

1. The kind of epithelium which forms the inner walls of blood vessels is
[AIPMT PRE 2010]

(a) Cuboidal epithelium (b) Columnar epithelium
(c) Ciliated columnar epithelium (d) Squamous epithelium

2. If for some reason our goblet cells are non-functional, this will adversely affect
[AIPMT PRE 2010]

(a) Production of somatostatin
(b) Secretion of sebum from the sebaceous glands
(c) Maturation of sperms
(d) Smooth movement of food down the intestine

3. The cells lining the blood vessels belong to the category of
[AIPMT MAINS 2011]

(a) Smooth muscle tissue (b) Squamous epithelium
(c) Columnar epithelium (d) Connective tissue

4. Consider the following four statements (A to D) related to the common frog *Rana tigrina*, select the correct option stating which ones are true (T) and which ones are false (F) statement?
(A) On dry land it would die due to lack of O_2 if its mouth is forcibly kept closed for a few days.
(B) It has four-chambered heart.
(C) On dry land it turns uricotelic from ureotelic.
(D) Its life history is carried out in pond water.
[AIPMT MAINS 2011]

	A	B	C	D
(a)	T	F	F	T
(b)	T	T	F	F
(c)	F	F	T	T
(d)	F	T	T	F

5. Which one of the following structures in Pheretima is correctly matched with its function?
[AIPMT MAINS 2011]

(a) Clitellum – Secretes cocoon
(b) Gizzard – Absorbs digested food
(c) Setae – Defence against predators
(d) Typhlosole – Storage of extra nutrients

6. Ureters act as urinogenital ducts in

[AIPMT MAINS 2011]

(a) Human males
(b) Human females
(c) Both male and female frogs
(d) Male frogs

7. The type of muscle present in our

[AIPMT MAINS 2011]

(a) Heart is involuntary and unstriated smooth muscle.
(b) Intestine is striated and involuntary.
(c) Thigh is striated and involuntary.
(d) Upper arm is smooth muscle and fusiform in shape.

8. One very special feature in the earthworm Pheretima is that

[AIPMT PRE 2011]

(a) The typhlosole greatly increases the effective absorption area of the digested food in the intestine.
(b) The S-shaped setae embedded in the integument are the defensive weapons used against the enemies.
(c) It has a long dorsal tubular heart.
(d) Fertilization of eggs occurs inside the body.

9. The ciliated columnar epithelial cells in humans are known to occur in

[AIPMT PRE 2011]

(a) Bronchioles and fallopian tubes
(b) Bile duct and oesophagus
(c) Fallopian tubes and urethra
(d) Eustachian tube and stomach lining

10. Which of the following is correctly states as it happen in the common cockroach?

[AIPMT PRE 2011]

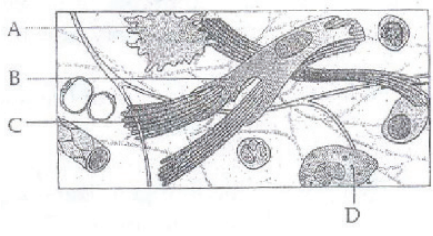
(a) Oxygen is transported by haemoglobin in blood.
(b) The nitrogenous excretory product is urea.
(c) The food is ground by mandibles and gizzard.
(d) Malpighian tubules are excretory organs projecting out from the colon.

11. The supportive skeletal structures in the human external ears and in the nose tip are examples of

[AIPMT MAINS 2012]

(a) Areolar tissue
(b) Bone
(c) Cartilage
(d) Ligament

12. Given below is the diagrammatic sketch of a certain type of connective tissue identify the parts labelled A, B, C and D and select the right option about them



[AIPMT MAINS 2012]

Options:

(a) A: Mast cell, B: Marcophage, C: Fibroblast, D: Collagen fibres
(b) A: Macrophage, B: Collagen fibres, C: Fibroblast, D: Mast cell
(c) A: Mast cell, B: Collagen fibres, C: Fibroblast, D: Macrophage
(d) A: Macrophage, B: Fibroblast, C: Collagen fibres, D: Mast cell

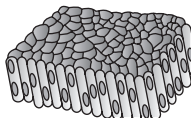
13. Which one of the following characteristics is common both in humans and adult frogs?

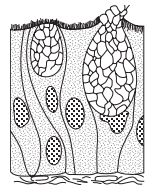
[AIPMT MAINS 2012]

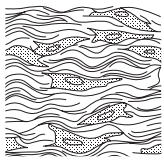
(a) Internal fertilization
(b) Nucleated RBCs
(c) Ureotelic mode of excretion
(d) Four chambered heart

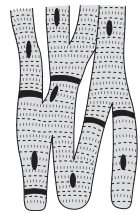
14. The four sketches (A, B, C and D) given below, represent four different types of animal tissues. Which one of these is correctly identified in the options given, along with its correct location and function?

[AIPMT MAINS 2012]

(a) 

(b) 

(c) 

(d) 

	Tissue	Location	Function
(a)	(C) Collagen fibres	Cartilage	Attach skeletal muscles to bones
(b)	(D) Smooth muscle tissue	Heart	Heart contraction
(c)	(A) Columnar epithelium	Nephron	Secretion and absorption
(d)	(B) Glandular epithelium	Intestine	Secretion

15. Pheretima and its close relatives derive nourishment from

[AIPMT PRE 2012]

(a) Sugarcane roots
(b) Decaying fallen leaves and soil organic matter
(c) Soil insects
(d) Small pieces of fresh fallen leaves of maize, etc.

16. Compared to those of humans, the erythrocytes in frog are

[AIPMT PRE 2012]

(a) Without nucleus but with haemoglobin
(b) Nucleated and with haemoglobin
(c) Very much smaller and fewer
(d) Nucleated and without haemoglobin

17. Select the correct statement from the ones given below with respect to Periplaneta americana. [AIPMT PRE 2012]

(a) Nervous system is located dorsally, it consists of segmentally arranged ganglia joined by a pair of longitudinal connectives.
(b) Males bear a pair of short thread like anal styles.
(c) There are 16 very long Malpighian tubules present at the junctions of midgut and hindgut.
(d) Grinding of foods is carried out only by the mouth parts.

18. What external changes are visible after the last moult of a cockroach nymph? [AIPMT 2013]

(a) Mandibles become harder
(b) Anal cerci develops
(c) Both forewings and hindwings develop
(d) Labium develops

19. Choose the correctly matched pair: [AIPMT 2014]

(a) Tendon – Specialized connective tissue
(b) Adipose tissue – Dense connective tissue
(c) Areolar tissue – Loose connective tissue
(d) Cartilage – Loose connective tissue

20. Choose the correctly matched pair: [AIPMT 2014]

(a) Inner lining of salivary ducts – Ciliated epithelium
(b) Moist surface of buccal cavity – Glandular epithelium
(c) Tubular parts of nephrons – Cuboidal epithelium
(d) Inner surface of bronchioles – Squamous epithelium

21. The terga, sterna and pleura of cockroach body are joined by [AIPMT 2015]

(a) Cementing glue (b) Muscular tissue (c) Arthrodial membrane (d) Cartilage

22. The function of the gap junction is to [RE-AIPMT 2015]

(a) Facilitate communication between adjoining cells by connecting the cytoplasm for rapid transfer of ions, small molecules and some large molecules.
(b) Separate two cells from each other.
(c) Stop substance from leaking across a tissue.
(d) Performing cementing to keep neighboring cells together.

23. The body cells in cockroach discharge tier nitrogenous waste in the haemolymph mainly in the form of: [RE-AIPMT 2015]

(a) Potassium urate (b) Urea (c) Calcium carbonate (d) Ammonia

24. Which of the following features is not present in *Periplaneta americana*? [NEET - I, 2016]

(a) Schizocoelom as body cavity
(b) Indeterminate and radial cleavage during embryonic development
(c) Exoskeleton composed of N – acetyl glucosamine
(d) Metamerically segmented body

25. Which type of tissue correctly matches with its location? [NEET - I, 2016]

	Tissue	Location
(a)	Smooth muscle	Wall of intestine
(b)	Areolar tissue	Tendons
(c)	Transitional epithelium	Tip of nose
(d)	Cuboidal epithelium	Lining of stomach

26. In male cockroaches, sperms are stored in which part of the reproductive system? [NEET - II, 2016]

(a) Mushroom glands (b) Testes
(c) Vas deferens (d) Seminal vesicles

27. Smooth muscles are [NEET - II, 2016]

(a) Voluntary, multinucleate, cylindrical (b) Involuntary, cylindrical, striated
(c) Voluntary, spindle-shaped, uninucleate (d) Involuntary, fusiform, non-straited

NCERT EXEMPLAR QUESTIONS

1. Which one of the following types of cell is involved in making of the inner walls of large blood vessels?

(a) Cuboidal epithelium (b) Columnar epithelium
(c) Squamous epithelium (d) Stratified epithelium

2. To which one of the following categories does the adipose tissue belong?

(a) Epithelial (b) Connective
(c) Muscular (d) Neural

3. Which one of the following is not a connective tissue?

(a) Bone (b) Cartilage
(c) Blood (d) Muscles

4. The clitellum is a distinct part in the body of earthworm, it is found in

(a) Segments 13–14–15 (b) Segments 14–15–16
(c) Segments 12–13–14 (d) Segments 15–16–17

5. Setae helps the earthworm but are not uniformly present in all the segments. They are present in

(a) 1st segment (b) Last segment
(c) Clitellar segment (d) 20th to 22nd segment

6. Which one of the following statements is true for cockroach?

(a) The number of ovarioles in each ovary is ten.
(b) The larval stage is called caterpillar.
(c) Anal styles are absent in females.
(d) They are ureotelic.

7. Match the following and choose the correct option

(a)	Adipose tissue	(i) Nose
(b)	Stratified epithelium	(ii) Blood
(c)	Hyaline cartilage	(iii) Skin
(d)	Fluid connective tissue	(iv) Fat storage

Options:
(a) (a)–(i), (b)–(ii), (c)–(iii), (d)–(iv)
(b) (a)–(iv), (b)–(iii), (c)–(i), (d)–(ii)
(c) (a)–(iii), (b)–(i), (c)–(iv), (d)–(ii)
(d) (a)–(ii), (b)–(i), (c)–(iv), (d)–(iii)

8. Match the following and choose the correct answer.

(a) Hermaphrodite	(i) Produces blood cells and haemoglobin.
(b) Direct development	(ii) Testis and ovary in the same animal.
(c) Chemoreceptor	(iii) Larval form is absent.
(d) Blood gland in earthworm	(iv) Sense of chemical substances.

Options:
(a) (a)–(ii), (b)–(iii), (c)–(iv), (d)–(i)
(b) (a)–(iii), (b)–(ii), (c)–(iv), (d)–(i)
(c) (a)–(i), (b)–(iii), (c)–(ii), (d)–(iv)
(d) (a)–(ii), (b)–(iv), (c)–(iii), (d)–(i)

9. Match the following with reference to Cockroach and choose the correct option:

(a) Phallomere	(i) Chain of developing ova.
(b) Gonopore	(ii) Bundles of sperm.
(c) Spermatophore	(iii) Opening of the ejaculatory duct.
(d) Ovarioles	(iv) The external genitalia.

Options:
(a) (a)–(iii), (b)–(iv), (c)–(ii), (d)–(i)
(b) (a)–(iv), (b)–(iii), (c)–(ii), (d)–(i)
(c) (a)–(iv), (b)–(ii), (c)–(iii), (d)–(i)
(d) (a)–(ii), (b)–(iv), (c)–(iii), (d)–(i)

10. Match the following and choose the correct answer.

(a) Touch	(i) Nasal epithelium
(b) Smell	(ii) Foramen magnum
(c) Cranial nerves	(iii) Sensory papillae
(d) Medulla oblongata	(iv) Peripheral nervous system

(a) (a)–(iii), (b)–(i), (c)–(ii), (d)–(iv)
(b) (a)–(ii), (b)–(i), (c)–(iv), (d)–(iii)
(c) (a)–(iii), (b)–(iv), (c)–(ii), (d)–(i)
(d) (a)–(iii), (b)–(i), (c)–(iv), (d)–(ii)

Answer Keys

Practice Questions

1. (c)	2. (c)	3. (c)	4. (c)	5. (c)	6. (d)	7. (d)	8. (b)	9. (a)	10. (b)
11. (a)	12. (d)	13. (a)	14. (c)	15. (b)	16. (c)	17. (d)	18. (d)	19. (d)	20. (d)
21. (b)	22. (a)	23. (c)	24. (b)	25. (b)	26. (c)	27. (c)	28. (d)	29. (c)	30. (b)
31. (c)	32. (a)	33. (c)	34. (a)	35. (a)	36. (c)	37. (c)	38. (b)	39. (c)	40. (b)
41. (d)	42. (a)	43. (c)	44. (c)	45. (b)	46. (b)	47. (b)	48. (d)	49. (b)	50. (b)
51. (b)	52. (b)	53. (c)	54. (c)	55. (c)	56. (c)	57. (c)	58. (d)	59. (b)	60. (b)
61. (b)	62. (b)	63. (d)	64. (a)	65. (d)	66. (d)	67. (a)	68. (a)	69. (d)	70. (c)
71. (a)	72. (a)	73. (c)	74. (d)	75. (c)	76. (c)	77. (c)	78. (d)	79. (a)	80. (b)
81. (a)	82. (b)	83. (d)	84. (c)	85. (a)	86. (a)	87. (c)	88. (b)	89. (a)	90. (b)
91. (d)	92. (a)	93. (d)	94. (a)						

Assertion and Reason Questions

95. (c)	96. (a)	97. (a)	98. (a)	99. (d)	100. (a)	101. (a)	102. (b)	103. (c)	104. (a)
105. (a)	106. (a)	107. (a)	108. (a)	109. (b)	110. (a)	111. (a)	112. (d)	113. (a)	114. (d)
115. (a)	116. (a)	117. (a)	118. (a)	119. (a)	120. (a)	121. (a)	122. (a)	123. (a)	124. (a)
125. (a)	126. (c)	127. (d)	128. (d)						

Previous Year Questions

1. (d)	2. (d)	3. (b)	4. (a)	5. (a)	6. (d)	7. (c)	8. (a)	9. (a)	10. (c)
11. (c)	12. (d)	13. (c)	14. (d)	15. (b)	16. (b)	17. (b)	18. (c)	19. (c)	20. (c)
21. (c)	22. (a)	23. (a)	24. (b)	25. (a)	26. (d)	27. (d)			

NCERT Exemplar Questions

1. (c)	2. (b)	3. (d)	4. (b)	5. (d)	6. (c)	7. (b)	8. (a)	9. (b)	10. (d)

This page is intentionally left blank.

Unit
III

Cell: Structures and Functions

Students Note

Unit III includes cytology and biomolecules. This unit is more important in AIPMT because its contribution in the exam is more than plant physiology. Diagrams like biomolecules and chemical structures are very important. If you can solve all problems given in this book, then you can crack various questions of this unit.

This page is intentionally left blank.

CHAPTER

8

Cell: The Unit of Life

PRACTICE QUESTIONS

Cell and Cell Theory

1. Which of the following organisms are not composed of cells?
(a) Amoeba (b) Paramecium
(c) Euglena (d) None of these

2. Unicellular organisms are not capable of
(a) Independent existence (b) Performing essential functions of life
(c) Both (a) and (b) (d) None of these

3. Who was the first one to see a live cell?
(a) Robert Hook (b) Leeuwenhoek
(c) Robert Brown (d) None of these

4. Who was the German botanist to study the different cells forming plant tissues?
(a) Schleiden (b) Schwann
(c) Rudolf Virchow (d) None of these

5. In which year Matthias Schleiden examined a large number of plants and observed that all plants are composed of different kinds of cells which form the tissues of the plant?
(a) 1638 (b) 1738 (c) 1838 (d) 1938

6. In which year Schwann studied different types of animal cells?
(a) 1839 (b) 1739 (c) 1639 (d) 1938

7. The cell has a thin outer layer which is known as 'Plasma membrane'. Who reported this?
(a) Schleiden (b) Schwann
(c) Virchow (d) Robert Hooke

8. 'Cell wall is a unique structure of plant cells'. Who concluded this?
(a) Schleiden (b) Schwann
(c) Both (a) and (b) (d) None of these

9. Who proposed the hypothesis that the bodies of animals and plants are composed of cells and product of cells?
(a) Schleiden (b) Schwann (c) Both (a) and (b) (d) None of these

10. Who formulated the cell theory?
(a) Schleiden (b) Schwann (c) Both (a) and (b) (d) None of these

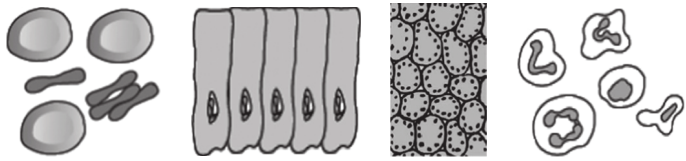
11. '*Omnis cellula e cellula*' was given in the year _____
(a) 1756 (b) 1855 (c) 1945 (d) 1839

12. Who was the one to describe that cells divided and new cells are formed from pre-existing cells?
(a) Schleiden (b) Schwann (c) Virchow (d) All of these

13. Which of the following statement is not a part of final cell theory?
(a) Cell has a thin outer layer called plasma membrane.
(b) All living organisms are made up of cells and products of cells
(c) All cells arise from pre-existing cells.
(d) All of these

14. What is the outer covering of typical plant cell?
(a) Cell wall externally
(b) Plasma membrane externally
(c) Cell wall internally
(d) Cell wall externally, plasma membrane internally

15. Identify the A, B, C and D in the given figure.



(a) A–WBC, B–Mesophyll cell, C–RBC, D–Columnar Epithelial cells
(b) A–Columnar epithelial cells, B–Mesophyll cell, C–WBC, D–RBC
(c) A–Mesophyll cell, B–WBC, C–Columnar epithelial cells, D–WBC
(d) A–RBC, B–Columnar epithelial cells, C–Mesophyll Cell, D–WBC

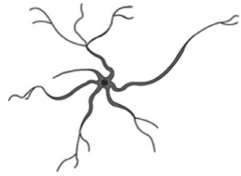
16. In each cheek cell, there is a dense membrane bound structure which contains chromosome. This structure is
(a) Endoplasmic reticulum (b) Golgi bodies
(c) Nucleus (d) Mitochondria

17. What does a nucleus of a typical animal cell contain?
(a) Chromosomes (b) Genes (c) DNA (d) All of these

Prokaryotic and Eukaryotic Cells

18. The cell containing membrane bound nucleus can be called
(a) Eukaryotic (b) Prokaryotic (c) Both (a) and (b) (d) None of these

19. Identify the figure given below.



(a) Tracheid (b) Nerve Cell (c) Lipid bilayer (d) None of these

20. If volume of the cell is filled with semi-fluid matrix called cytoplasm, what kind of cell is it?
(a) Eukaryotic (b) Prokaryotic
(c) Both (a) and (b) (d) None of these

21. Identify the given below figure.

(a) A tracheid (b) A vessel
(c) A parenchyma cell (d) A sieve cell

22. What is the main arena of cellular activities in eukaryotic cells?
(a) Nucleus (b) Cytoplasm
(c) Plasma membrane (d) All of these

23. In an eukaryotic cell, where does the various chemical reactions occur to keep the cell in living state?
(a) Nucleus (b) Cytoplasm (c) Mitochondria (d) All of these

24. How many of the following organelles are found in prokaryotic cells?
ER, Golgi complex, Lysosome, Mitochondria, Microbodies, Vacuoles
(a) 1 (b) 3 (c) 4 (d) 0

25. Where are the ribosomes found in prokaryotic cells?
(a) Cytoplasm (b) Mitochondria
(c) Chloroplast (d) All of these

26. Where are ribosomes found in eukaryotic cells?
(a) Cytoplasm (b) Mitochondria
(c) Chloroplast (d) All of these

27. How many of the following are membrane bound organelles?
Lysosomes, Ribosomes, Mitochondria, Vacuoles
(a) 2 (b) 3 (c) 4 (d) 0

28. Which of the following organelle is exclusively found in animal cells?
(a) Mitochondria (b) Chloroplast (c) Vacuole (d) Centriole

29. Which of the following is incorrect?
(a) Smallest cell → Mycoplasma (b) Smallest cell → Bacteria
(c) Largest single cell → Ostrich's egg (d) None of these

30. What is the length of mycoplasm cell?
(a) 300 mm (b) 0.3 μm (c) 3000 cm (d) All of these

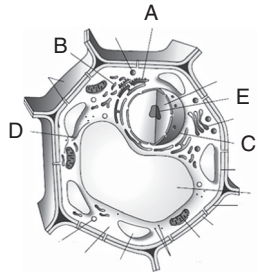
31. What could be the length of bacterial cell?
(a) 3 to 5 mm (b) 3 to 5 μm
(c) 3.5 cm (d) None of these

32. Diameter of an RBC is
(a) 7 μm (b) 700 mm
(c) 6 μm (d) 6000 mm

33. The longest cells in human body are
(a) Muscle cells (b) Cardiac muscle cells
(c) Neurons (d) None of these

34. Which of the following is incorrect matching?
(a) Round and biconcave – RBC (b) Amoeboid – WBC
(c) Elongated – Tracheid (d) Long and narrow - Nerve cells

35. Identify the A, B, C, D and E in this figure.



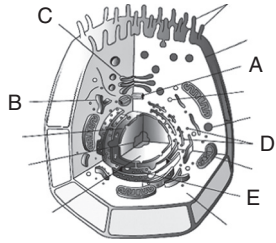
(a) A–Rough endoplasmic reticulum, B–Smooth endoplasmic reticulum, C–Nuclear envelope, D–Microtubule, E–Nucleolus
(b) A–Smooth endoplasmic reticulum, B–Rough endoplasmic reticulum, C–Microtubule, D–Nuclear envelope, E–Nucleolus
(c) A–Nucleolus, B–Microtubule, C–Smooth endoplasmic reticulum, D–Nuclear envelope, E–Rough endoplasmic reticulum
(d) A–Rough endoplasmic reticulum, B–Nucleolus, C–Microtubule, D–Smooth endoplasmic reticulum, E–Microtubule

36. Which of the following cells are round and oval?
(a) RBCs (b) WBCs
(c) Columnar cells (d) Mesophyll cells

37. Which of the following are long and narrow cells?
(a) Nerve cells (b) WBC
(c) Columnar epithelial cells (d) Tracheid

38. Which of the following represent prokaryotic cell?
(a) Blue-green algae (b) PPLO
(c) Bacteria (d) All of these

39. Identify the A, B, C, D and E in this figure.



(a) A–Smooth endoplasmic reticulum, B–Centriole, C–Golgi apparatus, D–Rough endoplasmic reticulum, E–Ribosomes
(b) A–Centriole, B–Smooth endoplasmic reticulum, C–Golgi apparatus, D–Ribosomes, E–Rough endoplasmic reticulum
(c) A–Rough endoplasmic reticulum, B–Smooth endoplasmic reticulum, C–Ribosomes, D–Centriole, E–Golgi apparatus,
(d) A–Centriole, B–Rough endoplasmic reticulum, C–Golgi apparatus, D–Smooth endoplasmic reticulum, E–Ribosomes

40. What is true for a prokaryotic cell?
(a) They are smaller in size
(b) Multiply much rapidly than eukaryotes
(c) Greatly vary in shape and size
(d) All of these

41. What is the size of a typical eukaryotic cell?
(a) 1–2 μm (b) 10–20 μm (c) 10–20 mm (d) 1–2 mm

42. How much is the size of typical bacteria?
(a) 1–2 μm (b) 10–20 μm (c) 10–20 mm (d) 1–2 mm

43. How much is the size of viruses?
(a) 0.02–0.2 μm (b) 0.2–0.4 μm (c) 0.02–0.04 μm (d) None

44. What is a genomic DNA of bacteria?
(a) Circular DNA
(b) Single stranded DNA
(c) Both (a) and (b)
(d) ds DNA, linear

45. Where is the genetic material located in prokaryotes?
(a) Nucleus
(b) Enveloped by nuclear membrane
(c) Naked in cytoplasm
(d) None of these

46. What are plasmids?
(a) Naked genomic DNA
(b) Smaller DNA than genomic DNA
(c) Enveloped DNA
(d) None of these

47. Resistance to antibiotics is conferred by
(a) Plasmid DNA
(b) Chromosome
(c) Both (a) and (b)
(d) None of these

48. Which is the common organelles that are found in both eukaryotes and prokaryote?
(a) Lysosome
(b) Ribosome
(c) Vacuole
(d) Mitochondria

49. What is a specialized differentiated form of cell membrane?
(a) Plasmid (b) Nucleosome
(c) Mesosome (d) All of these

50. Infoldings of cell membrane in prokaryotic is called
(a) Mesosomes (b) Lysosomes
(c) Both (a) and (b) (d) None of these

51. What is external to cell wall in a prokaryotic cell?
(a) Glycocalyx layer (b) Plasma membrane
(c) Both (a) and (b) (d) None of these

52. Select the incorrect statement:
(a) Glycocalyx differs in composition and thickness among different bacteria.
(b) All organism are made of cells or aggregates of cells.
(c) ER helps in synthesis of proteins, lipoproteins and glycogen.
(d) Cells of all living organisms have nuclues.

53. What is external to the plasma membrane in a prokaryotic cell like bacteria?
(a) Glycocalyx layer (b) Cell wall
(c) Both (a) and (b) (d) None of these

54. What is external to glycocalyx layer in prokaryotic cell like bacteria?
(a) Cell wall (b) Plasma membrane
(c) Both (d) None of these

55. What is external to plasma membrane and internal to glycocalyx layer?
(a) Capsule (b) Cell wall
(c) Cellular matrix (d) None of these

56. What is the basis of classification of bacteria's into gram +ve or gram –ve?
(a) Cell wall (b) Glycocalyx layer
(c) Plasma membrane (d) All of these

57. A bacterial cell was taken and gram staining was done and observed that it did not take up gram stain such a bacteria is known as
(a) Gram positive (b) Gram negative
(c) Non-effective to gram stain (d) None of these

58. Which of the following statement is not true?
(a) Response to gram stain is due to the cell envelop.
(b) The cell envelope act as a single protective unit.
(c) The glycocalyx layer is similar in all the bacteria.
(d) None of these

59. A loose sheath of glycocalyx layer is called
(a) Plasma membrane (b) Capsule
(c) Slime layer (d) Cell wall

60. What is a thick, tough, layer of glycocalyx known as?
(a) Slime layer (b) Capsule
(c) Cell wall (d) Cell envelope

61. Which of the following is not the function of cell wall?
(a) Interaction with outside world
(b) Provide structural support and shape
(c) Prevent from bursting and collapsing
(d) Exchange of nutrition takes place through it

62. Which of the following is a form of mesosome?
(a) Vesicles (b) Tubules
(c) Lamellae (d) All of these

63. Which of the following is a function of mesosome?
(a) Cell wall formation
(b) DNA replication and its distribution to daughter cells
(c) Both (a) and (b)
(d) None of these

64. Which of the following helps in respiration, secretion process,and increase the surface area for enzymatic content?
(a) Plasma membrane (b) Cell wall
(c) Mesosomes (d) Glycocalyx layer

65. In which organisms the pigment containing chromatophores are found?
(a) Algae (b) Cyanobacteria
(c) Green algae (d) Amoeba

66. A thin, filamentous extension of cell wall required for a bacterial motility is called _____.
(a) Hook (b) Flagella (c) Tail (d) Mesosome

67. Which of the following is not a part of bacteria flagellum?
(a) Filament (b) Hook
(c) Basal body (d) None

68. Of all the parts of flagellum, which one is the longest?
(a) Filament (b) Hook (c) Basal body (b) Fimbriae

69. Which of the following surface structure of bacteria does not take part in motility?
(a) Flagella (b) Pilli (c) Fimbriae (d) Both (b) and (c)

70. Which is the elongated tubular structure made of special protein on the surface of bacterial cell?
(a) Flagella (b) Fimbriae (c) Pilli (d) All of these

71. What is the small bristle like structures or fibres sprouting out of the cell?
(a) Flagella (b) Fimbriae (c) Pilli (d) All of these

72. In prokaryotes, the ribosomes are associated with which structure of cell?
(a) Cell wall (b) Mesosome
(c) Lysosomes (d) Plasma membrane

73. What is the size of ribosomes?
(a) 10–20 μm (b) 15–20 nm (c) 10–20 nm (d) 15–20 cm

74. In 70S prokaryotic ribosomes, what are the sub units present in them?
(a) 50S and 20S (b) 50S and 30S (c) 40S and 30S (d) 60S and 30S

75. A polysome is a chained structure of which organelle?
(a) Lysosome (b) Mesosome (c) Ribosome (d) All of these

76. In polyribosome, the ribosomes attach to which RNA?
(a) m-RNA (b) t-RNA (c) r-RNA (d) All of these

77. In what form, the reserve material in prokaryotic cells are stored in cytoplasm?
(a) Lysosome (b) Mesosome
(c) Ribosome (d) Inclusion bodies

78. Which of the following are not inclusion bodies?
(a) Phosphate granules (b) Cyanophycean granules
(c) Glycogen granules (d) Glucose granules

79. Gas vacuoles are found in
(a) Blue-green bacteria (b) Purple bacteria
(c) Green photosynthetic bacteria (d) All of these

80. Which of the following does not belong to eukaryote?
(a) Protists (b) Bacteria (c) Fungi (d) All of these

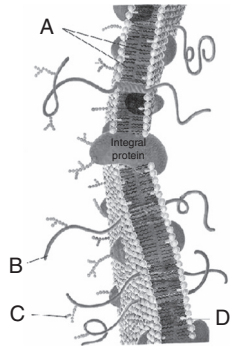
81. In eukaryotic cells, why there is an extensive compartmentalization of cytoplasm?
(a) Due to the presence of fibres
(b) Due to the presence of so many organelles
(c) Due to the presence of membranous organelles
(d) All of these

82. The chemical studies on cell membrane that was deduced to its possible structure was mostly done on which cells?
(a) WBC (b) Human erythrocytes
(c) Platelets (d) Cheek cells

83. In plasma membrane, the lipids have their polar heads facing
(a) Outer side (b) Inner side
(c) In the middle (d) Stable facing nowhere

84. The lipid component of plasma membrane will be mainly constituted of
(a) Glycolipids (b) Glycogen (c) Phosphoglycerides (d) All of these

85. Identify the A, B, C and D in this figure.



(a) A–Lipid bilayer, B–Protein, C–Sugar, D–Cholesterol
(b) A–Protein, B–Lipid bilayer, C–Cholesterol, D–Sugar
(c) A–Protein, B–Sugar, C–Lipid bilayer, D–Cholesterol
(d) A–Cholesterol, B–Protein, C–Sugar, D–Lipid bilayer

86. Which of the following are not the component of plasma membrane?
(a) Sugar (b) Protein (c) Cholesterol (d) None of these

87. What is the percentage of proteins and lipids in an RBC membrane respectively?
(a) 52%, 40% (b) 50%, 40% (c) 50%, 42% (d) 52%, 42%

88. Which of the following membrane proteins lie on the surface of the cell?
(a) Integral proteins (b) Peripheral proteins
(c) Both (a) and (b) (d) Glycoproteins

89. Which of the following membrane proteins are partially or totally buried in cell membrane?
(a) Integral proteins (b) Peripheral proteins
(c) Both (a) and (b) (d) Glycoproteins

90. The fluid mosaic model was given by Singer and Nicolson in the year _____
(a) 1972 (b) 1976 (c) 1982 (d) 1986

91. The ability of proteins to move laterally within the membrane is measured as
(a) Mobility (b) Flexibility (c) Fluidity (d) None of these

92. For what reason, the fluid nature of membrane is important?
(a) Cell growth (b) Secretions (c) Endocytosis (d) All of these

93. The most important function of plasma membrane is that it
(a) Divides the cell (b) Gives shape to the cell
(c) Transports the molecules across (d) Both (a) and (b)

94. In which kind of transport, the molecules move across without the utilization of energy?
(a) Passive transport (b) Osmosis
(c) Both (a) and (b) (d) Active transport

95. Movement of water across the plasma membrane occurs by
(a) Passive transport (b) Osmosis (c) Active transport (d) All of these

96. In which kind of transport, the molecules will go against the concentration gradient?
(a) Passive transport (b) Active transport
(c) Facilitated transport (d) All of these

97. In which of the following does active transport take place?
(a) Pumps (b) Carrier protein transport
(c) Ion channels (d) Diffusion

98. The functions of cell wall in eukaryotic cells
(a) Give shape to cell (b) Prevent from mechanical damage
(c) Protects from infection (d) All of these

99. Which of the following organisms have cell wall made up of cellulose, galactans, mannans, and minerals like calcium carbonates?
(a) Fungi (b) Plants (c) Algae (d) All of these

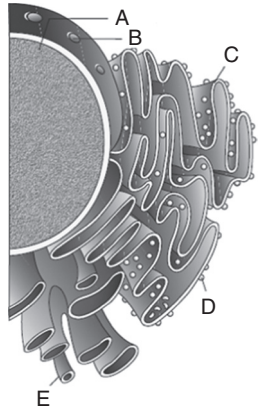
100. Which of the following organisms have cell wall made up of cellulose, hemicelluloses, pectins and proteins?
(a) Fungi (b) Plants (c) Algae (d) All of these

101. Which of the following wall is capable of growth in a plant cell?
(a) Primary wall (b) Secondary wall
(c) Both (a) and (b) (d) Middle lamella

102. What is the component of middle lamella that puts the different binds neighbouring cells together?
(a) Calcium phosphate (b) Sodium pectate
(c) Calcium pectate (d) Sodium phosphate

103. A structure that is traversing the middle lamella and connecting the cytoplasm of neighbouring cells is called
(a) Primary wall junction (b) Plasmodesmata
(c) Desmosomes (d) Secondary wall

104. Identify the A, B, C, D and E in this figure.



(a) A–Nuclear pore, B–Nucleus, C–Ribosome, D–Smooth endoplasmic reticulum, E–Rough endoplasmic reticulum
(b) A–Rough endoplasmic reticulum, B–Nuclear pore, C–Ribosome, D–Smooth endoplasmic reticulum, E–Nucleus
(c) A–Ribosome, B–Nuclear pore, C–Nucleus, D–Smooth endoplasmireticulum, E–Rough endoplasmic reticulum
(d) A–Nucleus, B–Nuclear pore, C–Rough endoplasmic reticulum, D–Ribosome, E–Smooth endoplasmic reticulum

105. How many of the following are not included in endomembrane system?
Endoplasmic Reticulum, Golgi complex, Lysosome, Mitochondria, Chloroplast, Vacuoles, Peroxisomes
(a) 2 (b) 3 (c) 4 (d) 5

106. What is the network of tiny tubular structures scattered in cytoplasm as seen from electron microscope?
(a) Golgi complex (b) Microtubules
(c) Endoplasmic reticulum (d) Mitochondria

107. What indicates A in the figure?

(a) Cisternae (b) Nuclear pore (c) Crista (d) Thylakoid

108. Which side in a cell does luminal and extra luminal compartments are situated respectively?
(a) Cytoplasm, inside ER (b) Inside ER, cytoplasm
(c) cytoplasm, plasma membrane (d) Nucleus, cytoplasm

109. Rough endoplasmic reticulum is called so due to the presence of
(a) Lysosome (b) Golgi granules
(c) Ribosomes (d) Protein granules

110. RER is frequently seen in cells associated with frequent synthesis and secretion of
(a) Lipid (b) Glucose (c) Protein (d) All of these

111. SER is frequently associated with the synthesis of
(a) Lipid (b) Glucose (c) Protein (d) All of these

112. What is the diameter of cisternae?
(a) 0.5 to 1 μm (b) 0.5 to 1 mm (c) 0.5 to 2 μm (d) 5 to 11 μm

113. Cis and trans face of golgi body are ____ and ____ respectively.
(a) Convex, Concave (b) Concave, Convex
(c) Convex, Convex (d) Concave, Concave

114. Which face of golgi apparatus receives the materials packaged in the form of vesicles from the ER?
(a) Cis (b) Trans
(c) Both (a) and (b) (d) None of these

115. Golgi apparatus is an important site for the formation of
(a) Protein and lipids (b) Glycoproteins and glycolipids
(c) Carbohydrates and proteins (d) Glucose and lipids

116. Which structure is formed by the process of packaging in golgi apparatus?
(a) Ribosomes (b) Protein granules (c) Lysosomes (d) Centrosomes

117. Which of the following are not hydrolytic enzyme?
(a) Lipase (b) Proteases (c) Carbohydrases (d) Ligases

118. Hydrolytic enzymes are activated at _____ pH.
(a) Acidic (b) Neutral (c) 0 basic (d) All of these

119. Which of the following cannot be digested by hydrolytic enzymes?
(a) DNA (b) Immunoglobulins
(c) Glucose (d) Insulin

120. Which of the following are not the contents of vacuole?
(a) Water (b) Enzymes
(c) Sap (d) Excretory products

121. Which of the following is correct about vacoule?
(a) Vacuole contain water sap, excretory product and other material not useful for the cell .
(b) In plant cell the vacuole can occupy up to 90 per cent of the volume of the cell.
(c) The vacuole is bounded by tonoplast.
(d) All of these

122. Tonoplast membrane is important for
(a) Transporting ions along concentration gradient.
(b) Transporting ions against concentration gradient.
(c) Providing rigidity to structure
(d) All of these

123. The contractile vacuole present in amoeba is useful for
(a) Ingestion (b) Locomotion (c) Both (a) and (b) (d) Excretion

124. The amount or number of mitochondria in a cell depends on
(a) Anatomical structure of cell (b) Size of the cell
(c) Colour and contour of the cell (d) Physiological activity of cell

125. What is the main function of cristae?
(a) To hold the vesicles formed (b) Increase the surface area
(c) Increase the density of organelle (d) All of these

126. What kind of ribosome is seen in mitochondria?
(a) 80S (b) 70S (c) Both (a) and (b) (d) None of these

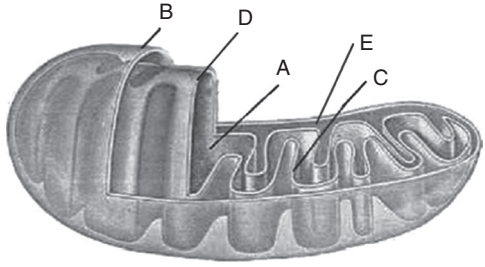
127. How is a new mitochondria formed by the pre-existing ones?
(a) Mitosis (b) Fission (c) Conjugation (d) Budding

128. What does a chloroplast contain?
(a) Chlorophyll (b) Carotenoid (c) Both (a) and (b) (d) Anthocyanin

129. Select the incorrect pair from the following:
(a) Leucoplast–Carotene (b) Amyloplast–Starch
(c) Elaioplast–Oils (d) Aleuroplasts–Proteins

130. In 30S and 40S ribosomes, 'S' stands for
(a) Sub-unit (b) Svedberg's unit (c) Single unit (d) Size

131. Identify A, B, C, D and E in the given figure.



(a) A–Matrix, B–Outer membrane, C–Crista, D–Inner membrane, E–Inner-membrane space
(b) A–Crista, B–Outer membrane, C–Inner-membrane space, D–Inner membrane, E–Matrix
(c) A–Matrix, B–Inner membrane, C–Inner-membrane space, D–Crista, E–Outer membrane
(d) A–Inner-membrane space, B–Outer membrane, C–Matrix, D–Crista, E–Inner membrane

132. What kind of ribosome is present in mitochondria?
(a) 70S (b) 80S (c) 40S (d) 60S

133. Plastids are found in
(a) All plant cells (b) All animal cells (c) Euglenoids (d) Both (a) and (c)

134. Based on the type of pigments, the plastid can be classified into how many types?
(a) 1 (b) 2 (c) 3 (d) 4

135. Which of the following is a type of plastid?
(a) Chloroplast (b) Chromoplast (d) Leucoplast (d) All of these

136. Select the correct matching:

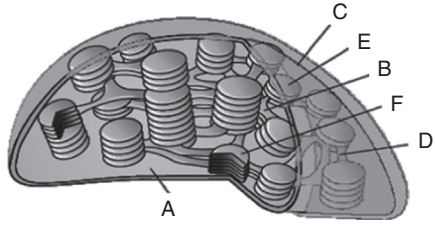
Column I (Type of leucoplast)	**Column II (Stored food)**
A. Amyloplast	1. Oil and fat
B. Elaioplast	2. Protein
C. Aleuroplasts	3. Carbohydrate

(a) A–3, B–1, C–2 (b) A–1, B–2, C–3 (c) A–3, B–2, C–1 (d) A–2, B–3, C–1

137. Select the incorrect statement:
(a) The chloroplast contains chlorophyll and carotenoid pigments.
(b) Chromoplast contains water soluble carotenoid pigments like carotene, xanthophylls.
(c) Plastid is easily observed under microscope.
(d) Chloroplast is a double membrane bound organelle.

138. The number of chloroplast in alga chlamydomonas is
(a) 2 (b) 1 (c) 20 to 40 (d) 5 to 10

139. Identify A to F in the given figure.



(a) A–Outer membrane, B–Thylakoid, C–Stroma lamella, D–Inner membrane, E–Granum, F–Stroma
(b) A–Thylakoid, B–Outer membrane, C–Stroma lamella, D–Inner membrane, E–Stroma, F–Granum
(c) A–Stroma, B–Granum, C–Outer membrane, D–Stroma lamella, E–Inner membrane, F–Thylakoid
(d) A–Inner membrane, B–Thylakoid, C–Stroma lamella, D–Outer membrane, E–Stroma, F–Granum

140. Number of chloroplast present in a mesophyll cell
(a) 5–10 (b) 10–15 (c) 20–40 (d) > 100

141. Chlorophyll pigments are present in
(a) Thylakoid (b) Stroma
(c) Outer membrane (d) Inner membrane

142. Ribosomes are the granular structure first observed under the electron microscope as dense particle by which scientist
(a) Robert Brown (1831) (b) George Palade (1953)
(c) Camillo Golgi (1898) (d) Singer and Nicolson (1972)

143. The types of ribosome present in eukaryote cell is
(a) 70S (b) 80S
(c) Both (a) and (b) (d) None of these

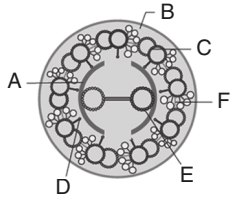
144. An elaborate network of filamentous proteinaceous structures present in the cytoplasm is collectively known as
(a) Cilia (b) Flagella (c) Cytoskeleton (d) ER

145. Cytoskeleton helps in
(a) Mechanical support to cell (b) Providing mobility to cell
(c) Maintenance of shape of cell (d) All of these

146. The central part of the proximal region of the centriole is also proteinaceous and is called
(a) Spokes (b) Doublet (c) Hub (d) Linkers

147. Find out the incorrect statement:
(a) Centrioles forms basal bodies of cilia or flagella.
(b) Centriole gives rise to spindle fibres at the time of cell division in animal cell.
(c) Centrosome is an organelle usually containing two cylindrical structures called centrioles.
(d) Peripheral fibril of centriole is doublet.

148. Identify A, B, C, D, E and F given in the figure.



(a) A–Interdoublet bridge, B–Peripheral microtubules (doublets), C–Central microtubule, D–Plasma membrane, E–Central bridge, F–Radial spoke
(b) A–Central sheath, B–Radial spoke, C–Interdoublet bridge, D–Central microtubule, E–Plasma membrane, F–Peripheral microtubules (doublets)
(c) A–Central sheath, B–Plasma membrane, C–Peripheral microtubules (doublets), D–Radial spoke, E–Central microtubule, F–Interdoublet bridge
(d) A–Plasma membrane, B–Radial spoke, C–Peripheral microtubules (doublets), D–Central sheath, E–Central microtubule, F–Interdoublet bridge

149. Select the incorrect statement:
(a) Cilia and flagella are hair-like outgrowths of the cell membrane.
(b) Cilia causes the movement of either the cell or the surrounding medium.
(c) Bacterial flagella are structurally similar to eukaryotic flagella.
(d) Flagella is responsible for cell movement.

150. Which of the following is true about the internal structure of axoneme?
(a) Central sheath is connected to one of the tubule of each peripheral doublets by a radial spoke.
(b) Axoneme is not covered by plasma membrane at all.
(c) Then are only and radial spokes are found.
(d) Peripheral doublets are not connected with each other.

151. Both cilium and flagellum emerges from centriole like structure which is called
(a) Basal granules (b) Basal bodies (c) Basal lamina (d) Basal ganglion

152. The name 'chromatin' was given by
(a) Robert Brown (b) Fleming (c) Schwann (d) Ramchandran

153. The outer membrane of nucleus remains continuous with which cell organelle
(a) ER (b) Golgi body (c) Lysosome (d) All of these

154. The perinuclear space is about
(a) 1–5 nm (b) 5–10 nm (c) 10–50 nm (d) > 100 nm

155. The following cells are without nucleus
(a) Erythrocytes of many mammals (b) Sieve tube cells of vascular plant
(c) Bacterial cell (d) All of these

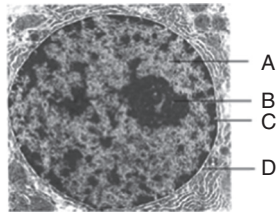
156. The site of active ribosomal RNA synthesis is
(a) Nucleolus (b) Mitochondria (c) Cytoplasm (d) All of these

157. Chromatin contains
(a) DNA (b) Basic protein histone
(c) Some non-histone protein and RNA (d) All of these

158. How long a DNA is distributed in our forty six chromosomes?
(a) 1 metre (b) 3 metre (c) 2 metre (d) 4 metre

159. Based on the position of centromere, the chromosomes are classified into how many types?
(a) 1 (b) 3 (c) 2 (d) 4

160. Identify A, B, C and D given in the figure.



(a) A–Nucleoplasm, B–Nucleolus, C–Nuclear pore, D–Nuclear membrane
(b) A–Nucleolus, B–Nucleoplasm, C–Nuclear membrane, D–Nuclear pore
(c) A–Nuclear pore, B–Nuclear membrane, C–Nucleoplasm, D–Nucleolus
(d) A–Nuclear membrane, B–Nucleoplasm, C–Nuclear pore, D–Nuclear membrane

161. Match the column:

Column I	**Column II**
A. Metacentric chromosomal	1. Middle centromere
B. Sub-metacentric	2. Centromere slightly way from middle
C. Acrocentric	3. Centromere close to its end
D. Telocentric	4. Terminal centromere

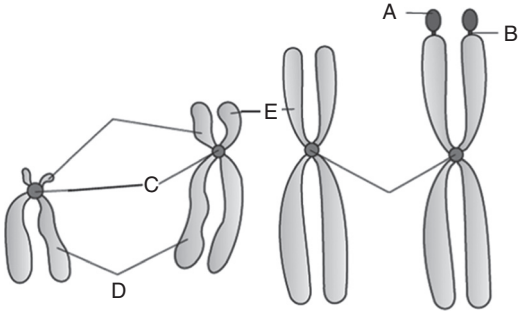
(a) A–1, B–2, C–3, D–4 (b) A–2, B–1, C–3, D–4
(c) A–1, B–2, C–4, D–3 (d) A–4, B–3, C–2, D–1

162. The following diagram shows a chromosome. Label A represents:

(a) Chromosomes (b) Kinetichore
(c) Centromere (d) Acrocentric

163. Select the incorrect statement:
(a) Micro bodies contain various enzyme and are present in both plant and animal cells.
(b) Few chromosomes have non-staining secondary constriction of constant location. This give the appearance of a small fragment called the satellite.
(c) Nuclei are spherical structures present in nucleoplasm and it is a site for ribosomal RNA synthesis.
(d) Every chromosome essentially has a secondary constriction or the centromere on the sides of which disc shaped structures called kinetochores are present.

164. Identify A, B, C, D, E, F and G given in the figure.



(a) A–Satellite, B–Secondary constriction, C–Centromere, D–Long arm, E–Short arm
(b) A–Secondary constriction, B–Satellite, C–Long arm, D–Centromere, E–Short arm
(c) A–Centromere, B–Satellite, C–Long arm, D–Short arm, E–Secondary constriction
(d) A–Satellite, B–Short arm, C–Long arm, D–Centromere, E–Secondary constriction

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

165. **Assertion:** Bacterial cells may be motile or non motile.
Reason: Bacterial cells may or may not posses cilia.

166. **Assertion:** Bacterial cell walls are not like the plant cell.
Reason: Bacterial cell wall is not made up of cellulose.

167. **Assertion:** Membrane transport occurs through the carrier proteins.
Reason: The transport carried by carrier proteins is always passive.

168. **Assertion:** Cristae are the infoldings of outer membrane of mitochondria.
Reason: Electron transport occurs in mitochondrial stroma.

169. **Assertion:** Eukaryotic cells have more DNA than prokaryotic cells.
Reason: Eukaryotes are genetically more complex than prokaryotes.

170. **Assertion:** Schleiden and Schwann were the first to observe the cells and to put forward the cell theory.
Reason: The cells are always living unit.

171. **Assertion:** In animal cells, the lipid-like steroidal hormones are synthesized in SER.
Reason: The smooth ER is the major site for synthesis of lipid.

172. **Assertion:** Lysosomes help in photorespiration.
Reason: Lysosome have basic enzyme.

173. **Assertion:** Mitochondria is known as the power house of cell.
Reason: ATP production takes place here.

174. **Assertion:** DNA is associated with proteins.
Reason: DNA binds around histone protein that form a pool and the entire structure is called a nucleosome.

175. **Assertion:** Cell wall is not found in animal cell.
Reason: Animal cells are covered by cell membrane.

176. **Assertion:** It is important that the organisms should have cell.
Reason: A cell keeps its chemical composition steady within its boundary.

177. **Assertion:** The number of cells in a multicellular organism is inversely proportional to the size of body.
Reason: All the cells in the biological world are of same size.

178. **Assertion:** A cell membrane shows fluid behaviour.
Reason: A membrane is a mosaic or composite of diverse lipids and proteins.

179. **Assertion:** Mitochondria and chloroplasts are semi-autonomous organelles.
Reason: Mitocondria and chloroplast are devoid of ribosomes.

180. **Assertion:** Cell is fundamental structural and functional unit of life.
Reason: Anything less than a complete structure of a cell does not ensure independent life.

181. **Assertion:** Na^+/K^+ pump is an active transport.
Reason: Na^+/K^+ pump utilize energy of ATP

182. **Assertion:** Calcium pectate is referred as plant cement.
Reason: It glues neighbouring plant cells together.

183. **Assertion:** Cell wall help in cell to cell interaction.
Reason: Cell wall provide barrier to undesirable macromolecules.

184. **Assertion:** Lateral movement of protein lipid bilayer of plasma membrane is possible
Reason: Lipid bilayer is of quasi fluid nature.

185. **Assertion:** Lysosomes posses' acidic pH.
Reason: Lysosomes are rich in hydrolytic enzymes which are activated by acidic pH.

186. **Assertion:** Mitochondria are the sites of aerobic respiration
Reason: Mitochondria contain 80s type of ribosomes.

187. **Assertion:** Carbohydrate synthesis occurs in stroma of chloroplast.
Reason: Enzyme required for carbohydrate synthesis present in stroma of chloroplast.

188. **Assertion:** Prokaryotic and Eukaryotic flagella are structurally similar.
Reason: Cilia are longer than flagella.

189. **Assertion:** 's' in '80s' represent sedimentation coefficient
Reason: Sedimentation coefficient is direct measure of density and size of ribosome.

190. **Assertion:** Lysosomes have acidic pH.
Reason: It is maintain by pumping proton into interior of lysosome.

191. **Assertion:** Mitochondria and chloroplast are semi-autonomous cell organelle.
Reason: Both contain DNA, RNA and ribosome.

192. **Assertion:** Unicellular organisms are capable of independent existence.
Reason: Single cell in these organisms can perform essential function of life.

193. **Assertion:** Cell is fundamental structural and functional unit of all living organisms.
Reason: A complete structure of cell does not ensure independent life.

194. **Assertion:** Cell wall is unique character of the plant cells
Reason: Cell membrane is only found in animal cells.

195. **Assertion:** Cells have different shapes
Reason: Shapes of cells vary with function they perform

196. **Assertion:** Genetic material in prokaryotic is said to be naked.
Reason: Genetic material in prokaryotic is not associated with histone proteins and absence of nuclear envelope around it.

197. **Assertion:** Certain bacteria possess resistance to antibiotic.
Reason: Certain bacteria possess plasmid

198. **Assertion:** Mesosome in bacteria help in respiration
Reason: Mesosome contain respiratory enzyme

199. **Assertion:** Polysomes are found in prokaryote as well as eukaryotes
Reason: Polysomes use to produce more protein replica from single mRNA.

200. **Assertion:** Ribosomes are found in both prokaryote and eukaryotes.
Reason: Ribosomes are protein factories which is required for both types of cells.

201. **Assertion:** In lipid bilayer in membrane, lipid are arranged with polar head towards outer side and the hydrophobic tail towards the inner part
Reason: This ensures that the nonpolar tail of saturated hydrocarbon is protected from aqueous environment.

202. **Assertion:** Integral proteins can't be extracted easily from plasma membrane
Reason: Integral proteins are partially or totally embedded in the membrane.

203. **Assertion:** RER is rough.
Reason: This endoplasmic reticulum bears ribosomes.

204. **Assertion:** Golgi apparatus remain in close association with the endoplasmic reticulum.
Reason: Material to be packaged in form of vesicle from the ER fuse with the cis face of the Golgi apparatus and move towards maturing face.

205. **Assertion:** Lysosomes are capable of digesting carbohydrate, protein, lipids and nucleic acids.
Reason: Lysosomes contain almost all type of hydrolytic enzymes.

206. **Assertion:** Some ion concentration is higher in the vacuole than in the cytoplasm of plant cell.
Reason: In the plant tonoplast facilitate the transport of some ions against concentration gradient into the vacuole.

207. **Assertion:** Chloroplast can synthesize proteins
Reason: Chloroplast contains ribosomes.

208. **Assertion:** Ribosomes were discovered after discovery of electron microscope.
Reason: Ribosomes can be observed by electron-microscope.

PREVIOUS YEAR QUESTIONS

1. Identify the components labelled A, B, C and D in the diagram below from the list (i) to (vii) given along with**:**

Components:

(i) Cristae of mitochondria
(ii) Inner membrane of mitochondria
(iii) Cytoplasm
(iv) Smooth endoplasmic reticulum
(v) Rough endoplasmic reticulum
(vi) Mitochondrial matrix
(vii) Cell vacuole
(viii) Nucleus

[AIPMT MAINS 2010]

The correct components are:

	A	B	C	D
(a)	(v)	(iv)	(viii)	(iii)
(b)	(i)	(iv)	(viii)	(vi)
(c)	(vi)	(v)	(iv)	(vii)
(d)	(v)	(i)	(iii)	(ii)

2. Membrane-bound organelles are absent in

[AIPMT PRE 2010]

(a) Saccharomyces
(b) Streptococcus
(c) Chlamydomonas
(d) Plasmodium

3. Which one of the following has its own DNA?

[AIPMT PRE 2010]

(a) Mitochondria
(b) Dictyosome
(c) Lysosome
(d) Peroxisome

4. The main arena of various types of activities of a cell is

[AIPMT PRE 2010]

(a) Plasma membrane
(b) Mitochondrion
(c) Cytoplasm
(d) Nucleus

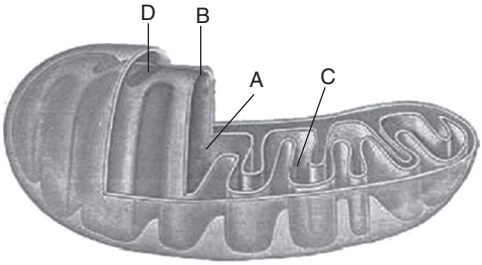
5. The plasma membrane consists mainly of

[AIPMT PRE 2010]

(a) Phospholipids embedded in a protein bilayer.
(b) Proteins embedded in a phospholipid bilayer.

(c) Proteins embedded in a polymer of glucose molecules.
(d) Proteins embedded in a carbohydrate bilayer.

6. The figure below shows the structure of a mitochondrion with its four parts labelled as A, B, C and D. Identify the parts:



[AIPMT MAINS 2011]

(a) D (outer membrane) – gives rise to inner membrane by splitting
(b) B (inner membrane) – forms infolding called cristae
(c) C (crista) – possesses single circular DNA molecule and ribosomes
(d) A (matrix) – major site for respiratory chain enzymes

7. In mitochondria, protons accumulate in the

[AIPMT MAINS 2011]

(a) Outer membrane
(b) Inner membrane
(c) Intermembrane space
(d) Matrix

8. Which one of the following is not considered as a part of the endomembrane system?

[AIPMT MAINS 2011]

(a) Golgi complex
(b) Peroxisome
(c) Vacuole
(d) Lysosome

9. Which one of the following organisms is not an example of eukaryotic cells?

[AIPMT PRE 2011]

(a) *Escherichia coli*
(b) *Euglena viridis*
(c) *Amoeba proteus*
(d) *Paramecium caudatum*

10. The important site for the formation of glycoproteins and glycolipids is

[AIPMT PRE 2011]

(a) Golgi apparatus
(b) Plastid
(c) Lysosome
(d) Vacuole

11. In eubacteria, a cellular component that resembles eukaryotic cells is

[AIPMT PRE 2011]

(a) Nucleus
(b) Ribosomes
(c) Cell wall
(d) Plasma membrane

12. Peptide synthesis inside a cell takes place in

[AIPMT PRE 2011]

(a) Mitochondria
(b) Chromoplast
(c) Ribosomes
(d) Chloroplast

13. Which one of the following cellular parts is correctly described?

[AIPMT MAINS 2012]

(a)	Centrioles	–	Sites for active RNA synthesis
(b)	Ribosomes	–	Those on chloroplasts are larger (80S) while those in the cytoplasm are smaller (70S)
(c)	Lysosomes	–	Optimally active at a pH of about 8.5
(d)	Thylakoids	–	Flattened membranous sacs forming the grana of chloroplasts

14. Which one of the following structures is an organelle within an organelle?

[AIPMT MAINS 2012]

(a) Peroxisome (b) ER
(c) Mesosome (d) Ribosome

15. Ribosomal RNA is actively synthesized in

[AIPMT PRE 2012]

(a) Lysosomes (b) Nucleolus
(c) Nucleoplasm (d) Ribosomes

16. What is true about ribosomes?

[AIPMT PRE 2012]

(a) The prokaryotic ribosomes are 80S, where 'S' stands for sedimentation coefficient.
(b) These are composed of ribonucleic acid and proteins.
(c) These are found only in eurkaryotic cells.
(d) These are self-splicing introns of some RNAs.

17. Nuclear membrane is absent in

[AIPMT PRE 2012]

(a) Penicillium (b) Agaricus (c) Volvox (d) Nostoc

18. Select the correct statement from the following regarding cell membrane.

[AIPMT PRE 2012]

(a) NA^+ and K^+ ions move across cell membrane by passive transport.
(b) Proteins make up 60 to 70 per cent of the cell membrane.
(c) Lipids are arranged in a bilayer with polar heads towards the inner part.
(d) Fluid mosaic model of cell membrane was proposed by Singer and Nicolson.

19. A major site for synthesis of lipids is

[AIPMT 2013]

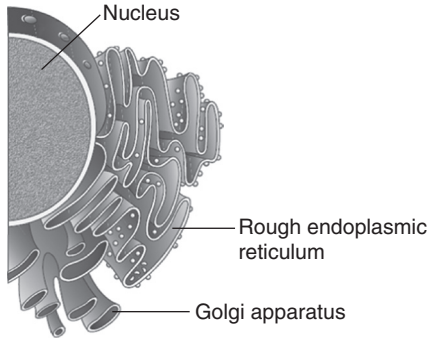
(a) RER (b) SER
(c) Symplast (d) Nucleoplasm

20. The Golgi complex plays a major role

[AIPMT 2013]

(a) In trapping the light and transforming it into chemical energy.
(b) In digesting proteins and carbohydrates.
(c) As energy transferring organelles.
(d) In post translational modification of proteins and glycosidation of lipids.

21. Which one of the following organelle in the figure correctly matches with its function?



[AIPMT 2013]

(a) Rough endoplasmic reticulum, formation of glycoproteins
(b) Golgi apparatus, protein synthesis
(c) Golgi apparatus, formation of glycolipids
(d) Rough endoplasmic reticulum, protein synthesis

22. Which structures perform the function of mitochondria in bacteria?

[AIPMT 2014]

(a) Nucleoid (b) Ribosomes
(c) Cell wall (d) Mesosomes

23. The solid linear cytosketetal elements having a diameter of 6 nm and made up of a single type of monomer are known as

[AIPMT 2014]

(a) Microtubules (b) Microfilaments
(c) Intermediate filaments (d) Lamins

24. Match the following and select the correct answer:

[AIPMT 2014]

(A) Centriole (1) Infoldings in mitochondria
(B) Chlorophyll (2) Thylakoids
(C) Cristae (3) Nucleic acids
(D) Ribozymes (4) Basal body cilia or flagella

(a) A : 4, B : 2, C : 1, D : 3 (b) A : 1, B : 2, C : 4, D : 3
(c) A : 1, B : 3, C : 2, D : 4 (d) A : 4, B : 3, C : 1, D : 2

25. The motile bacteria are able to move by

[AIPMT 2014]

(a) Fimbriae (b) Flagella
(c) Cilia (d) Pili

26. The chromosomes in which the centromere is situated close to one end are

[AIPMT 2015]

(a) Metacentric (b) Acrocentric
(c) Telocentric (d) Sub-metacentric

27. Nuclear envelope is a derivative of
(a) Smooth endoplasmic reticulum (b) Membrane of Golgi complex
(c) Microtubules (d) Rough endoplasmic reticulum

28. The structures that are formed by the stacking of organized flattened membranous sacs in the chloroplast are [AIPMT 2015]
(a) Cristae (b) Grana
(c) Stroma lamellae (d) Stroma

29. Select the correct matching in the following pairs: [AIPMT 2015]
(a) Smooth ER Oxidation of phospholipids
(b) Smooth ER Synthesis of lipids
(c) Rough ER Synthesis of glycogen
(d) Rough ER Oxidation of fatty acid

30. True nucleus is absent in [AIPMT 2015]
(a) Anabaena (b) Mucor
(c) Vaucheria (d) Volvox

31. Which one of the following is not an inclusion body found in prokaryotes? [AIPMT 2015]
(a) Phosphate granule (b) Cyanophycean granule
(c) Glycogen granule (d) Polysome

32. DNA is not present in
(a) Chloroplast (b) Ribosomes
(c) Nucleus (d) Mitochondria

33. Which of the following are not membrane-bound? [RE-AIPMT 2015]
(a) Ribosomes (b) Lysosomes
(c) Mesosomes (d) Vacuoles

34. Which of the following structures is not found in a prokaryotic cell? [RE-AIPMT 2015]
(a) Ribosome (b) Mesosome
(c) Plasma membrane (d) Nuclear envelope

35. The structures that help some bacteria to attach to rocks and/or host tissues are [RE-AIPMT 2015]
(a) Fimbriae (b) Mesosomes
(c) Holdfast (d) Rhizoids

36. Match the columns and identify the correct option. [RE-AIPMT 2015]

Column I	Column II
(a) Thylakoids	(i) Disc-shaped sacs in Golgi apparatus
(b) Cristae	(ii) Condensed structure of DNA
(c) Cisternae	(iii) Flat membranous sacs in stroma
(d) Chromatic	(iv) Infoldings in mitochondria

	(a)	(b)	(c)	(d)
(a)	(iii)	(iv)	(i)	(ii)
(b)	(iii)	(i)	(iv)	(ii)
(c)	(iii)	(iv)	(ii)	(i)
(d)	(iv)	(iii)	(i)	(ii)

37. Cellular organelles with membranes are [RE-AIPMT 2015]

(a) Chromosomes, ribosomes and endoplasmic reticulum
(b) Endoplasmic reticulum, ribosomes and nuclei
(c) Lysosomes, golgi apparatus and mitochondria
(d) Nuclei, ribosomes and mitochondria

38. Mitochondria and chloroplast are: [NEET - I, 2016]

(i) Semi-autonomous organelles.
(ii) Formed by division of pre-existing organelles and they contain DNA but lack protein synthesizing machinery.

Which one of the following options is correct?

(a) Both (i) and (ii) are correct
(b) (ii) is true and (i) is false
(c) (i) is true and (ii) is false
(d) Both (i) and (ii) are false

39. Microtubules are the constituents of: [NEET - I, 2016]

(a) Cilia, Flagella and Peroxisomes
(b) Spindle fibres, Centrioles and Cilia
(c) Centrioles, Spindle fibres and Chromatin
(d) Centrosome, Nucleosome and Centrioles

40. A complex of ribosome attached to a single strand of RNA is known as: [NEET - I, 2016]

(a) Polysome
(b) Polymer
(c) Polypeptide
(d) Okazaki fragment

41. Which one of the following cell organelles is enclosed by a single membrane? [NEET - I, 2016]

(a) Mitochondria
(b) Chloroplasts
(c) Lysosomes
(d) Nuclei

42. Water soluble pigments found in plant cell vacuoles are: [NEET - I, 2016]

(a) Xanthophylls
(b) Chlorophylls
(c) Carotenoids
(d) Anthocyanins

43. Select the mismatch [NEET - II, 2016]

(a) Large central vacuoles – Animal cells
(b) Protists-Eukaryotes
(c) Methanogens-Prokaryotes
(d) Gas vacuoles-Green bacteria

44. Select he wrong statement. [NEET - II, 2016]

(a) Pili and fimbriae are mainly involved in monthly of bacteria cells
(b) Cyanobacteria lack flagellated cells
(c) Mycoplasma is a wall-less microorganism
(d) Bacterial cell wall is made up of peptidoglycan

45. A cell organelle containing hydrolytic enzymes is [NEET - II, 2016]
(a) Microsome (b) Ribosome
(c) Mesosome (d) Lysosome

NCERT EXEMPLAR QUESTIONS

1. A common characteristic feature of plant sieve tube cells and most of the mammalian erythrocytes is
(a) Absence of mitochondria (b) Presence of cell wall
(c) Presence of haemoglobin (d) Absence of nucleus

2. Select one which is not true for ribosome
(a) Made of two sub–units (b) Form polysome
(c) May attach to mRNA (d) Have no role in protein synthesis.

3. Which one of these is not a eukaryote?
(a) Euglena (b) Anabena
(c) Spirogyra (d) Agaricus.

4. Which of the following dyes is not used for staining chromosomes?
(a) Basic Fuchsin (b) Safranin
(c) Methylene blue (d) Carmine

5. Different cells have different sizes. Arrange the following cells in an ascending order of their size. Choose the correct option among the followings:
(i) Mycoplasma (ii) Ostrich eggs
(iii) Human RBCs (iv) Bacteria
Options:
(a) (i), (iv), (iii) and (ii) (b) (i), (ii), (iii) and (iv)
(c) (ii), (i), (iii) and (iv) (d) (iii), (ii), (i) and (iv)

6. Which of the following features is common to prokaryotes and many eukaryotes?
(a) Chromosomes are present
(b) Cell wall is present
(c) Nuclear membrane is present
(d) Membrane bound sub–cellular organelles are present.

7. Who proposed the fluid mosaic model of plasma membrane?
(a) Camillo Golgi (b) Schleiden and Schwann
(c) Singer and Nicolson (d) Robert Brown

8. Which of the following statements is true for secretory cells?
(a) Golgi apparatus is absent.
(b) Rough Endoplasmic Reticulum (RER) is easily observed in the cell.
(c) Only Smooth Endoplasmic Reticulum (SER) is present.
(d) Secretory granules are formed in nucleus.

9. What is a tonoplast?
(a) Outer membrane of mitochondria.
(b) Inner membrane of chloroplast.
(c) Membrane boundary of the vacuole of plant cells.
(d) Cell membrane of plant cell.

10. Which of the following is not true of a eukaryotic cell?
(a) Cell wall is made up of peptidoglycans.
(b) It has 80 S type of ribosome present cytoplasm.
(c) Mitochondria contain circular DNA.
(d) Membrane bound organelles are present.

11. Which of the following statements is not true for plasma membrane?
(a) It is present in both plant and animal cells.
(b) Lipid is present as a bilayer in it.
(c) Proteins are present in integrated as well as loosely associated with the lipid bilayer.
(d) Carbohydrate is never found in it.

12. Plastid differs from mitochondria on the basis of one of the following features. Mark the right answer.
(a) The presence of two layers of membrane
(b) The presence of ribosome
(c) The presence of thylakoids
(d) The presence of DNA

13. Which of the following is not a function of cytoskeleton in a cell?
(a) Intracellular transport
(b) Maintenance of cell shape and structure
(c) Support of the organelles
(d) Cell motility

14. The stain used to visualize mitochondria is
(a) Fast green (b) Safranin (c) Acetocarmine (d) Janus green

Answer Keys

Practice Questions

1. (d)	2. (d)	3. (b)	4. (a)	5. (c)	6. (a)	7. (b)	8. (b)	9. (b)	10. (c)
11. (b)	12. (c)	13. (a)	14. (d)	15. (d)	16. (c)	17. (d)	18. (a)	19. (b)	20. (c)
21. (a)	22. (b)	23. (b)	24. (d)	25. (a)	26. (d)	27. (b)	28. (d)	29. (b)	30. (b)
31. (b)	32. (a)	33. (c)	34. (d)	35. (a)	36. (d)	37. (c)	38. (d)	39. (b)	40. (d)
41. (b)	42. (a)	43. (a)	44. (a)	45. (c)	46. (b)	47. (a)	48. (b)	49. (c)	50. (a)
51. (a)	52. (d)	53. (c)	54. (d)	55. (b)	56. (d)	57. (b)	58. (c)	59. (c)	60. (b)
61. (d)	62. (d)	63. (c)	64. (c)	65. (b)	66. (b)	67. (d)	68. (a)	69. (d)	70. (c)
71. (b)	72. (d)	73. (b)	74. (b)	75. (c)	76. (a)	77. (d)	78. (d)	79. (d)	80. (b)
81. (c)	82. (b)	83. (a)	84. (c)	85. (a)	86. (d)	87. (a)	88. (b)	89. (a)	90. (a)
91. (c)	92. (d)	93. (c)	94. (c)	95. (b)	96. (b)	97. (a)	98. (d)	99. (c)	100. (b)
101. (a)	102. (c)	103. (b)	104. (d)	105. (b)	106. (c)	107.(a)	108. (b)	109. (c)	110. (c)

111. (a) 112. (a) 113. (a) 114. (a) 115. (b) 116. (c) 117. (d) 118. (a) 119. (c) 120. (b)
121. (d) 122. (b) 123. (d) 124. (d) 125. (b) 126. (b) 127. (b) 128. (c) 129. (a) 130. (b)
131. (a) 132. (a) 133. (d) 134. (c) 135. (d) 136. (a) 137. (b) 138. (b) 139. (c) 140. (c)
141. (a) 142. (b) 143. (c) 144. (c) 145. (d) 146. (c) 147. (d) 148. (c) 149. (c) 150. (a)
151. (b) 152. (b) 153. (a) 154. (c) 155. (d) 156. (a) 157. (d) 158. (c) 159. (d) 160. (a)
161. (a) 162. (b) 163. (d) 164. (a)

Assertion and Reason Questions

165. (c) 166. (a) 167. (c) 168. (d) 169. (a) 170. (d) 171. (b) 172. (d) 173. (a) 174. (a)
175. (a) 176. (a) 177. (d) 178. (a) 179. (c) 180. (a) 181. (b) 182. (a) 183. (b) 184. (a)
185. (a) 186. (c) 187. (a) 188. (d) 189. (c) 190. (a) 191. (a) 192. (a) 193. (c) 194. (c)
195. (a) 196. (a) 197. (a) 198. (a) 199. (a) 200. (a) 201. (a) 202. (a) 203. (a) 204. (a)
205. (a) 206. (a) 207. (a) 208. (a)

Previous Year Questions

1. (a) 2. (b) 3. (a) 4. (c) 5. (b) 6. (b) 7. (c) 8. (b) 9. (a) 10. (a)
11. (d) 12. (c) 13. (d) 14. (d) 15. (b) 16. (b) 17. (d) 18. (d) 19. (b) 20. (d)
21. (d) 22. (d) 23. (b) 24. (a) 25. (b) 26. (b) 27. (d) 28. (b) 29. (b) 30. (a)
31. (d) 32. (b) 33. (a) 34. (d) 35. (a) 36. (a) 37. (c) 38. (c) 39. (b) 40. (a)
41. (c) 42. (d) 43. (a) 44. (a) 45. (d)

NCERT Exemplar Questions

1. (d) 2. (d) 3. (b) 4. (b) 5. (a) 6. (b) 7. (c) 8. (b) 9. (c) 10. (a)
11. (d) 12. (c) 13. (a) 14. (d)

CHAPTER

9

Biomolecules

PRACTICE QUESTIONS

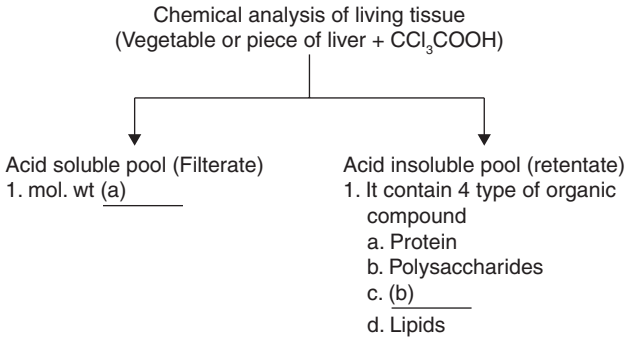
Analyzing the Chemical Composition

1. Which elements are abundantly found in living organism with comparison to earth's crust?
(a) Carbon (b) Hydrogen (c) Oxygen (d) All of these

2. To analyse the chemical composition of living tissue we solubilize them in
(a) HNO_3 (b) HCl (c) CF_3COOH (d) CCI_3COOH

3. The percentage of oxygen in human body is
(a) 65% (b) 46.6% (c) 18.5% (d) 3.3%

4.



Fill in the blanks in (1) and (2) in the above flowchart.
(a) a → greater than 1000 Dalton b → Nucleotide
(b) a → 18–800 Da b → Nucleic acid
(c) a → greater than 10,000 Da b → Oligosaccharides
(d) a → greater than 1000 Dalton b → Nucleoside

5. All the carbon compounds that we get from the living tissues can be called
(a) Bioresource (b) Bioinformatics (c) Biowar (d) Biomolecules

6. Select the incorrect compounds that we get from living tissues can be called:
(a) Elemental analysis of living tissues gives elemental composition of living tissue.
(b) Analysis of chemical compound of living tissue gives idea of organic and inorganic constituent of living tissue.
(c) Weight of small amount of living fresh tissue is known as wet weight.
(d) Acid soluble pool contain lipids, nucleic acid, polysaccharide only.

7. The biomolecule whose weight is less than____ dalton (Da) is referred to as biomicromolecule.
(a) 800 (b) 18 (c) 1000 (d) 10,000

8. Which of the following is not a macromolecule?
(a) Nucleic acid (b) Polysaccharides
(c) Lipids (d) Proteins

9. Lipids are extracted with acid insoluble fraction because
(a) Its molecular weight is less than 800 Da
(b) It form vesicle or micelle which are not water soluble
(c) It is a polymer
(d) It is not a polymer

10. Select the incorrect matching for component percentage in living cell:
(a) Water – 70 to 90%
(b) Proteins – 10 to 15%
(c) Carbohydrate – 2%
(d) Nucleic Acid – 5 to 7%

11. _____ of the total cell mass is formed by ions.
(a) 1% (b) 2% (c) 3% (d) 4%

12. Monomeric unit of cellulose is
(a) Glucose (b) Fructose (c) Mannose (d) Ribose

13. Monomeric unit of inulin is
(a) Glucose (b) Fructose (c) Mannose (d) Ribose

14. Which of the following is homopolysaccharide?
(a) Cellulose (b) Inulin (c) Starch (d) All of these

15. Starch forms helical _____ structure that can hold _____ molecule and gives blue colour.
(a) primary, I_2 (b) secondary, I_2 (c) tertiary, I_2 (d) quaternary, I_2

16. Select the incorrect statement from the following:
(a) Cellulose does not contain complex helices.
(b) Cellulose does not give colour with I_2.
(c) Cotton fibre, plant cell wall are made up of cellulose.
(d) Cellulose is heteropolysaccharide.

17. Which of the following is amino-sugar?
(a) Glucosamine (b) Galactosamine (c) Both (a) and (b) (d) None of these

18. Chitin is a
(a) Homopolysaccharide (b) Heteropolysaccharide
(c) Oligosaccharide (d) Monosaccharide

19. Chitin is present in
(a) Exoskeleton of arthropods (b) Cell wall of fungus
(c) Setae of earthworm (d) All of these

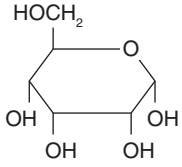
20. In glycogen, which kind of linkage is found between adjacent glucose molecule?
(a) 1, 4 (b) 1, 6 (c) both (d) 1, 2

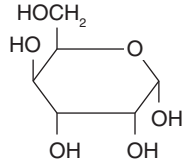
21. Which of the following is incorrect about glycogen?
(a) It is a stored form of glucose in animals.
(b) In glycogen, the right end is reducing and the left end is non-reducing.
(c) It is a branched polymer of glucose.
(d) It is a stored form of glucose in plants.

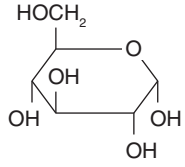
22. The bond formed between two adjacent monosaccharide is
(a) Peptide bond (b) Ester bond (c) Glycosidic bond (d) Ionic bond

23. Blood concentration of glucose in normal healthy individual is
(a) 2–3 mM (b) 4.5–5 mM (c) 6–7 mM (d) 1 mM

24. Which is the correct Haworth structure of glucose?

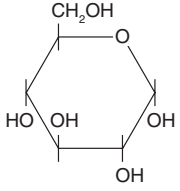
(a) 

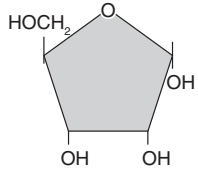
(b) 

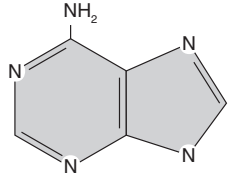
(c) 

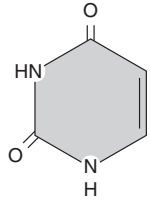
(d) All of these

25. Which is the correct representation of ribose?

(a) 

(b) 

(c) 

(d) 

26. Which of the following is a stored form of energy in plant?
(a) Starch (b) Cellulose (c) Glycogen (d) Chitin

27. Lipids are
(a) Compounds of carbon, hydrogen and oxygen
(b) Compounds of glycerol and fatty acid
(c) Insoluble in water
(d) All of these

28. Lipids may be
(a) Fatty acid (b) Glycerol
(c) Compound respectively of both (d) All of these

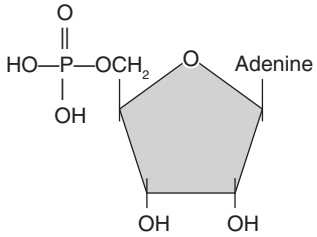
29. What is the number of carbon atoms which the palmitic and arachidonic acid contain (including carboxyl carbon)?
(a) 16, 19 (b) 15, 19 (c) 16, 20 (d) 18, 20

30. Fats or oils are
(a) Monoglycerides (b) Diglycerides (c) Triglycerides (d) Any of the above

31. Which of following is an example of phospholipid?
(a) Palmitic acid (b) Arachidonic acid
(c) Lecithin (d) Glycerol

32. Which of the following is correct about lipids?
(a) On the basis on melting points they are divided into fats and oils.
(b) Neural tissues are made up of simple lipids only.
(c) Phospholipids never forms a part of cell membrane.
(d) Lipids are strictly macromolecule.

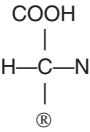
33. Select the incorrect matching regarding the following diagram:



(a) Purine – Its metabolism forms uric acid
(b) Uracil – It is exclusively found in RNA only
(c) Adenylic acid – Monomer of both RNA and DNA
(d) Cholesterol – Forms a part of cell membrane

34. Which of the following is correct about amino acid?
(a) It is a compound containing amino and acidic group (–COOH).
(b) It is a substitute and is methane.
(c) It is based on the nature of 'R' group they are of many types.
(d) All the above

35. How many amino-acids are used to form protein?
(a) 18 (b) 20 (c) 21 (d) 22

36.  is a structure of α–amino acid. Based on different ® groups the following amino acids are formed. Select the correct amino acid according to different ® group.
(a) R→H (glycine),
(b) R→CH_3 (alanine),
(c) R→CH_2OH (serine)
(d) All the above

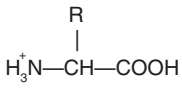
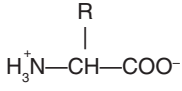
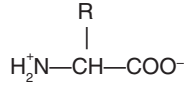
37. The chemical and physical property of amino acid is based on
(a) $–NH_2$ group (b) –COOH group
(c) –R group (d) All of these

38. Match the column:

Column I		**Column II**
A. Acidic	–	1. Valine
B. Basic	–	2. Lysine
C. Neural	–	3. Glutamic acid
D. Aromatic	–	4. Tyrosine, phenylalanine, tryptophan

(a) A–3, B–2, C–1, D–4 (b) A–2, B–3, C–4, D–1
(c) A–4, B–1, C–2, D–3 (d) A–1, B–2, C–2, D–4

39. Which of the following is a Zwitter-ionic form of amino acid?

(a)  (b)  (c)  (d) All of these

Proteins

40. Protein is
(a) Homopolymer (b) Heteropolymer (c) Polypeptide (d) Both (b) and (c)

41. Essential amino acids are those which are
(a) Not synthesized by our body (b) Not required by our body
(c) Synthesized by our body (d) Only used to form proteins

42. The most abundant protein in animal world is
(a) RuBisCO (b) Collagen (c) Elastin (d) Albumin

43. The most abundant protein in whole biosphere is
(a) RuBisCO (b) Collagen (c) Elastin (d) Albumin

44. Protein acts as a
(a) Enzyme (b) Receptor (c) Antibody (d) All of these

45. Match the column:

Column I		**Column II**
A. Collagen	–	1. Hormone
B. Trypsin	–	2. Enzyme
C. Insulin	–	3. Fight Infectious agent
D. Receptor	–	4. Enable glucose transport into cells
E. GLUT–4	–	5. Sensory reception (smell, taste hormone)
F. Antibody	–	6. Intercellular ground substance

(a) A–3, B–2, C–4, D–1, E–6, F–5 (b) A–6, B–2, C–1, D–5, E–4, F–3
(c) A–1, B–4, C–2, D–5, E–3, F–6 (d) A–2, B–4, C–5, D–3, E–1, F–6

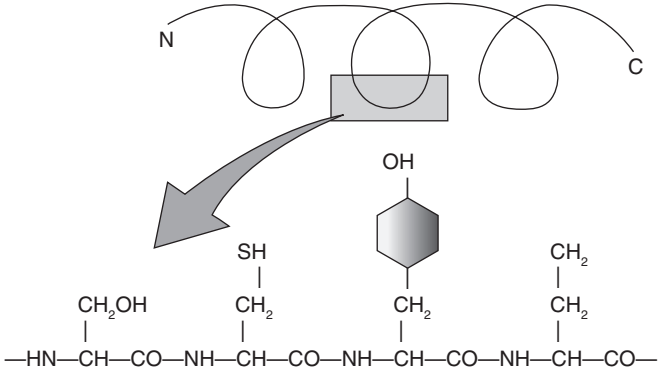
46. The macromolecular fraction is comprised by which of the following?
(a) Polynucleotides (b) Polypeptides (c) Polysaccharides (d) All of these

47. Protein is described by biologists at _____ levels.
(a) 1 (b) 2 (c) 3 (d) 4

48. Sequence or positional information of amino acid is given by the
(a) 2° structure (b) 1° structure
(c) Tertiary structure (d) Quaternary structure

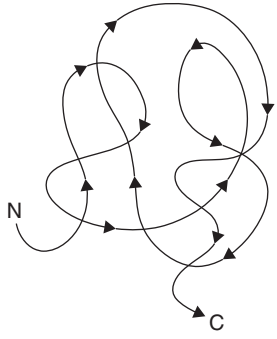
49. In the primary structure of protein
(a) Left end represents → 1st amino acid (C-terminal amino acid)
(b) Right end represents → Last amino acid (N terminal amino acid)
(c) Left end represents → 1st amino acid (N-terminal amino acid)
(d) Right end represents → 1st amino acid (C-terminal amino acid)

50.



Name the used amino acid in the above diagram.
(a) Serine–Cysteine–Tyrosine–Glutamic acid
(b) Serine–Methionin–Tryptophan–Glutamic acid
(c) Serine–Methionin–Tyrosine–Aspartic acid
(d) Serine–Cysteine–Tyrosine–Aspartic acid

51. Which of the following is correct about secondary structure?



(a) Helix is a primary structure.
(b) In proteins only left handed helices are observed.
(c) In proteins only right handed helices are observed.
(d) None of these

52. Which structure is absolutely necessary for the many biological activities of proteins?
(a) 1° (b) 3° (c) 2° (d) 4°

53. When an assembly of more than one polypeptide occurs then it is known as _____ structure of protein.
(a) 1° (b) 2° (c) 3° (d) 4°

54. Which of the following is correct about human Haemoglobin (Hb)?
(a) Made up to 2-α and 2-β subunits (b) Present in RBC
(c) Use to carry O_2 and CO_2 (d) All of these

55. Select the incorrect statement from the following:
(a) Most of the enzymes are protein.
(b) 'Hb' is an example of quaternary structure of protein.
(c) In the primary structure of protein, the left hand is N-terminal and the right hand is C-terminal.
(d) In protein or polypeptide, the amino acids are linked by glycosidic bond.

56. Which of the following possess heterocyclic ring?
(a) Adenine (b) Guanine and Cytosine
(c) Thymine and Uracil (d) All of these

57. Identify the nucleoside from the following:
A. Adenosine
B. Uridylic acid
C. Uridine
D. Cytidylic acid
(a) A and B only (b) A and C only (c) C and D only (d) B and C only

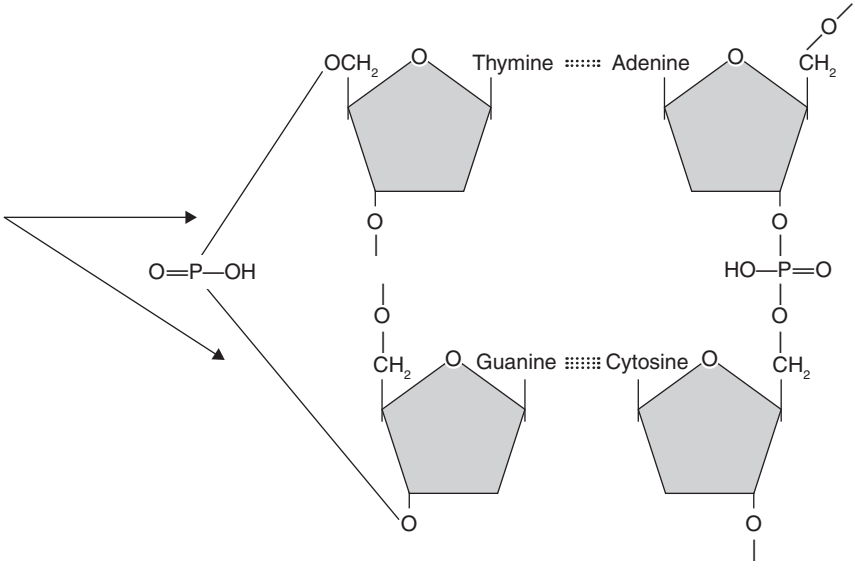
58. Which of the following acts as a genetic material?
(a) DNA and RNA (b) Uridylic acid (c) Adenylic acid (d) Guanylic acid

59. Sugar + Nitrogen bases form
(a) Nucleoside (b) Nucleotide (c) Peptide (d) Glycoside

60. Sugar + Nitrogen bases + Phosphate forms
(a) Nucleoside (b) Nucleotide (c) Peptide (d) Glycoside

61. How many Nitrogen atoms are present in adenine?
(a) 3 (b) 4 (c) 5 (d) 6

62.



The linkage represented by arrow is
(a) Peptide linkage (b) Phosphodiester linkage
(c) Glycosidic linkage (d) N-glycosidic linkage

63. DNA and RNA are
(a) Polypeptides (b) Polynucleotides
(c) Polysaccharides (d) All of these

64. How much percentage of total cellular mass is formed by nucleic acid?
(a) 3 (b) 2 (c) 5 to 7 (d) 10 to 15

65. Which of the following are purines?
(a) Adenine (b) Guanine
(c) Cytosine (d) Both (a) and (b)

66. Which of the following are pyramidine (substituted)?
(a) Cytosine (b) Thymine
(c) Uracil (d) All of these

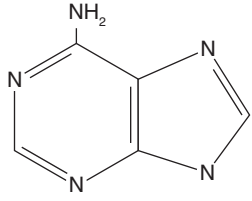
67. DNA contains
(a) Ribose (b) 3' deoxyribose
(c) 5' deoxyribose (d) 2' deoxyribose

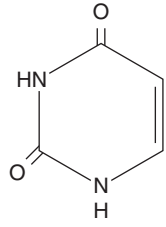
68. The bond present between two nucleotides is known as
(a) Phosphoester linkage (b) Phosphodiester linkage
(c) Glycosidic linkage (d) Peptide linkage

69. The Watson-Crick Structure of DNA is
(a) 1° structure (b) 2° structure
(c) 3° structure (d) 4° Structure

70. Which of the following is correct about DNA?
(a) Double helical structure in which two strands of polynucleotide runs antiparallel.
(b) Backbone is formed by Sugar–Phosphate–Sugar chain.
(c) N_2-bases projected more or less perpendicular to back bone and faces inside.
(d) All of these

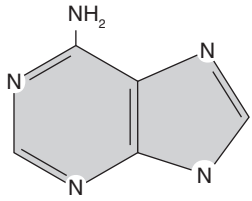
71.

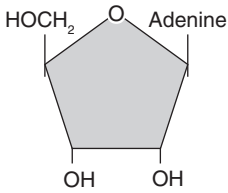


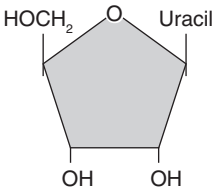


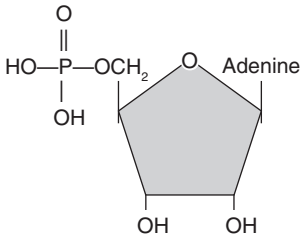
The diagrams represent the nitrogenous bases. Identify the correct combination.
(a) A→Adenine; B→Thymine (b) A→Guanine; B→Uracil
(c) A→Adenine; B→Uracil (d) A→Guanine; B→Thymine

72. Which one of the following is the diagrammatic representation of a nucleotide?

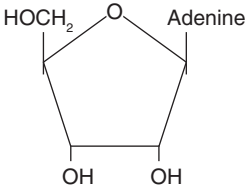
(a) 

(b) 

(c) 

(d) 

73. Which one is correct about the following diagram?



(a) It is a nucleotide.
(b) It contains pyrimidine nitrogen base.
(c) It is used to form DNA.
(d) It is used to form RNA.

74. Which one is correct about DNA?
(a) DNA exist as double helix.
(b) Two strands of polynucleotide in DNA are antiparallel.
(c) The nitrogen bases are projected more or less perpendicular to this backbone but face inside.
(d) All the above

75. At each step of an ascent in a B-DNA double helical structure, the strand turns _____.
(a) 36° (b) 72° (c) 90° (d) 18°

76. One full turn of B-DNA helix strand would involve how many base pairs?
(a) 12 (b) 8 (c) 10 (d) 20

77. Select the incorrect statement from the following:
(a) N_2-bases (A, G, C, T, U) have heterocyclic rings.
(b) In most of the organisms, the DNA is genetic material.
(c) Adenylic acid is nucleoside.
(d) The rise per base pair in B-DNA is 3.4A°.

78. There are _____ hydrogen bond between A and T, and _____ hydrogen bond between G and C.
(a) 2, 2 (b) 3, 3 (c) 2, 3 (d) 3, 2

79. Plants produce an enormous diversity of substances that have no apparent roles in growth and development processes and are classified under the heading of
(a) Primary metabolites (b) Secondary metabolites
(c) Necessary metabolites (d) Tertiary metabolites

80. Which one of the following is a secondary metabolite?
(a) Amino acid (b) Sugar
(c) Flavonoides and antibiotics (d) Protein

81. Which one of the following statement is incorrect?
(a) Primary metabolites have identifiable functions.
(b) Some secondary metabolites have ecological importance.
(c) Secondary metabolites like rubber, drugs, spices, scents and pigments are useful to human welfare.
(d) Secondary metabolites are not found in fungi, microbes and plants.

82. Which of the following are pigments?
(a) Morphine (b) Vinblastine
(c) Carotenoids and anthocyanin (d) Ricin

83. Which one of the following is not a polymeric substance?
(a) Rubber (b) Morphine (c) Protein (d) Cellulose

84. Which of the following secondary metabolites are used as drugs?
(a) Abrin + Ricin (b) Vinblastin + Curcumin
(c) Anthocyanins (d) Monoterpenes

85. Which one of the following is a secondary metabolite?
(a) Lemon oil grass (b) Sucrose (c) Lactose (d) Glycine

86. Match the Column

Column I (Category)		**Column II (Secondary Metabolites)**
A. Pigments	–	1. Concanavalin A
B. Terpenoids	–	2. Monoterpenes, Diterpenes
C. Alkaloids	–	3. Morphine, Codeine
D. Lectins	–	4. Carotenoids, Anthocyanine
E. Toxins	–	5. Abrin and Ricin
F. Drugs	–	6. Vinblastin, Curcumin

(a) A–1, B–2, C–6, D–4, E–5, F–6 (b) A–4, B–2, C–3, D–1, E–5, F–6
(c) A–3, B–4, C–6, D–5, E–1, F–2 (d) A–2, B–1, C–4, D–6, E–5, F–6

87. Which one of the following are secondary metabolites?
(a) Flavonoids and rubber
(b) Antibiotics, coloured pigments and essential oils
(c) Scents, gums, spices
(d) All the above

88. Select the incorrect statement from the following:
(a) All biomolecules have turnover in cell.
(b) Metabolic reaction does not occur in isolation.
(c) Metabolic pathways are either linear or circular.
(d) Metabolites flow is a steady state of body constituent.

89. Select the incorrect statement from the following:
(a) Acetic acid becoming cholesterol is an example of biosynthetic or anabolic pathway.
(b) Glucose becoming lactic acid in our skeletal muscles is an example of degradation or catabolic pathway.
(c) The flow of metabolite through metabolic pathway does not have a definite rate and direction.
(d) Anabolic pathway requires energy whereas catabolic pathway releases energy.

90. Bond energy, which is stored in our body in the form of ATP is utilized in
(a) Biosynthetic phase (b) Osmotic work
(c) Mechanical work (d) All of these

91. Living state is
(a) Non-equilibrium, non-steady state (b) Equilibrium, steady state
(c) Non-equilibrium, steady state (d) Equilibrium, non-steady state

92. Select the correct statement from the following:
(A) Biomolecules are in metabolic flux in living state.
(B) Living process is a constant effort to prevent falling into equilibrium.
(C) Metabolism provides a mechanism for the production of energy.
(D) Living state and metabolism is synonymous.
(a) All except A (b) All except B (c) All except D (d) All of these

93. In how many metabolic steps the degradation of glucose to lactic acid occurs?
(a) 8 (b) 9 (c) 10 (d) 2

94. How do living organisms derive their energy? What strategies have they evolved? How do they store this energy and in what form? How do they convert this energy into work? These aspects are studied under a sub-discipline called
(a) Biowar (b) Bioinformatics (c) Bioenergetics (d) Biosynthesis

95. Almost all enzymes are
(a) Proteins (b) Nucleic acid (c) Carbohydrates (d) Vitamins

96. There are some nucleic acids that behaves like enzymes and are called
(a) DNase (b) RNase (c) Endonuclease (d) Ribozymes

97. _____ of an enzyme is a crevices or pocket into which substrate fit.
(a) Inactive site (b) Active site (c) Allosteric site (d) Any of these

98. Select the incorrect statement from the following:
(a) Active enzyme has tertiary structure having many active sites (substrate binding sites).
(b) Enzymes are biocatalyst.
(c) Enzymes occur in viruses.
(d) Enzymes are mainly protein in nature.

99. Select the correct statement from the following:
(a) Inorganic catalysts work efficiently at high temperature and high pressure while enzymes get damaged at high temperature (above 40°C).
(b) Ribozymes are nucleic acids behaving like enzyme.
(c) Thermophilic organisms living in hot vents and sulphur springs have enzymes that are stable and retain their catalytic power even at high temperatures (80–90°C).
(d) All of these

100. Select the incorrect statement from the following:
(a) A physical change simply refers to a change in shape without breaking of bonds.
(b) Change is a state of matter and it is also a physical change.
(c) Hydrolysis of starch into glucose is an inorganic chemical reaction.
(d) Catalyzed reactions proceed at rates vastly higher than that of uncatalyzed ones.

101. $CO_2 + H_2O \Leftarrow H_2CO_3$
Carbonic acid
Which one of the following statement is incorrect about the above reaction?
(a) In the absence of enzyme, the rate of H_2CO_3 formation is about 200 molecules per hour.
(b) When carbonic anhydrase catalyses the same reaction, there is no change in the rate of H_2CO_3 formation.
(c) The reaction catalyzed by the enzyme shows dramatically higher decrease speed about 600,000 molecules being formed every second (rate becomes 10 million times more).
(d) The enzymes carbonic anhydrase occurs in abundance of RBC's.

102. Fill in the blanks in the below statements:
A. A multistep chemical reaction, when each of the steps is catalyzed by the same enzyme complex or different enzymes is called a _____ 1 _____ pathway.
B. In our skeletal muscle, under anaerobic conditions, _____ 2 _____ is formed.
C. In yeast, during fermentation, the gylcolytic pathway leads to the production of _____ 3 _____.

(a)	1-metabolic pathway	2-acetic acid	3-ethanol
(b)	1-glycolytic pathway	2-lactic acid	3-ethanol
(c)	1-glycolytic pathway	2-ethanol	3-ethanol
(d)	1-metabolic pathway	2-lactic acid	3-ethanol

103. There could be many more altered structural states (like transition state) between the stable substrate and the product in enzymatic reaction. These structural states are
(a) Stable
(b) Unstable
(c) Metastable
(d) Of lower energy than both substrate and product

104. Which one of the following statements about enzymes is true?
1. Enzymes are proteins whose three dimensional shape is key to their functions.
2. Enzymes speed up reactions by lowering the activation energy.
3. Enzymes are highly specific for reactions.
4. Enzyme activity is affected by the change in temperature and pH.
(a) All except 2 (b) All except 1 (c) All except 3 (d) All of these

105. Which of the following is a unique feature about the enzyme?
(a) They are not consumed by the enzyme-mediated reaction.
(b) They are not altered by the enzyme-mediated reaction.
(c) They lower the activation energy.
(d) All of these

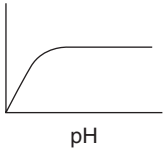
106. The catalytic cycle of an enzyme action can be described in the following steps. Arrange them in sequence accordingly.
1. The binding of the substrate induces the enzyme to alter its shape, fitting more tightly around the substrate.
2. The substrate binds to the active site of the enzyme, fitting into the active site.
3. The enzyme releases the products of the reaction and the free enzyme is ready to bind to another molecule of the substrate and run through the catalytic cycle once again.
4. The active site of the enzyme, now in close proximity of the substrate breaks the chemical bonds of the substrate and the new enzyme product complex is formed.

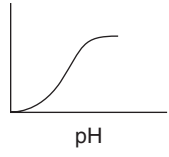
(a) $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$ (b) $2 \rightarrow 1 \rightarrow 4 \rightarrow 3$
(c) $1 \rightarrow 2 \rightarrow 4 \rightarrow 3$ (d) $2 \rightarrow 1 \rightarrow 3 \rightarrow 4$

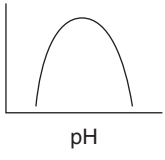
107. The activation energy for given reaction is (i.e., reactant $\rightarrow$ product):
(a) Energy of transition state – Energy of substrate
(b) Energy of transition state – Energy of product
(c) Threshold energy – Energy of transition state
(d) All are correct

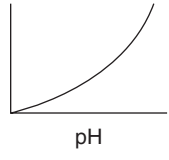
108. Which one is correct?
(a) $E + S \rightarrow ES \rightarrow EP \rightarrow EP$ (b) $E + S \rightarrow ES \rightarrow EP \rightarrow E + P$
(c) $E + S \rightarrow ES \rightarrow EP \rightarrow E - P$ (d) $E + S \rightarrow ES \rightarrow EP \rightarrow E - P$

109. Which one of the graphs shows the effect of pH on the enzymatic activity (EA)?

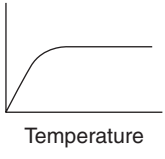
(a) 

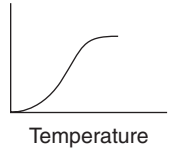
(b) 

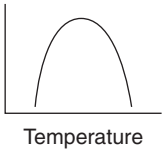
(c) 

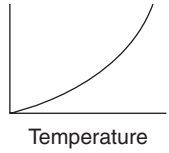
(d) 

110. Which one of the graphs shows the effect of temperature on the enzymatic activity?

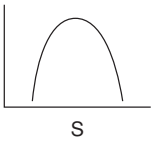
(a) 

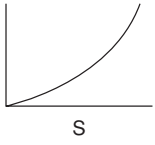
(b) 

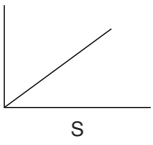
(c) 

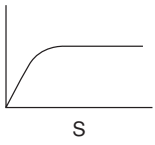
(d) 

111. Which one of the following graphs show the relationship between the of an (EA) and substrate conc.(S)?

(a) 

(b) 

(c) 

(d) 

112. Each enzyme shows its highest activity at particular temperature and pH called the **(1)** temperature and **(2)** pH.

(a) optimum, optimum
(b) minimum, minimum
(c) maximum, maximum
(d) minimum, maximum

113. Select the correct statement:

(a) Low temperature preserves the enzyme in a temporarily inactive state.
(b) Higher temperature destroys enzymatic activity because proteins are denatured by heat.
(c) The activity of enzymes declines both below and above the optimum value.
(d) All of these

114. Select the correct statement:

(a) Increase in substrate concentration, increases the velocity of enzymatic reaction at first then it reaches maximum and further increment does not occur.
(b) In competitive inhibition, the inhibitor closely resembles the substrate in its molecular structure.
(c) Competitive inhibition are often used in the control of bacterial pathogens.
(d) All of these

115. The activity of an enzyme is also sensitive to the presence of specific chemicals that bind to the enzyme. When the binding of the chemical shuts off enzyme activity, the process is called _____ and the chemical is called an _____ .

(a) activation, activator
(b) inhibition, inhibitor
(c) Inhibition, promoter
(d) activation, inhibitor

116. Inhibition of succinate dehydrogenase by malonate is an example of

(a) Non-competitive inhibition
(b) Negative feed back
(c) Allosteric inhibition
(d) Competitive inhibition

Enzymes

117. Enzymes are divided into
(a) 6 classes, each with 4–13 subclasses and named accordingly by a four-digit number.
(b) 7 classes, each with 3–13 subclasses and named accordingly by a four-digit number.
(c) 7 classes, each with 4–13 subclasses and named accordingly by a three-digit number.
(d) 6 classes, each with 4–20 subclasses and named accordingly by a four-digit number.

118. Enzymes which catalyse oxidoreduction between two substrate belongs to the class
(a) Oxidoreductase (b) Transferase (c) Hydrolase (d) Ligase

119. Enzymes which catalyse transfer of group other than hydrogen belongs to the class
(a) Oxidoreductase (b) Transferase (c) Hydrolase (d) Ligase

120. Enzymes which catalyse hydrolysis of ester, ether, peptide, glycosidic bond belongs to the class
(a) Oxidoreductase (b) Transferase (c) Hydrolase (d) Ligase

121. Enzymes that catalyse removal of groups from substrates by mechanisms other than hydrolysis leaving double bonds is known as
(a) Oxidoreductase (b) Transferase (c) Hydrolase (d) Lyase

122. Enzymes which catalyse the inter-conversion of optical, geometric or positional isomers belongs to the class of class
(a) Isomerase (b) Transferase (c) Hydrolase (d) Ligase

123. Enzymes catalysing the linking together of two compounds, for example enzymes which catalyse the joining of C-O, C-S, C-N, P-O, etc., bonds, belongs to the class of
(a) Isomerases (b) Transferases (c) Hydrolases (d) Ligases

124. How many types of cofacter can be identified?
(a) 1 (b) 2 (c) 3 (d) 4

125. The suffix '–' added to substrate for naming the enzyme is
(a) –ase (b) –in (c) –zyme (d) –ose

126. Ptylin is an example of
(a) Oxidoreductase (b) Transferase (c) Hydrolase (d) Ligase

127. When Apoenzyme is separated from its metal component, its activity is
(a) Decreased (b) Increased
(c) Lost (d) Remains unaffected

128. Cofactors are
(a) Prosthetic groups (b) Co-enzymes
(c) Metallic ions (d) All of these

129. Which of the following combinations is correct?
(a) Metal ions loosely attached with Apoenzyme–Activators.
(b) Non-protein organic part attached tightly to the Apoenzyme–Prosthetic group.
(c) Non-protein organic part attached loosely to the Apoenzyme–Coenzyme.
(d) All of these

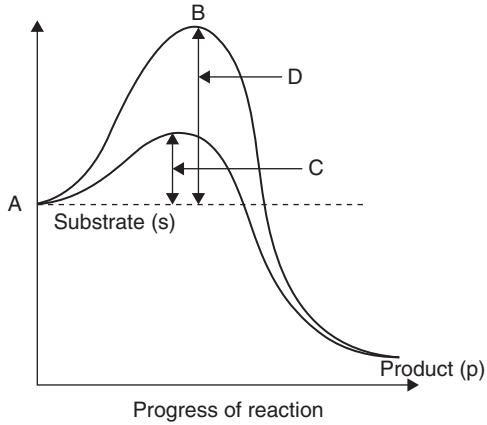
130. Which one of the following is not a cofactor?
(a) Coenzyme (b) Metal ions (c) Prosthetic group (d) Apoenzyme

131. Haem is a prosthetic group of _____ enzyme
(a) Peroxidase (b) Catalase (c) Both (a) and (b) (d) None of these

132. Zn is an activator of _____ enzyme.
(a) Carbonic anhydrase (b) Carboxypeptidase
(c) Carboxylases (d) All of these

133. Which of the following statement is correct?
(1) Catalytic activity is lost when the co-factor is removed from the enzyme.
(2) Coenzyme nicotinamide adenine dinucleotide (NAD) and NADP contains the vitamin niacin.
(3) Biomacromolecules have a hierarchy of structures such as primary, secondary, tertiary and quaternary.
(4) Enzymes lower the activation energy of reactions and enhance greatly the rate of the reactions.
(5) Nucleic acids carry hereditary information and are passed on from parental generation to progeny.
(a) 1 and 5 only (b) 2 and 3 only (c) 2 and 5 only (d) All of these

134. The figure given below shows the conversion of a substrate into product by an enzyme. In which one of the options (a to d) the components of reaction labelled as A, B, C and D are identified correctly?



A	B	C	D
(a) Potential energy	Transition state	Activation energy with enzyme	Activation energy without enzyme
(b) Transition state	Potential energy	Activation energy without enzyme	Activation energy with enzyme
(c) Potential energy	Transition state	Activation energy without enzyme	Activation energy with enzyme
(d) Activation energy with enzyme	Transition state	Activation energy without enzyme	Potential energy

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

135. **Assertion:** Arachidonic acid is an unsaturated fatty acid.
Reason: There are one or more double bonds which are present between the carbon atoms in unsaturated fatty acids.

136. **Assertion:** Amino acids are amphoteric in their function.
Reason: All amino acids are necessary for our body.

137. **Assertion:** Coenzyme is a nonprotein group without which enzymes are inactive or incomplete.
Reason: Coenzymes not only provide a point of attachment for the chemical group being transformed but also influence the properties of the group.

138. **Assertion:** Activity of an enzyme is pH dependent.
Reason: Change in pH, affects the solubility of the enzyme in water.

139. **Assertion:** The coenzymes or metal ions that is very tightly bound to enzyme protein is called prosthetic group.
Reason: A complete, catalytically active enzyme together with its bound prosthetic group is called apoenzyme.

140. **Assertion:** Enzymes are proteins which catalyse the biochemical reactions.
Reason: The enzymes itself is unchanged in the reaction, its presence allows the reaction to take place.

141. **Assertion:** Simple carbohydrates having free aldose or ketose group are called reducing sugars.
Reason: They can reduce cupric ion to cuprous state.

142. **Assertion:** Protein amino acids possess an amino group attached to a carbon (α amino acid).
Reason: Proline and hydroxyproline have NH (imino group) so they are imino acids.

143. **Assertion:** Linolenic acid is the precursor of arachidonic acid.
Reason: Ascorbic acid is a sugar acid having NH_2 group.

144. **Assertion:** Protein is a heteropolymer.
Reason: Protein is made up of amino acid.

145. **Assertion:** Watson–Crick model of DNA is the secondary structure of DNA.
Reason: It contains covalent as well as hydrogen bond.

146. **Assertion:** The total number of amino acids involved in protein synthesis in plants is 20.
Reason: Only 20 amino acids have been discovered so far.

147. **Assertion:** In human body 'collagen' is the most abundant protein.
Reason: Scleroproteins occurs in hard parts of animals body for providing support and protection.

148. **Assertion:** Living state is a non–equilibrium steady state to be able to perform work.
Reason: System at equilibrium cannot perform work.

149. **Assertion:** ATP is energy currency of cell.
Reason: ATP is formed in catabolic pathway.

150. **Assertion:** There are two hydrogen bond exist between A&T.
Reason: There are three hydrogen bond exist between G&C.

151. **Assertion:** The distance between adjacent base pair in B- DNA is 3.4 A°.
Reason: One full turn of helical strand of B-DNA contain 10 bp and the length of this pitch is 34 A°.

152. **Assertion:** In proteins only left handed helix are observed exists in nature.
Reason: Protein found only in secondary structure.

153. **Assertion:** Tertiary structure is necessary for the many biological activities of proteins.
Reason: Tertiary structure in 3-dimentional view of protein.

154. **Assertion:** DNA is called deoxyribonucleic acid.
Reason: DNA is nucleic acid containing deoxyribose sugar.

155. **Assertion:** RuBisCO is most abundant protein in the whole biosphere.
Reason: RuBisCO is present in all animal cells.

156. **Assertion:** Starch forms complex with $I_{2.}$
Reason: Starch forms secondary helical structure.

157. **Assertion:** Cellulose is homo polymer.
Reason: Cellulose formed of only one type of monosaccharide viz. glucose

158. **Assertion:** Co-factor play sepical role in the catalytic activity of enzyme.
Reason: Catalytic activity is lost when co-factor is removed.

159. **Assertion:** Living organism contain only biomolecules
Reason: Biomolecules are made up of carbon atoms only

160. **Assertion:** DNA and RNA consists of nucleotides only
Reason: Nucleotides are monomer of Nucleic acid

161. **Assertion:** Biomacromolecules are those which are found in acid soluble fraction
Reason: Biomacromolecules gave molecular weight less than 1000 dalton.

162. **Assertion:** Starch with I_2 gives blue colour because of starch I_2 complex.
Reason: Starch Can hold I_2 in their helical portion

163. **Assertion:** Cellulose doesn't give colour with I_2
Reason: Cellulose doesn't contain helix which can hold I_2

164. **Assertion:** In polysaccharide chain the right end is reducing
Reason: The right end contain free anomeric -OH group.

165. **Assertion:** Chitin is homopolymer.
Reason: Chitin is made up of only one type of monomer i.e. N-acetylglucosamine.

166. **Assertion:** The first amino acid in primary structure protein is called as N-terminal amino acid.
Reason: NH_2 group of first amino acid is free, not bound to form peptide bond.

167. **Assertion:** Oil containing PUFA are good for health.
Reason: They reduce blood cholesterol level. Thus, decreases chance of heart diseases.

168. **Assertion:** A B-DNA structure proposed by Watson and Crick is secondary structure.
Reason: B- DNA contains hydrogen bond in addition to covalent bond.

169. **Assertion:** Conversion of glucose to lactic acid in our skeletal muscle is catabolic pathways.
Reason: In this metabolic pathway complex structure is degraded to simpler one.

170. **Assertion:** All enzymes are protein.
Reason: RNA can't act as enzyme .

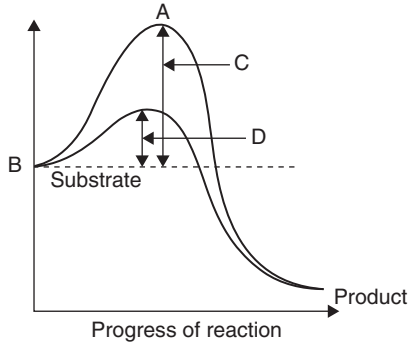
171. **Assertion:** Enzymes isolated from thermophilic organisms are thermally stable.
Reason: They retain their catalytic power even at higher temperature.

172. **Assertion:** Enzyme increases the rate of biochemical reactions.
Reason: Enzymes lower down the energy of activation.

PREVIOUS YEAR QUESTIONS

1. The figure given below shows the conversion of a substrate into product by an enzyme. In which one of the four options (a to d) the components of reaction labelled as A, B, C and D are identified correctly?

[AIPMT MAINS 2010]



(a) A: Potential energy, B: Transition state, C: Activation energy with enzyme, D: Activation energy without enzyme
(b) A: Transition state, B: Potential energy, C: Activation energy without enzyme, D: Activation energy with enzyme
(c) A: Potential energy, B: Transition state, C: Activation energy with enzyme, D: Activation energy without enzyme
(d) A: Activation energy with enzyme, B: Transition state, C: Activation energy without enzyme, D: Potential energy

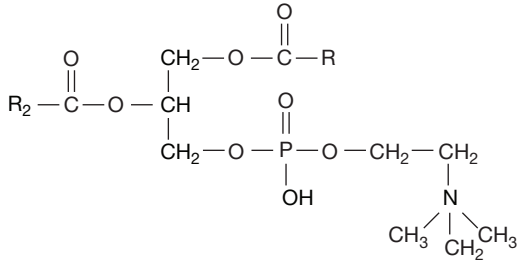
2. Three of the following statements about enzymes are correct and one is wrong. Which one is wrong?

[AIPMT MAINS 2010]

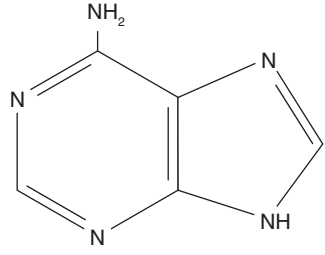
(a) Enzymes require optimum pH for maximal activity.
(b) Enzymes are denatured at high temperature but in certain exceptional organisms they are effective even at temperatures from 80°–90°C.
(c) Enzymes are highly specific.
(d) Most of the enzymes are proteins but some are lipids.

3. Which one of the following structural formulae of two organic compounds is correctly identified along with its related function?

[AIPMT PRE 2011]



(A)



(B)

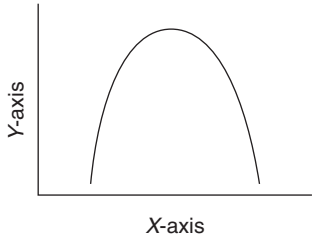
(a) A: Triglyceride — Major source of energy
(b) B: Uracil — A component of DNA
(c) A: Lecithin — A component of cell membrane
(d) B: Adenine — A nucleotide that makes up nucleic acids

4. Select the correct option with respect to mitosis.

[AIPMT PRE 2011]

(a) Chromatids start moving towards opposite poles in telophase.
(b) Golgi complex and endoplasmic reticulum are still visible at the end of prophase.
(c) Chromosomes move to the spindle equator and get aligned along the equatorial plate in metaphase.
(d) Chromatids separate but remains at the centre of the cell in anaphase.

5. The curve given below shows enzymatic activity with relation to three conditions (pH, temperature and substrate concentration)



What do the two axes (X and Y) represent?

[AIPMT PRE 2011]

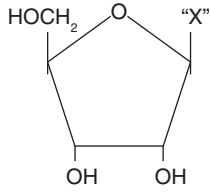
	X-axis	**Y-axis**
(a)	Temperature	Enzyme activity
(b)	Substrate concentration	Enzymatic activity
(c)	Enzymatic activity	Temperature
(d)	Enzymatic activity	pH

6. Which one of the following biomolecules is correctly characterized?

[AIPMT MAINS 2012]

(a) Palmitic acid - An unsaturated fatty acid with 18 carbon atoms.
(b) Adenylic acid - Adenosine with a glucose phosphate molecule.
(c) Alanine amino acid - Contains an amino group and an acidic group anywhere in the molecule.
(d) Lecithin - A phosphorylated glyceride found in cell membrane.

7. Given below is the diagrammatic representation of one of the categories of small molecular weight organic compounds in the living tissues. Identify the category shown and the one blank component 'X' in it.



[AIPMT PRE 2012]

	Category	**Component**
(a)	Cholesterol	Guanin
(b)	Amino acid	NH_2
(c)	Nucleotide	Adenine
(d)	Nucleoside	Uracil

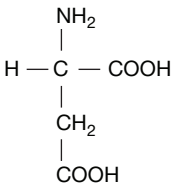
8. Which one is the most abundant protein in the animal world?

[AIPMT PRE 2012]

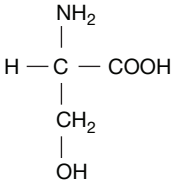
(a) Trypsin (b) Haemoglobin
(c) Collagen (d) Insulin

9. Which one out of A to D given below correctly represents the structural formula of the basic amino acid?

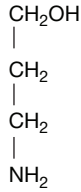
(A)



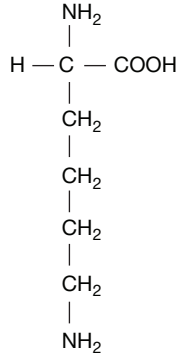
(B)



(C)



(D)



[AIPMT PRE 2012]

Options:

(a) C (b) D (c) A (d) B

10. The transition state structure of the substrate formed during an enzymatic reaction is

[AIPMT AIPMT 2013]

(a) Transient but stable
(b) Permanent but unstable
(c) Transient and unstable
(d) Permanent and stable

11. A phosphoglyceride is always made up of

[AIPMT AIPMT 2013]

(a) Only a saturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached.
(b) Only an unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached.
(c) A saturated or unsaturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached.
(d) A saturated or unsaturated fatty acid esterified to a phosphate group which is also attached to a glycerol molecule.

12. Macromolecule chitin is

[AIPMT 2013]

(a) Nitrogen containing polysaccharide
(b) Phosphorus containing polysaccharide
(c) Sulphur containing polysaccharide
(d) Simple polysaccharide

13. The essential chemical components of many coenzymes are

[AIPMT 2013]

(a) Proteins
(b) Nucleic acids
(c) Carbohydrates
(d) Vitamins

14. Select the option which is not correct with respect to enzyme action [AIPMT 2014]

(a) Substrate binds with enzyme at its active site
(b) Addition of lot of succinate does not reverse the inhibition of Succinic dehydrogenase by malonate
(c) A non – competitive inhibitor binds the enzyme at a site distinct from that which binds the substrate
(d) Malonate is a competitive inhibitor of Succinic dehydrogenase

15. Which one of the following is non reducing carbohydrate? [AIPMT 2014]

(a) Maltose (b) Sucrose
(c) Lactose (d) Ribulose 5 – phosphate

16. Which one of the following statement is incorrect? [AIPMT 2015]

(a) A competitive inhibitor reacts reversibly with the enzyme to form an enzyme inhibitor complex
(b) In competitive inhibition, the inhibitor molecule is not chemically change by the enzyme
(c) The competitive inhibitor does not affect the rate of breakdown of the enzyme subtract complex
(d) The present of the competitive inhibitor decreases the K_m of the enzyme for the substrate.

17. The chitinous exoskeleton of arthropods is formed by the polymerization of: [RE-AIPMT 2015]

(a) D – glucosamine (b) N – acetyl glucosamine
(c) Lipoglycans (d) Keratin sulphate and chondroitin sulphate

18. Which of the following biomolecules does have a phosphodiester bond? [RE-AIPMT 2015]

(a) Monosaccharides in a polysaccharide (b) Amino acids in a polypeptide
(c) Nucleis acids in a nucleotide (d) Fatty acids in a diglycerides

19. One of the major components of cell wall of most fungi is: [NEET - I, 2016]

(a) Chitin (b) Peptidoglacan
(c) Cellulose (d) Hemicellulose

20. Which one of the following statements is wrong? [NEET - I, 2016]

(a) Sucrose is a disaccharide
(b) Cellulose is a polysaccharide
(c) Uracil is a pyrimidine
(d) Glycine is a sulphur containing amino acid

21. A typical molecule is made up of: [NEET - I, 2016]

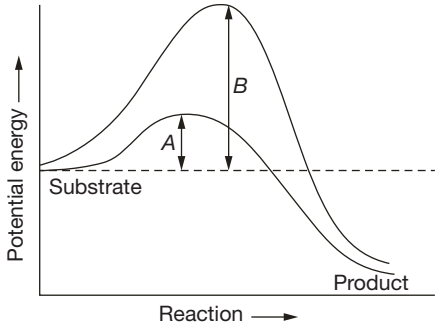
(a) Three glycerol molecules and one fatty acid molecule
(b) One glycerol and three fatty acid molecules
(c) One glycerol and one fatty acid molecule
(d) Three glycerol and three fatty acid molecules

22. A non-proteinaceous enzyme is [NEET - II, 2016]

(a) Ribozyme (b) Ligase
(c) Deoxyribonuclease (d) Lysozyme

23. Which of the following is the least likely to be involved in stabilizing the three-dimensional folding of most proteins? [NEET - II, 2016]
(a) Electrostatic interaction
(b) Hydrophobic interaction
(c) Ester bonds
(d) Hydrogen bonds

24. Which of the following describes the given graph correctly? [NEET - II, 2016]



(a) Exothermic reaction with energy A in presence of enzyme and B in absence of enzyme
(b) Endothermic reaction with energy A in absence of enzyme and B in presence of enzyme
(c) Exothermic reaction with energy A in absence of enzyme and B in presence of enzyme
(d) Endothermic reaction with energy A in presence of enzyme and B in absence of enzyme

NCERT EXEMPLAR QUESTIONS

1. lt is said that the elemental composition of living organisms and that of inanimate objects (like earth's crust) are similar in the sense that all the major elements are present in both. Then what would be the difference between these two groups? Choose a correct answer from among the following:
(a) Living organisms have more gold in them than inanimate objects.
(b) Living organisms have more water in their body than inanimate objects.
(c) Living organisms have more carbon, oxygen and hydrogen per unit mass than inanimate objects.
(d) Living organisms have more calcium in them than inanimate objects.

2. Many elements are found in living organisms either free or in the form of compounds. One of the following is not found in living organisms.
(a) Silicon (b) Magnesium
(c) Iron (d) Sodium

3. Amino acids, as the name suggests, have both an amino group and a carboxyl group in their structure. In addition, all naturally occurring amino acids (those which are found in proteins) are called L–amino acids. From this, can you guess from which compound can the simplest amino acid be made?
(a) Formic acid (b) Methane
(c) Phenol (d) Glycine

4. Many organic substances are negatively charged, for e.g., acetic acid, while others are positively charged for e.g., ammonium ion. An amino acid under certain conditions would have both positive and negative charges simultaneously in the same molecule. Such a form of amino acid is called
(a) Positively charged form (b) Negatively charged form
(c) Neutral form (d) Zwitterionic form

5. Sugars are technically called carbohydrates referring to the fact that their formulae are only multiple of $C(H_2O)$. Hexoses therefore have six carbons, twelve hydrogen's and six oxygen atoms. Glucose is a hexose. Choose another hexose from among the following.
(a) Fructose (b) Erythrose
(c) Ribulose (d) Ribose

6. When you take cells or tissue pieces and grind them with an acid in a mortar and pestle, all the small biomolecules dissolves in the acid. Proteins, polysaccharides and nucleic acids are insoluble in mineral acid and get precipitated. The acid soluble compounds include amino acids, nucleosides, small sugars, etc. When one adds a phosphate group to a nucleoside one gets another acid soluble biomolecule called
(a) Nitrogen base (b) Adenine
(c) Sugar phosphate (d) Nucleotide

7. When we homogenize any tissue in an acid, the acid soluble pool represents
(a) Cytoplasm (b) Cell membrane
(c) Nucleus (d) Mitochondria

8. The most abundant chemical in living organisms could be
(a) Protein (b) Water
(c) Sugar (d) Nucleic acid

9. A homopolymer has only one type of building block called monomer repeated '*n*' number of times. A heteropolymer has more than one type of monomers. Proteins are heteropolymers made of amino acids. While a nucleic acid like DNA or RNA is made of only 4 types of nucleotide monomers, proteins are made of
(a) 20 types of monomers (b) 40 types of monomers
(c) 3 types of monomers (d) Only one type of monomer

10. Proteins perform many physiological functions. For example, some functions as enzymes. One of the following represents an additional function that some proteins discharge
(a) Antibiotics (b) Pigments conferring colour to skin
(c) Pigments making colours of flowers (d) Hormones

11. Glycogen is a homopolymer made of
(a) Glucose units (b) Galactose units
(c) Ribose units (d) Amino units

12. The number of 'ends' in a glycogen molecule would be
(a) Equal to the number of branches plus one.
(b) Equal to the number of branch points.
(c) One
(d) Two, one on the left side and another on the right side.

13. The primary structure of a protein molecule has two ends.
(a) Two ends (b) One end
(c) Three ends (d) No ends

14. Enzymes are biocatalysts. They catalyse biochemical, reactions. In general they reduce the activation energy of reactions. Many physicochemical processes are enzyme mediated. Some examples of enzyme mediated reactions are given below. Tick the wrong entry.
(a) Dissolving CO_2 in water
(b) Unwinding the two strands of DNA
(c) Hydrolysis of sucrose
(d) Formation of peptide bond

Answer Keys

Practice Questions

1. (d)	2. (d)	3. (a)	4. (b)	5. (d)	6. (d)	7. (c)	8. (c)	9. (b)	10. (c)
11. (a)	12. (a)	13. (b)	14. (d)	15. (b)	16. (d)	17. (c)	18. (b)	19. (d)	20. (c)
21. (d)	22. (c)	23. (b)	24. (c)	25. (b)	26. (a)	27. (d)	28. (d)	29. (c)	30. (d)
31. (c)	32. (a)	33. (c)	34. (d)	35. (b)	36. (d)	37. (d)	38. (a)	39. (b)	40. (d)
41. (a)	42. (b)	43. (a)	44. (d)	45. (b)	46. (d)	47. (d)	48. (b)	49. (c)	50. (a)
51. (c)	52. (b)	53. (d)	54. (d)	55. (d)	56. (d)	57. (b)	58. (a)	59. (a)	60. (b)
61. (c)	62. (b)	63. (b)	64. (c)	65. (d)	66. (d)	67. (d)	68. (b)	69. (b)	70. (d)
71. (c)	72. (d)	73. (d)	74. (d)	75. (a)	76. (c)	77. (c)	78. (c)	79. (b)	80. (c)
81. (d)	82. (c)	83. (b)	84. (b)	85. (a)	86. (b)	87. (d)	88. (d)	89. (c)	90. (d)
91. (c)	92. (d)	93. (c)	94. (c)	95. (a)	96. (d)	97. (b)	98. (c)	99. (d)	100. (c)
101. (b)	102. (d)	103. (b)	104. (d)	105. (d)	106. (b)	107. (a)	108. (b)	109. (c)	110. (c)
111. (d)	112. (a)	113. (d)	114. (d)	115. (b)	116. (d)	117. (a)	118. (a)	119. (b)	120. (c)
121. (d)	122. (a)	123. (d)	124. (c)	125. (a)	126. (c)	127. (c)	128. (d)	129. (d)	130. (d)
131. (c)	132. (d)	133. (d)	134. (a)						

Assertion and Reason Questions

135. (a)	136. (b)	137. (a)	138. (a)	139. (c)	140. (b)	141. (a)	142. (b)	143. (c)	144. (b)
145. (a)	146. (c)	147. (b)	148. (a)	149. (b)	150. (b)	151. (a)	152. (d)	153. (b)	154. (a)
155. (c)	156. (a)	157. (a)	158. (a)	159. (d)	160. (a)	161. (d)	162. (a)	163. (a)	164. (a)
165. (a)	166. (a)	167. (a)	168. (a)	169. (a)	170. (d)	171. (a)	172. (a)		

Previous Year Questions

1. (b)	2. (d)	3. (c)	4. (c)	5. (a)	6. (d)	7. (d)	8. (c)	9. (b)	10. (c)
11. (c)	12. (a)	13. (d)	14. (b)	15. (b)	16. (d)	17. (b)	18. (c)	19. (a)	20. (d)
21. (b)	22. (a)	23. (c)	24. (a)						

NCERT Exemplar Questions

1. (c)	2. (a)	3. (b)	4. (d)	5. (a)	6. (d)	7. (a)	8. (b)	9. (a)	10. (d)
11. (a)	12. (a)	13. (a)	14. (a)						

CHAPTER

10

Cell Cycle and Cell Division

PRACTICE QUESTIONS

Cell Cycle

1. All organism starts its life with
(a) Single cell (b) Many cells (c) Few cells (d) Few organs

2. The sequence of events by which a cell duplicates its genome, synthesize the other constituent of cells and eventually divides itself into two daughter cells is termed as
(a) Cytology (b) Cell division (c) Cell cycle (d) Cell biology

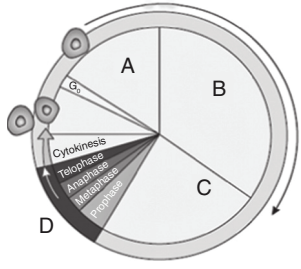
3. Which of the following is correct about cell cycle?
(a) All events occur in coordinated manner.
(b) All events are under genetic control.
(c) DNA synthesis occurs only during one specific stage in the cell cycle.
(d) All of these

4. Cell growth (increase in cytoplasm) is a
(a) Continuous process (b) Discontinuous process
(c) Irregular process (d) Retrogressive process

5. Our cell can divide itself once approximately in
(a) 24 hours (b) 24 minutes (c) 24 seconds (d) 24 days

6. Duration of a cell cycle in yeast is approximately
(a) 90 seconds (b) 90 minutes (c) 20 minutes (d) 45 minutes

7. Identify A, B, C and D in the below diagram:



(a) A–G_1, B–S, C–G_2, D–M Phase (b) A–G_2, B–M Phase, C–G_1, D–S
(c) A–S, B–G_2, C–G_1, D–M Phase (d) A–M Phase, B–G_1, C–G_1, D–S

M Phase

8. M-phase in human cell lasts for
(a) 1 hour (b) 2 hours (c) 23 hours (d) 4 hours

9. Which of the following is correct about Interphase?
(a) It is the phase present between two successive M-phase.
(b) It lasts for more than 95 per cent in the duration of cell cycle in human cell.
(c) It is also known as resting phase.
(d) All the above

10. Select the correct matching:

Column I		**Column II**
A. G_1 Phase	–	1. Gap 1 Phase
B. Cytokinesis	–	2. Nuclear division
C. Karyokinesis	–	3. Cytoplasmic division
D. S phase	–	4. Synthesis phase

(a) B–1, C–2, A–3, D–4 (b) A–1, C–2, B–3, D–4
(c) D–1, C–2, B–3, A–4 (d) A–1, D–2, B–3, C–4

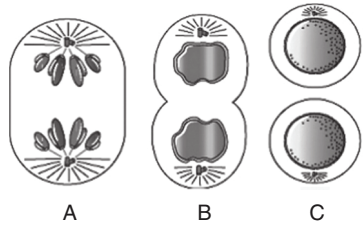
11. G_1 phase is not characterized by
(a) Continuous growth (b) Active metabolism
(c) DNA replication (d) Non-replication of DNA

12. S-phase is not characterized by
(a) DNA duplication
(b) No increase in chromosome number
(c) DNA replication
(d) Duplication of centriole in nucleus of eukaryotic animal cell

13. What occurs continuously when cell is divided into G_1, S and G_2 phase?
(a) DNA Replication (b) DNA Duplication
(c) Centriole duplication (d) Growth of cell

14. If a cell has $2n$ number of chromosome in G_1 phase, what is the number of chromosome in cell after S-phase?
(a) n (b) $4n$ (c) $2n$ (d) $8n$

15. Identify A, B and C in the below diagram.



(a) A–Interphase, B–Telophase, C–Anaphase
(b) A–Anaphase, B–Telophase, C–Interphase
(c) A–Telophase, B–Interphase, C–Anaphase
(d) A–Interphase, B–Anaphase, C–Telophase

16. The cells which do not divide enter ____ phase from G_1 phase.
(a) S-phase (b) Directly G_2-phase (c) G_0-phase (d) Any one of these

17. G_0 phase is characterized by
(a) DNA duplication (b) Active metabolism
(c) S-phase (d) M-phase

18. Select the incorrect statement from the following:
(a) In animals, mitotic cell division is only seen in the diploid somatic cells.
(b) Plants can show mitotic division in both haploid and diploid cells.
(c) In an adult's heart, the cells does not divide.
(d) All organisms starts their life cycle from multiple cell.

19. Mitosis is further divided in ____ stages of cytoplasmic division?
(a) 1 (b) 2 (c) 3 (d) None of these

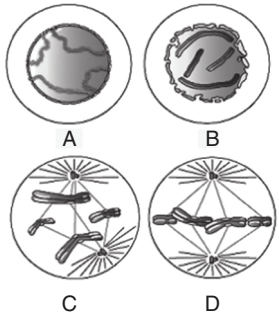
20. Prophase is characterized by
(a) Initiation of condensation of chromosomal material.
(b) Centrioles moving towards opposite pole.
(c) Initiation of the assembly of mitotic spindle.
(d) All of these

21. Cells at the end of prophase, when viewed under the microscope, do not show
(a) Golgi body and ER (b) Nucleolus
(c) Nuclear envelop (d) All of these

22. Which of the following initiates the start of metaphase?
(a) Completion of bivalent chromosome formation
(b) Assemblage of microtubules of nucleoplasm
(c) Complete disintegration of nuclear envelope
(d) Duplication of chromosome

23. Metaphase is not characterized by
(a) Complete condensation of chromosome
(b) Alignment of chromosome on metaphase plants
(c) Attachment of spindle fibre to kinetochore
(d) Splitting of chromosome

24. Indentify A, B, C and D in the below mitosis diagram.



(a) A–Transition to Metaphase, B–Metaphase, C–Early Prophase, D–Late Prophase
(b) A–Late Prophase, B–Transition to Metaphase, C–Metaphase, D–Early Prophase
(c) A–Early Prophase, B–Late Prophase, C–Transition to Metaphase, D–Metaphase
(d) A–Metaphase, B–Early Prophase, C–Late Prophase, D–Transition to Metaphase

25. Anaphase is characterized by
(a) Splitting of centromere
(b) Separation of chromatids
(c) Movement of chromatid to opposite pole
(d) All of these

26. Events of telophase are
(a) Chromosomes cluster at opposite spindle poles and their identity is lost as discrete elements.
(b) Nuclear envelope assembles around the chromosome cluster.
(c) Nucleolus, Golgi complex and ER reforms
(d) All the above

27. Furrow formation does not occur in plant cell during cytokinesis because of
(a) Extensible cell wall (b) Inextensible cell wall
(c) Extensible plasma membrane (d) Inextensible plasma membrane

28. Select the total number of correct statement:
I. Cell-plate formation occurs in plant cell during cytokinesis.
II. During cytokinesis mitochondria and plastid gets distributed between two daughter cells in mitosis.
III. Liquid endosperm in coconut is syncytium.
IV. Furrow formation occurs in Animal cell during cytokinesis
(a) 1 (b) 2 (c) 3 (d) 4

29. Cell which divides by mitosis is
(a) Upper layer of epidermis (b) Cells lining gut
(c) Stem cells (d) All of these

30. Plant shows continuous growth throughout their life because of
(a) Mitosis (b) Amitosis (c) Meiosis (d) All of these

31. Mitosis helps
(a) Growth (b) Repair
(c) Both (a) and (b) (d) None of these

32. Which of the following holds true about meiosis?
I. It ensures the production of haploid phase in the life cycle of sexually reproducing organism where fertilization restores the diploid phase.
II. It involves the two sequential cycle of nuclear and cell division called meiosis I and II but only a single cycle of DNA replication.
III. It involves the pairing of homologous chromosomes and recombination between them.
IV. Four haploid cells are formed at the end of meiosis.
(a) I, II, IV only (b) IV only (c) I and III only (d) All of these

33. Prophase I is divided into how many phases based on the chromosomal behaviour?
(a) 1 (b) 2 (c) 4 (d) 5

34. Synaptonemal complex formes in
(a) Zygotene (b) Pachytene (c) Diplotene (d) Diakinesis

35. Select the correct statement from the following:
(a) In leptotene stage the chromosomes become gradually visible under light microscope.
(b) During zygotene the heterologous chromosome shows pairing.
(c) Chiasmata is a J-shape structure formed in diplotene.
(d) Pachytene is characterized by the formation of synaptonemal complex.

36. Recombination is seen in
(a) Diplotene (b) Zygotene or synaptotene
(c) Pachytene (d) Diakinesis

37. Synaptonemal complex is visible in
(a) Compound microscope (b) Simple microscope
(c) Hand lens (d) Electron microscope

38. Crossing over is an exchange of genetic material between
(a) Homologous chromosome (b) Heterologus chromosome
(c) Non-homologous chromosome (d) All of these

39. The beginning of diplotene is characterized by
(a) Recombination (b) Synapsis
(c) Dissolution of synaptonemal complex (d) Formation of tetrad

40. Diakinesis is characterized by
(a) Condensation of chromosome
(b) Assemblage of spindle
(c) Disappearance of nucleous and nuclear membrane
(d) All the above

41. Homologous chromosomes gets separate during
(a) Metaphase-I (b) Anaphase-I (c) Anaphase-II (d) Telophase-I

42. The stage between two meiosis is
(a) M-phase (b) Interphase (c) S-phase (d) Interkinesis

43. Which of the following statement is incorrect?
(a) Prophase II is simpler than prophase I.
(b) Prophase I is longer and complex than prophase of mitosis.
(c) Nuclear membrane reappears in telophase I.
(d) Anaphase II is not characterized by the splitting of centromere.

44. Meiosis is significant because it
(a) Increases genetic variability
(b) Helps in the conservation of specific chromosome number
(c) Is important for evolution
(d) All of these

45. Most of the cell organelle duplicates during
(a) G_1 phase (b) S-phase (c) G_2 phase (d) M-phase

46. Reduction of the division is
(a) Meiosis (b) Mitosis
(c) Both (a) and (b) (d) None of these

47. The main difference between dividing an animal and plant cell lies in
(a) Cell plate formation (b) Chromosome movement
(c) Coiling of chromosome (d) Chromosome division

48. Which of the following cells do not divide once it is differentiated?
(a) Interstitial cells (b) Nerve cells (c) Myeloid cells (d) Glial cells

49. Mitosis occurs in
(a) Haploid cells only (b) Diploid cells only
(c) Triploid cells only (d) Both (a) and (b)

50. Interphase is also called resting stage because
(a) Cell has stopped differentiation (b) Cell is metabolically inactive
(c) No visible changes occur in the nucleus (d) Cell does not grow

51. Diploid somatic cells is divided by
(a) Meiosis (b) Mitosis only
(c) Both meiosis and mitosis. (d) None of these

52. Cell division takes place when the cell
(a) Is haploid (b) Becomes diploid
(c) Attains optimum growth (d) Any time

53. Before cell division, the entire DNA content of the cell gets doubled during interphase.This doubling takes place
(a) Throughout the interphase
(b) At the beginning of the interphase
(c) At the end of the interphase
(d) Somewhere during the middle of the interphase

54. Cell cycle is divisible into
(a) karyokinesis and cytokinesis (b) Interphase and prophase
(c) Interphase and mitotic phase (d) M-phase and S-phase

55. The correct sequence of stages in cell cycle is
(a) G_1, S, G_2, M (b) G_1, G_2, S, M (c) M, S, G_1, G_2 (d) G_2, G_1, M, S

56. Condensation of chromosome with visible centromere occurs during
(a) G_1 phase (b) G_2 phase (c) S-phase (d) M-phase

57. Synthesis of RNA and proteins takes place in
(a) M-phase (b) S-phase
(c) G_1 phase (d) G_1 and G_2 phases

58. Mitosis is
(a) Karyokinesis (b) Cytokinesis
(c) Reduction in chromosome number (d) Both (a) and (b)

59. As compared to meiosis, in mitosis
(a) Homologous chromosomes form pairs
(b) Daughters have half chromosome number
(c) Telophase stage is absent
(d) Prophase is shorter

60. The cellular structure which always disappears during mitosis or meiosis is
(a) Plastids (b) Plasma membrane
(c) Nucleolus and nuclear envelope. (d) None of these

61. Chromosomes are arranged at equatorial plate of division spindle in
(a) Prophase (b) Metaphase (c) Anaphase (d) Telophase

62. Chromosomes can be counted best at the stage of
(a) Prophase (b) Anaphase (c) Metaphase (d) Telophase

63. The best stage to observe the shape, size and number of chromosomes is
(a) Interphase (b) Metaphase (c) Prophase (d) Telophase

64. Spindle fibres are made up of
(a) Proteins (b) Lipids (c) Cellulose (d) Pectin

65. Mitotic spindle is mainly composed of the protein
(a) Actin (b) Actomyosin (c) Tubulin (d) Myoglobin

66. The separation of daughter chromosomes occurs in
(a) The beginning of anaphase (b) Metaphase
(c) Late prophase (d) Early prophase

67. At which stage of mitosis, the chromatids separate and start moving towards poles?
(a) Prophase (b) Metaphase (c) Anaphase (d) Telophase

68. Mitotic anaphase differs from metaphase in possessing
(a) Same number of chromosomes and half number of chromatids.
(b) Half the number of chromosomes and same number of chromatids.
(c) Half the number of chromosomes and half number of chromatids.
(d) Same number of chromosomes and same number of chromatids.

69. Animal cells undergo cytokinesis by
(a) Furrowing
(b) Cell plate
(c) Both (a) and (b)
(d) Furrowing and followed by the deposition of special materials

70. Significance of mitosis lies in
(a) Producing cells genetically similar to parent cell
(b) Occurrence in energy tissue of body
(c) Increasing cellular mass
(d) Swift division

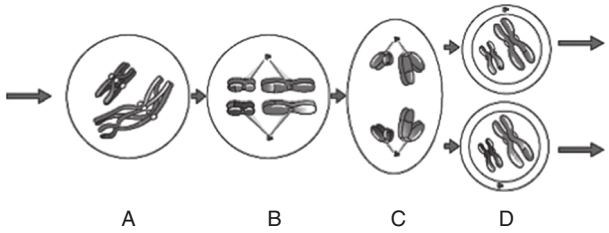
71. Mitosis differs from meiosis in
(a) Forming four haploid cells.
(b) Pairing of homologous chromosomes and their subsequent separation.
(c) Doubling of each chromosome and each pair showing four chromatids.
(d) Duplication of chromosomes and subsequent separation of the duplicates.

72. The number of chromosomes present in pollen grains is six. What shall be their number in leaf cells?
(a) 12 (b) 24 (c) 6 (d) 3

73. Meiosis occurs in
(a) Liver (b) Kidney (c) Gonad (d) Brain

74. Meiosis is
(a) Disjunctional division (b) Equational division
(c) Multiplicational division (d) Reductional division

75. The following diagram shows modification of the meiosis I. Identify A, B, C, D.



(a) A–Telophase I, B–Anaphase I, C–Metaphase I, D–Prophase I
(b) A–Prophase I, B–Metaphase I, C–Anaphase I, D–Telophase I
(c) A–Metaphase I, B–Telophase I, C–Prophase I, D–Anaphase I
(d) A–Anaphase I, B–Prophase I, C–Telophase I, D–Metaphase I

76. Meiosis involves
(a) Two nuclear divisions and two chromosome divisions
(b) Two nuclear divisions and one chromosome division
(c) One nuclear division and one chromosome division
(d) One nuclear division and two chromosome divisions

77. Meiosis occurs in
(a) Haploid cells (b) Diploid cells
(c) Both haploid and diploid cells (d) Triploid cells

78. Which of the following statements is correct for meiosis?
(a) First division is equational and the second is reductional
(b) First division is reductional and the second is equational
(c) Both divisions are equational
(d) Both divisions are reductional

79. Meiosis can be studied in angiosperm in
(a) Root apical meristem (b) Shoot apical meristem
(c) Dividing cells of vascular cambium (d) Dividing pollen mother cells in anther

80. How many meiotic divisions are necessary to produce 600 pollen grains?
(a) 50 (b) 100 (c) 150 (d) 300

81. Before undergoing meiosis, the amount of DNA of a cell
(a) Halves (b) Doubles
(c) Remains the same (d) Quadruples

82. Which of the following represents the correct order in Prophase I?
(a) Zygotene, diplotene, pachytene, leptotene, diakinesis
(b) Diakinesis, diplotene, leptotene, pachytene, zygotene
(c) Leptotene, zygotene, pachytene, diplotene, diakinesis
(d) Pachytene, leptotene, zygotene, diplotene, diakinesis

83. In which stage of meiosis, the chromosome is thin, long and thread-like?
(a) Leptotene (b) Zygotene (c) Pachytene (d) Diakinesis

84. Synaptonemal complex has a role in
(a) Chromosome pairing (b) Chromosome movement
(c) Chromosome segregation (d) Chromosome organization

85. The synaptonemal complex is formed during
(a) Cytokinesis (b) Amitosis (c) Mitosis (d) Meiosis

86. Bivalents are formed during
(a) Diplotene (b) Pachytene (c) Zygotene (d) Leptotene

87. Tetrad is made of
(a) Four non-homologous chromatids
(b) Four non-homologous chromosomes
(c) Four homologous chromosomes with four chromatids
(d) Two homologous chromosomes and each with two chromatids

88. The exchange of paternal and maternal chromosome material during cell division is
(a) Dyad formation (b) Crossing over
(c) Synapsis (d) Bivalent formation

89. Transfer of genes from one chromosome to another and vice versa during synapsis is called
(a) Crossing over (b) Exchange
(c) Chiasmata (d) Translocation

90. Repulsion of homologous chromosomes takes place in
(a) Diplotene (b) Zygotene (c) Diakinesis (d) Leptotene

91. When are chromatids clearly visible in meiosis?
(a) Zygotene (b) Pachytene (c) Diplotene (d) Diakinesis

92. Chiasma formation occurs in
(a) Leptotene (b) Zygotene (c) Pachytene (d) Diplotene

93. Cross-like configuration when non-sister chromatids of a bivalent comes in contact during the first meiotic division are
(a) Chiasmata (b) Bivalents (c) Chromomeres (d) Centromeres

94. Terminalization occurs during
(a) Mitosis (b) Diakinesis (c) Cytokinesis (d) Meiosis II

95. Number of chromosome groups at equatorial plate of metaphase I of a plant body having $2n = 50$ chromosomes shall be
(a) 100 (b) 75 (c) 50 (d) 25

96. In meiosis I, the centromere undergoes
(a) No division
(b) Division between anaphase and interphase
(c) Division between prophase and metaphase
(d) Division but the daughter chromosomes do not separate

97. Meiosis II performs
(a) Synthesis of DNA and centromere
(b) Separation of sex chromosomes
(c) Separation of chromatids
(d) Separation of homologous chromosomes

98. Significance of meiosis lies in the
(a) Reduction of chromosome number to one half.
(b) Maintaining the consistency of chromosome number during sexual reproduction.
(c) Production of genetic variability.
(d) All of these

99. 200 egg cells are produced by (in meiosis)
(a) 50 divisions (b) 100 divisions
(c) 200 divisions (d) 400 divisions

100. A cell has 23 pairs of chromosomes just after the completion of mitotic telophase. The number of chromatids at the preceding metaphase was
(a) 23 (b) 46
(c) 69 (d) 92

101. In plant cells, cytokinesis occurs by
(a) Furrowing (b) Invagination
(c) Anticlinal division (d) Cell plate formation

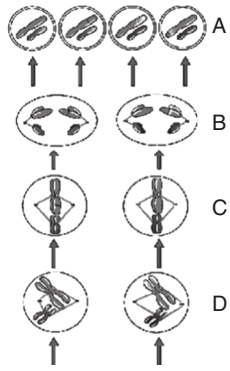
102. The phase of cell cycle during which 'DNA polymerase' is functionally active is
(a) S (b) G_2
(c) G_1 (d) M

103. The number of mitotic divisions required to produce 128 cells from a single cell is
(a) 7 (b) 14
(c) 8 (d) 36

104. Which statement is correct for meiosis?
(a) Meiosis I is reduction division
(b) Meiosis II is reduction division
(c) Meiosis I and II are both reduction divisions
(d) Meiosis I and II both are not reduction divisions

105. Which of the following is the longest phase of meiosis?
(a) Prophase I (b) Anaphase I
(c) Prophase II (d) Metaphase II

106. The following diagram shows modification of the meiosis II for storage. Identify A, B, C, D from the below figure.



(a) A–Prophase II, B–Metaphase II, C–Anaphase II, D–Telophase II
(b) A–Anaphase II, B–Prophase II, C–Telophase II, D–Metaphase II
(c) A–Metaphase II, B–Telophase II, C–Prophase II, D–Anaphase II
(d) A–Telophase II, B–Anaphase II, C–Metaphase II, D–Prophase II

107. G_1 phase is
(a) End of mitosis and the start of S-phase
(b) End of S-phase and the start of mitosis
(c) Start of S-phase and the start of mitosis
(d) End of S-phase and the end of mitosis

108. At which stage of mitosis the chromatids separate and pass to different poles?
(a) Prophase (b) Metaphase (c) Anaphase (d) Telophase

109. During meiosis, the crossover occurs between
(a) Sister chromatids of homologous chromosomes
(b) Non-sister chromatids of homologous chromosomes
(c) Sister chromatids of non-homologous chromosomes
(d) Non-homologous chromatids of homologous chromosomes

110. Which of the following is not true for anaphase?
(a) Golgi body and ER are reformed
(b) Spindle poles move further apart
(c) Chromosomes move to opposite poles
(d) Centromeres split and chromatids separate

111. The longest phase of meiosis I is
(a) Metaphase I (b) Prophase I (c) Anaphase I (d) Telophase I

112. Cyclin protein is required for cell cycle. Which other molecule is essential for the completion of cell cycle?
(a) CCK (b) CKC (c) CDK (d) CKD

113. Which is the correct statements from the following:

I. Synapsis of homologous chromosomes takes place during prophase I of meiosis.
II. Division of centromeres takes place during anaphase I of meiosis.
III. Spindle fibres disappear completely in telophase of mitosis.
IV. Nucleoli reappear at telophase I of meiosis.

(a) I only (b) III only (c) I and II only (d) I, III and IV only

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

114. **Assertion:** The complex formed by a pair of synapsed homologous chromosome is called a bivalent or a tetrad.
Reason: The first two stages of prophase I are relatively short lived when compared to the next stage that is pachytene.

115. **Assertion:** In oocytes of some vertebrates, the diplotene can last for months or years.
Reason: The final stage of meiotic prophase I is diakinesis.

116. **Assertion:** Variartions are are very important for the process of evolution.
Reason: Most of the organelle duplication occur in G_1 phase of cell cycle.

117. **Assertion:** Liquid endosperm in coconut is multinucleated.
Reason: Karyokinesis is not followed by cytokinesis.

118. **Assertion:** Karyokinesis occurs in S-phase
Reason: Cell division stops in M-phase

119. **Assertion:** Interphase is the resting stage.
Reason: The interphase cell is metabolically inactive.

120. **Assertion:** DNA synthesis occurs in G_1 and G_2 periods of cell cycle.
Reason: During G_1 and G_2 phase the DNA contents become double.

121. **Assertion:** Mitosis maintains the genetic similarity of somatic cells.
Reason: Chromosomes do not undergo crossing over.

122. **Assertion:** Chiasmata is formed during diplotene.
Reason: Chiasmata are formed due to the deposition of nucleoproteins.

123. **Assertion:** During zygotene, chromosomes show bivalent stage.
Reason: Bivalent is half the number of chromosomes.

124. **Assertion:** Meiosis takes place in pollen mother cells.
Reason: Each pollen mother cell produces 4 haploid pollen grains.

125. **Assertion:** Meiotic division results in the production of haploid cells.
Reason: Synapsis occurs during zygotene of meiosis.

126. **Assertion:** Plant shows open growth.
Reason: Plant contains meristmetic tissues.

127. **Assertion:** Prophase is characterised by formation of mitotic chromosome.
Reason: Chromosomal material condenses in prophase stage.

128. **Assertion:** Morphology of chromosome is studied in metaphase stage.
Reason: Condensation of chromosome is completed in this stage and can be easily visualised under microscope.

129. **Assertion:** Chromatid separation occurs in anaphase stage.
Reason: Centromere splitting occurs in anaphase stage.

130. **Assertion:** In some social insect haploid cells divide by mitosis
Reason: Growth of multicellular organism is due to mitosis

131. **Assertion:** Stage between two meiotic divisions (I & II) is referred as interkinesis.
Reason: Interkinesis is short lived phase.

132. **Assertion:** Meiotic division help in evolution process.
Reason: Meiosis increases genetic variability in the population.

133. **Assertion:** The complex formed by a pair of synapsed homologous chromosome is called as tetrad.
Reason: Each of the homologous chromosomes in meiotic prophase I consists a two closely apposed sister chromatids.

134. **Assertion:** In oocytes, diplotene can last for months or years
Reason: It is at this stage that chromosome decondense and engage in RNA synthesis

135. **Assertion:** Mitosis is called equational division.
Reason: Mitosis is the division of parent cell into two identical daughter cells having the same amount of DNA as in parent cell.

136. **Assertion:** The interphase is considered as the most active stage of cell cycle.
Reason: This phase is a period of intense synthesis and growth

137. **Assertion:** Disappearance of nuclear membrane is generally essential for karyokinesis.
Reason: Forward movement of chromosomes is dependent on spindle apparatus, which organise is cytoplasm.

138. **Assertion:** Kinetochore is essential for cell division.
Reason: Kinetochore serves as the sites of attachment of spindle fibres to the chromosome.

139. **Assertion:** Meiosis is also known as reduction division.
Reason: Meiosis reduces the number of chromosome in daughter cells.

140. **Assertion:** Meiosis produces four genetically dissimilar cells.
Reason: Crossing over or gene exchange takes place in meiosis.

141. **Assertion:** In mitotic metaphase, morphology of chromosomes can most easily study.
Reason: Condensation of chromosomes is completed in this stage.

142. **Assertion:** Cell growth results into division.
Reason: Cell growth leads to change in nucleocytoplasmic ratio.

143. **Assertion:** During pachytene crossing over takes place which is dependent on recombinase.
Reason: Recombinase is the group of enzymes involved in crossing over and crossing over is an enzyme dependent process.

144. **Assertion:** Colchicine is a mitotic poison.
Reason: Colchicine interferes in the arrangement of spindle fibres.

PREVIOUS YEAR QUESTIONS

1. An elaborate network of filamentous proteinaceous structures present in the cytoplasm which helps in the maintenance of cell shape is called

[AIPMT MAINS 2010]

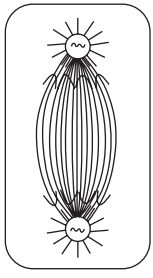
(a) Thylakoid
(b) Endoplasmic reticulum
(c) Plasmalemma
(d) Cytoskeleton

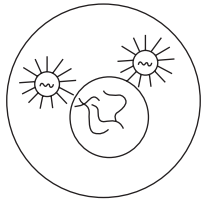
2. During mitosis the ER and nucleolus begins to disappear at

[AIPMT PRE 2010]

(a) Late prophase
(b) Early metaphase
(c) Late metaphase
(d) Early prophase

3. Which stages of cell division do the following figures A and B represent respectively?


A


B

[AIPMT PRE 2010]

	A		B
(a)	Metaphase	-	Telophase
(b)	Telophase	-	Metaphase
(c)	Late anaphase	-	Prophase
(d)	Prophase	-	Anaphase

4. At metaphase, the chromosomes are attached to the spindle fibres by their

[AIPMT MAINS 2011]

(a) Satellites
(b) Secondary constrictions
(c) Kinetochores
(d) Centromeres

5. Identify the meiotic stage in which the homologous chromosomes separate while the sister chromatids remain associated at their centromeres:

[AIPMT MAINS 2012]

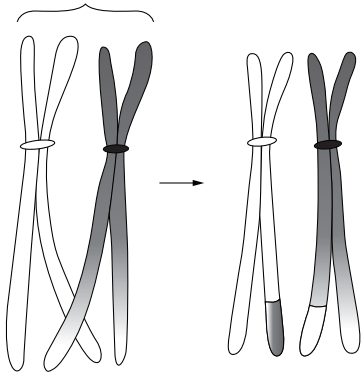
(a) Metaphase II
(b) Anaphase I
(c) Anaphase II
(d) Metaphase I

6. During gamete formation the enzyme recombinase participates during

[AIPMT PRE 2012]

(a) Metaphase I
(b) Anaphase II
(c) Prophase I
(d) Prophase II

7. Given below is the representation of a certain event at a particular stage of a type of cell division. What is this stage?



[AIPMT PRE 2012]

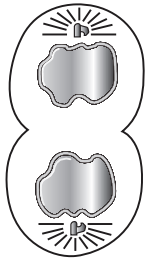
(a) Prophase I during meiosis
(b) Prophase II during meiosis
(c) Prophase of mitosis
(d) Both prophase and metaphase of mitosis

8. The complex formed by a pair of synapsed homologous chromosomes is called

[AIPMT 2013]

(a) Equatorial plate
(b) Kinetochore
(c) Bivalent
(d) Axoneme

9. A stage of cell division is shown in the below figure. Select the answer which gives the correct identification of this stage with its characteristics.



[AIPMT 2013]

(a) Telophase — Nuclear envelope reforms, Golgi complex reforms.
(b) Late anaphase — Chromosomes move away from the equatorial plate, Golgi complex is not present.
(c) Cytokinesis — Cell plate formed by mitochondria is distributed between two daughter cells.
(d) Telophase — Endoplasmic reticulum and nucleolus is not reformed yet.

10. During which phase(s) of cell cycle, the amount of DNA in a cell remains at 4C level if the initial amount is denoted as 2C?

[AIPMT 2014]

(a) G_0 and G_1
(b) G_1 and S
(c) Only G_2
(d) G_2 and M

11. In 'S' phase of the cell cycle

[AIPMT 2014]

(a) The amount of DNA doubles in each cell.
(b) The amount of DNA remains same in each cell.
(c) The chromosome number is increased.
(d) The amount of DNA is reduced to half in each cell.

12. The enzyme recombinase is required at which state of meiosis

[AIPMT 2014]

(a) Pachytene
(b) Zygotene
(c) Diplotene
(d) Diakinesis

13. Select the correct option.

Column I		**Column II**
A. Synapsis aligns homologous chromosomes	–	1. Anaphase II
B. Synthesis of RNA and protein	–	2. Zygotene
C. Action of enzyme recombinase	–	3. G_2 phase
D. Centromeres do not separate but chromatids move towards opposite poles	–	4. Anaphase I

[AIPMT 2015]

(a) A : 2, B : 1, C : 3, D : 4
(b) A : 2, B : 3, C : 1, D : 4
(c) A : 1, B : 2, C : 3, D : 4
(d) A : 2, B : 3, C : 4, D : 1

14. A somatic cell that has just completed the S phase of its cell cycle when compared to the gamete of the same species has

[AIPMT 2015]

(a) Twice the number of chromosomes and twice the amount of DNA.
(b) Same number of chromosomes but twice the amount of DNA.
(c) Twice the number of chromosomes and four times the amount of DNA.
(d) Four times the number of chromosomes and twice the amount of DNA.

15. Arrange the following events of meiosis in correct sequence:

[RE-AIPMT 2015]

(A) Crossing over
(B) Synapsis
(C) Terminalization of chiasmata
(D) Disappearance of nucleolus

(a) (B), (A), (C), (D)
(b) (A), (B), (C), (D)
(c) (B), (C), (D), (A)
(d) (B), (A), (D), (C)

16. Spindle fibres attach on to: [NEET - I, 2016]
(a) Telomere of the chromosome
(b) Kinetochore of the chromosome
(c) Centromere of the chromosome
(d) Kinetosome of the chromosome

17. In meiosis crossing over is initiated at: [NEET - I, 2016]
(a) Pachytene
(b) Leptotene
(c) Zygotene
(d) Diplotene

18. Which of the following is not characteristic feature during mitosis in somatic cells? [NEET - I, 2016]
(a) Spindle fibres
(b) Disappearance of nucleolus
(c) Chromosome movement
(d) Synapsis

19. During cell growth, DNA synthesis takes place in [NEET - II, 2016]
(a) G_1 phase
(b) G_2 phase
(c) M phase
(d) S phase

20. Match the stage of meiosis in Column – I to their characteristic features in Column – II and select the correct option using the codes given below: [NEET - II, 2016]

Column – I	**Column – II**
A. Pachytene	1. Pairing of homologous chromosomes
B. Metaphase I	2. Terminalisation of chiasmata
C. Diakinesis	3. Crossing over takes place
D. Zygotene	4. Chromosomes align at equatorial plate

(a) A : 1, B : 4, C : 2, D : 3
(b) A : 2, B : 4, C : 3, D : 1
(c) A : 4, B : 3, C : 2, D : 1
(d) A : 3, B : 4, C : 2, D : 1

21. When cell has stalled DNA replication fork which checkpoint should be predominantly activated? [NEET - II, 2016]
(a) G_2/M
(b) M
(c) Both G_2/M and M
(d) G_1/S

NCERT EXEMPLAR QUESTIONS

1. Meiosis results in
(a) Production of gametes
(b) Reduction in the number of chromosomes
(c) Introduction of variation
(d) All the above

2. At which stage of meiosis does the genetic constitution of gametes is finally decided?
(a) Metaphase I
(b) Anaphase II
(c) Metaphase II
(d) Anaphase I

3. Meiosis occurs in organisms during
(a) Sexual reproduction
(b) Vegetative reproduction
(c) Both sexual and vegetative reproduction
(d) Pairing of homologous chromosomes

4. During anaphase–I of meiosis
(a) Homologous chromosomes separate
(b) Non-homologous autosomes separate
(c) Sister chromatids separate
(d) Non-sister chromatids separate

5. Mitosis is characterized by
(a) Reduction division
(b) Equal division
(c) Both reduction and equal division
(d) Pairing of homologous chromosomes

6. A bivalent of meiosis-I consists of
(a) Two chromatids and one centromere
(b) Two chromatids and two centromeres
(c) Four chromatids and two centromeres
(d) Four chromatids and four centromeres.

7. Cells which are not dividing are likely to be at
(a) G_1 (b) G_2
(c) G_0 (d) S phase

8. Which of the events listed below is not observed during mitosis?
(a) Chromatin condensation.
(b) Movement of centrioles to opposite poles.
(c) Appearance of chromosomes with two chromatids joined together at the centromere.
(d) Crossing over

9. Identify the wrong statement about meiosis
(a) Pairing of homologous chromosomes.
(b) Four haploid cells are formed.
(c) At the end of meiosis the number of chromosomes are reduced to half.
(d) Two cycles of DNA replication occur.

10. Select the correct statement about G_1 phase.
(a) Cell is metabolically inactive.
(b) DNA in the cell does not replicate.
(c) It is not a phase of synthesis of macromolecules.
(d) Cell stops growing.

Answer Keys

Practice Questions

1. (a)	2. (c)	3. (d)	4. (a)	5. (a)	6. (b)	7. (a)	8. (a)	9. (d)	10. (b)
11. (c)	12. (d)	13. (d)	14. (c)	15. (b)	16. (c)	17. (b)	18. (d)	19. (d)	20. (d)
21. (d)	22. (c)	23. (d)	24. (c)	25. (d)	26. (d)	27. (b)	28. (d)	29. (d)	30. (a)
31. (c)	32. (d)	33. (d)	34. (a)	35. (a)	36. (c)	37. (d)	38. (a)	39. (c)	40. (d)
41. (b)	42. (d)	43. (d)	44. (d)	45. (a)	46. (a)	47. (a)	48. (b)	49. (d)	50. (c)
51. (b)	52. (c)	53. (d)	54. (c)	55. (a)	56. (d)	57. (d)	58. (d)	59. (d)	60. (c)
61. (b)	62. (c)	63. (b)	64. (a)	65. (c)	66. (a)	67. (c)	68. (a)	69. (a)	70. (a)
71. (d)	72. (a)	73. (c)	74. (d)	75. (b)	76. (b)	77. (b)	78. (b)	79. (d)	80. (c)
81. (b)	82. (c)	83. (a)	84. (a)	85. (d)	86. (c)	87. (d)	88. (b)	89. (a)	90. (a)
91. (b)	92. (d)	93. (a)	94. (b)	95. (d)	96. (a)	97. (c)	98. (d)	99. (c)	100. (d)
101. (d)	102. (a)	103. (a)	104. (a)	105. (a)	106. (d)	107. (a)	108. (c)	109. (b)	110. (a)
111. (b)	112. (c)	113. (d)							

Assertion and Reason Questions

114. (b)	115. (b)	116. (b)	117. (a)	118. (d)	119. (c)	120. (d)	121. (a)	122. (c)	123. (b)
124. (a)	125. (a)	126. (a)	127. (a)	128. (a)	129. (a)	130. (b)	131. (b)	132. (a)	133. (a)
134. (a)	135. (a)	136. (a)	137. (a)	138. (a)	139. (a)	140. (a)	141. (a)	142. (a)	143. (a)
144. (a)									

Previous Year Questions

1. (d)	2. (a)	3. (c)	4. (c)	5. (b)	6. (c)	7. (a)	8. (c)	9. (a)	10. (d)
11. (a)	12. (a)	13. (b)	14. (c)	15. (a)	16. (b)	17. (a)	18. (d)	19. (d)	20. (d)
21. (a)									

NCERT Exemplar Questions

1. (d)	2. (d)	3. (a)	4. (a)	5. (b)	6. (c)	7. (c)	8. (d)	9. (d)	10. (b)

This page is intentionally left blank.

Unit
IV

Plant Physiology

Students Note

Unit IV includes plant physiology. In this unit, more questions are asked from the chapter on plant water relationship and mineral nutrition. In AIPMT, three to five questions are asked from this unit. For these chapters, the textbook is more than sufficient.

This page is intentionally left blank.

CHAPTER

11

Transport in Plants

PRACTICE QUESTIONS

Means of Transport

1. In flowering plant, we need to transport
(a) Water and mineral nutrients (b) Organic nutrients
(c) Plant growth regulators (d) All of these

2. For covering a small distance, the substances move by
(a) Diffusion (b) Cytoplasmic streaming
(c) Active transport (d) All of these

3. Transport over longer distance is known as
(a) Translocation (b) Transformation (c) Transduction (d) Diffusion

4. Which of the following undergoes multidirectional transport?
(a) Water (b) Mineral nutrients
(c) Organic nutrients (d) Both (b) and (c)

5. Transport of which substance is essentially unidirectional in xylem?
(a) Water (b) Mineral nutrients
(c) Organic nutrients (d) Both (a) and (b)

6. Select the correct statement from the following:
(a) Mineral nutrients taken up by the roots and transported upward into stem, leaves and growing region.
(b) When a plant part undergoes senescence, the nutrient always remain in the senescence part and gets lost from the plant.
(c) In flowering plant the complex traffic of compound in unorderly manner moving in different direction.
(d) All hormones shows polarised movement.

7. Diffusion can occur between
(a) One part of cell to other part
(b) Cell to cell
(c) Intercellular space to outside of leaf
(d) All of these

8. The only mode of gaseous movement in plant body is
(a) Diffusion (b) Osmosis
(c) Facilitated transport (d) All of these

9. Which of the following is incorrect about diffusion?
(1) Molecules move in random fashion.
(2) It occurs from higher to lower concentration.
(3) It is a slow process.
(4) It does not depend on living system.
(5) Protein carriers are required.
(6) It is a passive process.
(a) Only 1 and 5 (b) Only 5 (c) 1, 3 and 5 only (d) Only 4

10. Diffusion rate is affected by
(a) Concentration gradient
(b) Membrane permeability through which it occur
(c) Pressure and temperature
(d) All of these

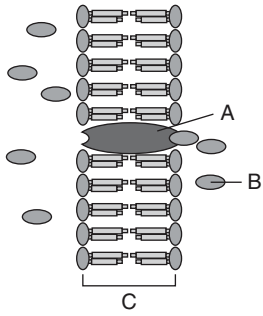
11. Find out the total number of false statements from the following.
(1) The diffusion rate depends on the size of substrate.
(2) Diffusion across membrane depends upon the solubility of lipids.
(3) Membrane protein provide sites for hydrophilic substance to cross membrane.
(4) Facilitated diffusion do not require concentration gradient.
(a) 1 (b) 2 (c) 3 (d) 4

12. Facilitated diffusion requires _____ to transport substance across membrane.
(a) Special membrane protein (b) ATP
(c) Protein inhibitor (d) All of these

13. Which process undergoes saturation?
(a) Facilitated diffusion (b) Active transport
(c) Simple diffusion (d) Both (a) and (b)

14. Which of the following transport is not highly selective?
(a) Facilitated diffusion (b) Active transport
(c) Simple diffusion (d) All of these

15. Identify A, B and C in the given figure.



(a) A–Transported molecule, B–Inner side of cell, C–Transport protein
(b) A–Transport protein, B–Transported molecule, C–Membrane
(c) A–Inner side of cell, B–Membrane, C–Transported molecule
(d) A–Membrane, B–Transport protein, C–Transported molecule

16. Where are poring proteins present?
(a) Outer membrane of plastid (b) Inner membrane of mitochondria
(c) Inner membrane of some bacteria (d) Outer membrane of ribosomes

17. Choose the total number of correct statements from the following:
(1) Some channels in membrane are always open.
(2) Porins allow the passage of molecule of size up to small protein.
(3) Water channel made up of eight different type of aquaporins.
(4) Facilitated diffusion is very specific.
(a) 1 (b) 2 (c) 3 (d) 4

18. Some transport proteins allow diffusion only. If two type of molecules move together in the same direction. Such type of transport is known as
(a) Symport (b) Antiport (c) Uniport (d) All of these

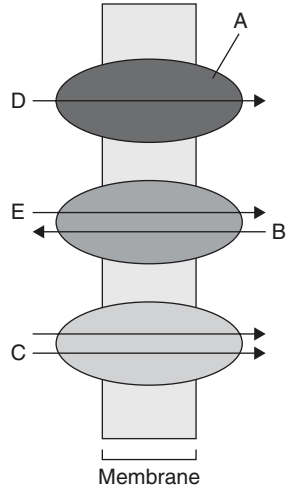
19. If two type of molecules move together in opposite direction. Such type of transport is known as
(a) Symport (b) Antiport (c) Uniport (d) All of these

20. When the molecule move across in a membrane independent of other molecules through carrier protein the process is known as
(a) Symport (b) Antiport (c) Uniport (d) All of these

21. A transport which uses energy to pump molecules against a concentration gradient is known as
(a) Diffusion (b) Facilitated diffusion
(c) Active transport (d) All of these

22. Proteins in the membrane, responsible for facilitated diffusion and active transport, show some common characteristic like.
(1) Being highly selective (2) Being liable to saturate
(3) Responding to inhibitor (4) Being regulated by hormones
(a) 1 and 2 only (b) 2 and 3 only (c) 3 and 4 only (d) All of these

23. Identify the parts A to E given in the figure.



(a) A–Antiport B, B–Uniport A, C–Antiport A, D–Symport B, E–Carrier point
(b) A–Carrier point, B–Antiport A, C–Uniport A, D–Symport B, E–Antiport B
(c) A–Carrier point, B–Antiport B, C–Symport B, D–Uniport A, E–Antiport A
(d) A–Symport B, B–Antiport A, C–Antiport B, D–Carrier point, E–Uniport A

24. Identify A, B and C shown in this table:

Property	Simple Diffusion	Facilitated Transport	Active Transport
Requires special membrane proteins	A	Yes	Yes
Highly selective	No	Yes	Yes
Transport Saturates	No	B	Yes
Uphill transport	No	No	C
Requires ATP energy	No	No	Yes

(a) A–Yes, B–Yes, C–Yes (b) A–Yes, B–No, C–Yes
(c) A–No, B–Yes, C–Yes (d) A–No, B–No, C–Yes

25. Select the incorrect statement from the following:
(1) A watermelon has over 92 per cent water.
(2) Most herbaceous plants have only about 10–15% of its fresh water as dry matter.
(3) Woody parts of the plant have very little water.
(4) Seed is without water.
(5) Mature corn plant absorbs almost three litres of water per day.
(6) Mustered plant absorbs water epical to its own weight in about 5 hours.
(a) All except 6 (b) All except 5 (c) Only 4 (d) Only 3

26. Water is often a limitary factor for plant growth and _____ in both _____ and _____ environments.
(a) productivity, agricultural, natural (b) movement, agricultural, artificial
(c) photosynthesis, aquatic, terrestrial (d) senescence, agricultural, natural

27. The major similarity between active transport and facilitated diffusion is that
(a) Both consume ATP (b) Both are passive
(c) Both are non-selective (d) Both require membrane proteins

28. A watermelon has approximately _____ of water.
(a) 20% (b) 80% (c) 100% (d) 92%

29. Which of the following has minimum amount of water?
(a) Leaf (b) Flower
(c) Epidermal cell of root (d) Cork

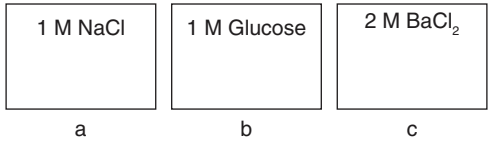
30. Select from the following which one is moved by active transport
(1) Na^+ amino acid, in proximal convoluted tubules.
(2) Absorption of most minerals by epidermal cells of root.
(3) Na^+ K^+ pump.
(4) Loading of sucrose from companion cell to sieve tube cells.
(a) All except 4 (b) All except 3
(c) All except 1 (d) All of these

Plant Water Relations

31. The two main components which determine water potential are
(a) Solute potential (b) Pressure potential
(c) Matric potential (d) Both (a) and (b)

32. Which of the following has the maximum water potential?
(a) 1 M of NaCl (b) 0.5 M of glucose
(c) Pure water (d) 0.001 M of HCl

33. Three solutions in the container are given under one similar condition. Which solution posses greater kinetic energy in water molecules?



(a) A (b) B
(c) C (d) All solution possess same energy

34. What is the condition for pure water having zero water potential?
(a) Standard temperature (b) No pressure
(c) At 1 atm pressure (d) Only (a) and (b)

35. Which is always negative (under natural condition)?
(1) ψ_s (2) ψ_w of solution
(3) ψ_p (4) ψ_p of solution
(a) 1, 2 only (b) 1 only (c) 4 only (d) 3 only

36. The relationship between ψ_w, ψ_s and ψ_p can be given as:
(a) $\psi_s = \psi_w + \psi_p$ (b) $\psi_p = \psi_w + \psi_s$ (c) $\psi_w = \psi_p + \psi_s$ (d) All of these

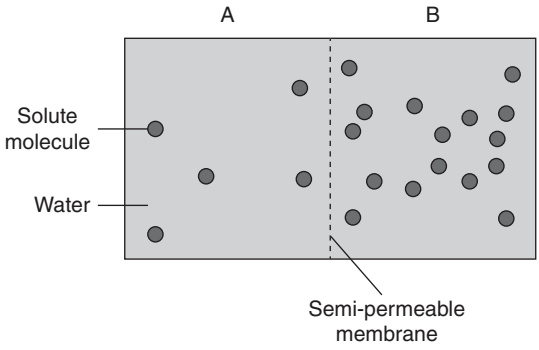
37. Which of the following is important to determine that what is going in or out of the plant cell?
(a) Cell membrane only (b) Tonoplast only
(c) Both together (d) Cell wall only

38. Cell wall is
(a) Permeable (b) Impermeable
(c) Semi-permeable (d) Selectively permeable

39. Osmosis means diffusion of water across
(a) Semi-permeable membrane
(b) Differentially permeable membrane
(c) Permeable membrane
(d) Both (a) and (b)

40. Water will move from
(a) Higher pressure potential to lower
(b) Higher solute potential to lower
(c) Higher water potential to lower
(d) Lower water potential to higher

41.



Answer the question with respect to the above diagram:

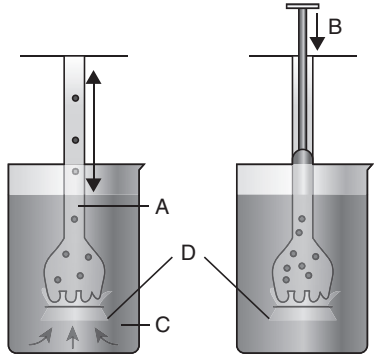
(1) The solution of which chamber has a lower water potential?
(a) A (b) B (c) Both have same (d) Cannot predict

(2) The solution of which chamber has a lower solute potential?
(a) A (b) B (c) Both have same (d) Cannot predict

(3) In which direction will osmosis occur?
(a) None (b) B to A (c) Both the direction (d) A to B

42. How we can get the egg membrane?
(a) Remove yolk and albumin through a small hole at one end of the egg
(b) Place the shell in dilute HCl for few hours
(c) Both (a) and (b)
(d) None of these

43. Identify A to D in the given figure.



(a) A–Pressure, B–Membrane, C–Water, D–Sucrose solution
(b) A–Sucrose solution, B–Pressure, C–Water, D–Membrane
(c) A–Membrane, B–Sucrose solution, C–Pressure, D–Water
(d) A–Sucrose solution, B–Membrane, C–Water, D–Pressure

44. Select the correct statement from the following:
(a) Osmotic pressure is the negative pressure applied.
(b) Osmotic potential is positive.
(c) More is the solute concentration of solution, more will be the pressure required to prevent water from diffusing in.
(d) The net direction and the rate of osmosis does not depend on the pressure gradient nor on concentration gradient.

45. Which portion of the root absorbs both water and minerals?
(a) Terminal portion of roots (b) Zone of cell elongation
(c) Zone of cell formation (d) Zone of cell differentiation

46. Meaningful girdling (ringing) experiments cannot be done on sugarcane because
(a) Phloem is present inside the xylem (b) It cannot tolerate the injury
(c) Vascular bundles are scattered (d) Plants are very delicate

47. Some leaves are removed from the stem cuttings planted for vegetative propagation. This is done
(a) To increase water uptake (b) Because it helps in rooting of cuttings
(c) To reduce water loss (d) Because the cuttings need less food

48. In terms of permeability, the cell wall and plasmalemma are
(a) Permeable and differentially permeable respectively
(b) Both semi-permeable
(c) Semi-permeable and differentially permeable
(d) Both differentially permeable

49. The process of osmosis involves
(a) Movement of solute through semi-permeable membrane
(b) Movement of solvent through a semi-permeable membrane
(c) Movement of solution through a semi-permeable membrane
(d) None of these

50. Dry seeds when placed in water swells due to
(a) Imbibitions (b) Absorption (c) Diffusion (d) Adsorption

51. A cell placed in strong solution will shrink because
(a) Cytoplasm will decompose (b) Mineral salt will break the cell wall
(c) Salt water enter the cell (d) Water comes out by exosmosis

52. A cell increases in volume if the external medium is
(a) Hypotonic (b) Hypertonic (c) Isotonic (d) None of these

53. All the following involves osmosis except
(a) Water from soil entering a root hair
(b) Water passing from root hair to adjacent cells
(c) Water passing up a xylem vessel element to xylem vessel element above it
(d) Water entering a mesophyll cell from xylem vessel element

54. A cell is plasmolysed after being kept in a hypertonic solution. What will be present between the cell wall and plasmalemma?

(a) Isotonic solution (b) Hypertonic solution
(c) Air (d) Hypotonic solution

55. Wilting of a plant results from excessive
(a) Respiration (b) Photosynthesis
(c) Absorption (d) Transpiration

56. Water moves across a selectively permeable membrane:

	From	To
(a)	Region of higher water potential	Region of lower water potential
(b)	Lower water concentration	Higher water concentration
(c)	Higher solute concentration	Lower solute concentration
(d)	Region of higher osmotic potential	Region of lower osmotic potential

57. In seed germination, the first phenomenon which takes place is called
(a) Diffusion (b) Osmosis (c) Imbibitions (d) All of these

58. Deplasmolysis occurs in a cell when it is placed in
(a) Hypotonic solution (b) Hypertonic solution
(c) Isotonic solution (d) Buffer solution

59. Grapes immersed in water would shrink if
(a) Water contains salts (b) Water contains starch
(c) Water is cold (d) Water is hot

60. Plant cells submerged in distilled water will become
(a) Turgid (b) Flaccid (c) Plasmolysed (d) Impermeable

61. The plants face water stress due to the use of excessive fertilizers because of
(a) Exosmosis (b) Endosmosis (c) Imbibitions (d) None of these

62. You are given three cells such as a root hair, a cell of the inner cortical layer and a cell of the mesophyll. Arrange them in the ascending order of DPD.
(a) Root hair < Cortical cell < Mesophyll
(b) Cortical cell < Mesophyll < Root hair
(c) Mesophyll < Root hair < Cortical cell
(d) Root hair < Mesophyll < Cortical cell

63. What will be the direction of movement of water, when solution A having water potential of –9 bars and another solution B of –4 bars is separated by a semi-permeable membrane?
(a) B to A (b) A to B
(c) Both directions (d) None

64. If the external solution is more dilute than cytoplasm, then the external solution is said to be
(a) Hypotonic (b) Hypertonic (c) Isotonic (d) Isothermal

65. During plasmolysis
(a) Cell membrane of a plant cell shrinks away from its cell wall
(b) Water first lost from the cytoplasm and then from the vacuoles
(c) Area between cell wall and shrunken protoplast is occupied by outer solution
(d) All the above

66. What happens when plant cell is put in hypotonic solution?
(a) Cell swells up (b) Cell undergoes plasmolysis
(c) Cell wall shrinks (d) Cell will burst

67. The pressure exerted by the protoplast due to the entry of water against the rigid cell wall is called
(a) Osmotic potential (b) Pressure potential
(c) Water potential (d) Matrix potential

68. Imbibition is
(a) Special type of diffusion (b) Osmosis
(c) Facilitated diffusion (d) Active transport

69. Imbibition is characterized by
(a) Increase in volume (b) Release of energy
(c) Increase in pressure (d) All of these

70. The best example of imbibition is
(a) Absorption of water by seed (b) Absorption of water by dry wood
(c) Both (a) and (b) (d) None of these

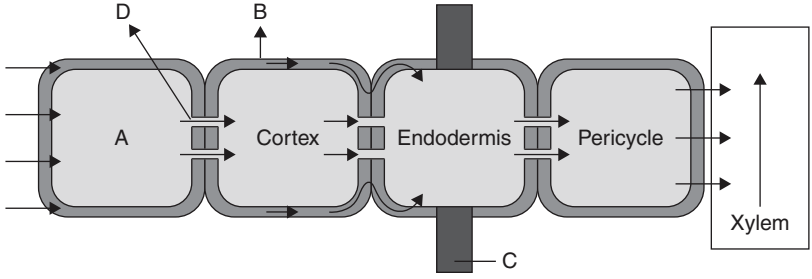
71. Which of the following is correct about imbibitions?
(a) It requires ψω gradient between the absorbent and the liquid imbibed.
(b) It requires affinity between the absorbent and the liquid.
(c) Imbibition pressure is produced by the swelling of wood and in turn used by prehistoric man to split rocks and boulders.
(d) All the above

72. The path of the movement of water is demonstrated by using
(a) Solution containing pure water (b) Solution of water and mineral
(c) Dye (colour) dissolved in water (d) All of these

73. Simple long distance transport cannot be achieved by
(a) Diffusion (b) Facilitated diffusion
(c) Active transport (d) All of these

74. Water, mineral and food are generally moved by over large distance by
(a) Simple diffusion (b) Facilitated diffusion
(c) Active transport (d) Bulk flow or mass flow

75. Identify A to D in the given figure.



(a) A–Plasma membrane, B–Plasmodesmata, C–Epidermis, D–Casparian strip
(b) A–Casparian strip, B–Epidermis, C–Plasmodesmata, D–Plasma membrane
(c) A–Plasmodesmata, B–Epidermis, C–Casparian strip, D–Plasma membrane
(d) A–Epidermis, B–Plasma membrane, C–Casparian strip, D–Plasmodesmata

76. Bulk flow can be achieved by
(a) Positive hydrostatic pressure gradient
(b) Negative hydrostatic pressure gradient (suction)
(c) Both (a) and (b)
(d) None of these

Long Distance Transport of Water

77. Xylem is associated with the translocation of
(a) Water (b) Mineral
(c) Some organic nitrogen and hormone (d) All of these

78. Which of the following is incorrect about apoplastic pathway?
(a) Movement of water takes place through intercellular spaces and the walls of cells.
(b) Movement depends on the gradient.
(c) Mass flow occurs due to adhesive and cohesive property of water.
(d) This pathway provides barrier to water movement.

79. During symplastic pathway water moves through
(a) Cytoplasm (b) Plasmodesmata (c) Cell membrane (d) All of these

80. Which of the following is incorrect about symplastic pathway?
(a) Movement of water is relatively slower.
(b) Movement is down the concentration gradient.
(c) It may be aided by cytoplasmic streaming.
(d) Most of the water flow in root occurs by this pathway.

81. Cytoplasmic streaming is easily seen in
(a) Leaf of hydrilla (b) Leaf of mango
(c) Stem cells of sunflower (d) Pollen grains

82. Movement of water is correctly represented by
(a) Cortex → Root hair (Epidermis) → Xylem → Endodermis → Pericycle
(b) Root hair (Epidermis) → Endodermis → Xylem → Pericycle → Cortex
(c) Root hair (Epidermis) → Cortex → Endodermis → Pericycle → Xylem
(d) Xylem → Cortex → Endodermis → Pericycle → Root hair (Epidermis)

83. Where is apoplastic movement shifted to symplastic pathway?
(a) Cortex (b) Endodermis (c) Pericycle (d) Xylem

84. Which of the following is true about mycorrhizae?
(a) Association between roots and fungus.
(b) Fungal hyphae have very large surface area that absorb water and mineral from the soil.
(c) Roots provide sugar and N-containing compound to the fungus.
(d) All the above

85. Which plant seeds cannot be germinated and established without the presence of mycorrhizae?
(a) Mango (b) Pulses (c) Pinus (d) Selaginella

86. Root pressure develops due to
(a) Passive absorption of ions (b) Active absorption of ions
(c) Active absorption of glucose (d) None of these

87. Effect of root pressure is visible
(a) At night (b) At early morning
(c) When evaporation is low (d) All of these

88. Guttation is seen in
(a) Vein opening near the tip of grass blade (b) Leaves of many herbaceous plant
(c) Both (a) and (b) (d) Leaves of trees

89. Root pressure contributes to the
(a) Ascent of sap in small herbaceous plants.
(b) Re-establishment of continuous chains of water molecules in the xylem which often breaks down under the enormous tension created by transpiration.
(c) Guttation
(d) All the above

90. What is the approximate rate of the ascent of sap?
(a) 5 m/hr (b) 15 m/hr (c) 40 m/hr (d) 2 m/hr

91. How much percentage of water is used for photosynthesis?
(a) 1% (b) 2% (c) 3% (d) 4%

Transpiration

92. Stomata helps in
(a) Transpiration (b) Exchange of gases
(c) Both (a) and (b) (d) None of these

93. Transpiration is affected by
(a) Humidity (b) Wind speed
(c) Light and temperature (d) All of these

94. The plant factor which affects the transpiration are
(a) Number and distribution of stomata (b) Number of stomata open
(c) Water status of plant (d) All of these

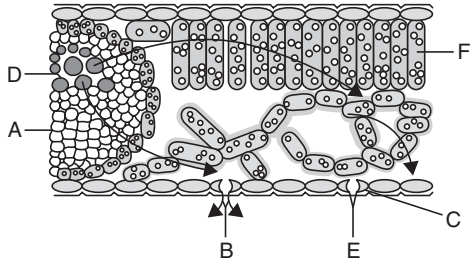
95. Transpiration driven ascent of sap depends mainly on the _____ physical properties of water.
(a) Cohesion (b) Adhesion (c) Surface tension (d) All of these

96. Properties of water which provide high tensile strength (i.e., ability to resist a pulling force) are:
(a) Cohesion (b) Adhesion (c) Surface tension (d) All of these

97. Force generated by transpiration creates pressure sufficient to lift a xylem sized column of water over _____ meters.
(a) 130 (b) 200 (c) 400 (d) 500

98. Sap ascends in woody stems because of the root pressure and
(a) Transpiration pull (b) Capillarity
(c) Molecular adhesion (d) Photosynthesis

99. Identify the parts A to F in the given figure.



(a) A–Phloem, B–Diffusion into surrounding air, C–Guard cell, D–Xylem, E–Stomatal pore, F–Palisade
(b) A–Palisade, B–Guard cell, C–Phloem, D–Xylem, E–Diffusion into surrounding air, F–Stomatal pore
(c) A–Stomatal pore, B–Xylem, C–Palisade, D–Diffusion into surrounding air, E–Guard cell, F–Phloem
(d) A–Guard cell, B–Phloem, C–Xylem, D–Stomatal pore, E–Diffusion into surrounding air, F–Palisade

100. The most widely accepted explanation for the ascent of sap in tree is
(a) Capillarity
(b) Roll of atmospheric pressure
(c) Pulsating action of living cells
(d) Transpiration cohesion theory of Dixon

101. The path of water from soil up to secondary xylem is
(a) Soil → Root hair cell wall → Cortex → Endodermis → Pericycle → Protoxylem → Metaxylem
(b) Metaxylem → Protoxylem → Cortex → Soil → Root hair
(c) Cortex → Root hair → Endodermis → Pericycle → Protoxylem → Metaxylem
(d) Pericycle → Soil → Root hair → Cortex → Endodermis → Protoxylem → Metaxylem

102. A plant with well-washed roots is placed in a beaker of water diluted with red ink. The red colour travels up the stem and into the leaf veins. Which of the following should be the correct explanation of the uptake of red ink into the roots?
(a) The red ink entered the root hairs by osmosis.
(b) The molecules of red ink is diffused into the root hairs.
(c) The membranes of the root hairs are destroyed and the red ink could enter.
(d) The molecules of red ink passed from a region of low concentration to one of high concentration.

103. Exudation of xylem is due to
(a) Passive absorption
(b) Root pressure
(c) Guttation
(d) Presence of transpiration

104. By what mechanism does water moves through vessels and tracheids of root stem and leaves?
(a) Osmotic flow (b) Bulk flow (c) Gravity flow (d) Imbibition

105. When the cut end of a shoot is placed in a solution of safranin, the presence of dye could be located in

(a) Cortex (b) Tracheid elements
(c) Phloem (d) Pith

106. Bulk flow of water occurs through
(a) Living cells (b) Cell vacuoles
(c) Apparent free spaces (d) Plasmodesmata

107. The continuity of water column in xylem is maintained due to the
(a) Presence of air bubbles (b) Cohesive property of water
(c) Evaporation power of water (d) None of these

108. The chief role of transpiration in plants is to cause
(a) Loss of surplus water (b) Cooling of the plant
(c) Rapid ascent of sap (d) Rapid rise of minerals

109. The loss of water in the form of vapour from the aerial plant parts is known as
(a) Osmosis (b) Respiration (c) Photosynthesis (d) Transpiration

110. Guard cells are found in
(a) Stomata (b) Root tips (c) Ovary (d) Lenticels

111. The position and frequency of stomata can be determined by
(a) Calculating the loss of water (b) Cobalt chloride paper method
(c) Photometer (d) Porometer

112. In both transpiration and evaporation, water is lost in the form of vapour yet they differ, because
(a) Both transpiration and evaporation are similar but the rate of water loss differs.
(b) Frequency of water loss is different in both of them.
(c) Transpiration is a physical process and evaporation is a physiological process.
(d) Transpiration is a physiological process and evaporation is a physical process.

113. Out of the following, which one is the most common type of transpiration?
(a) Foliar (b) Stomatal (c) Lenticular (d) Cuticular

114. In a hot summer day, a plant cools itself due to
(a) Loss of water vapours from leaf (b) Transport of water in plant
(c) Loss of liquid water (d) Loss of water from entire plant

115. Guard cells are surrounded by
(a) Epidermal hairs (b) Mesophyll cells
(c) Palisade cells (d) Subsidiary cells

116. Which of the following is an adaptation to reduce water loss?
(a) Presence of thick cuticle (b) Change of leaf into spine
(c) Change of leaf into phylloclade (d) All of these

117. Which of the following is called necessary evil?
(a) Osmosis (b) Absorption (c) Transpiration (d) Photosynthesis

118. Which of the following plants economizes the transpirational loss of water?
(a) C_3 (b) C_4 (c) Both equally (d) C_2

119. The condition under which transpiration would be most rapid is
(a) High humidity
(b) Excess of water in soil
(c) Low humidity, high temperature, guard cells are turgid (open) and moist soil
(d) Low velocity of wind

120. The transpiration in plants will be the lowest
(a) When there is high humidity in the atmosphere
(b) High wind velocity
(c) There is excess of water in the cell
(d) Environmental conditions are very dry

121. Under what conditions the rate of transpiration increases?
(a) Increase of humidity (b) Increase of atmospheric pressure
(c) Decrease of temperature (d) Decrease of humidity

122. Transpiration increases with an increase in
(a) Humidity (b) Temperature (c) Minerals (d) Soil moisture

123. Stomata in angiosperms open and close due to
(a) Their genetic constitution
(b) Effect of hormones
(c) Changes of turgor pressure in guard cells
(d) Pressure of gases inside the leaves

124. Stomata opens because of
(a) Oxygen in the air
(b) Increased turgidity of the guard cells brought about by the exposure to light
(c) Vacuoles in guard cells
(d) All the above

125. The transpiration is regulated by the movements of
(a) Subsidiary cells of the leaves (b) Guard cells of the stomata
(c) Mesophyll tissue cells (d) Epidermal cells of the leaves

126. Guttation is caused due to
(a) Imbibitions (b) Osmosis
(c) Positive root pressure (d) Transpiration

127. Guttation usually occurs when the plant is put in a
(a) More saturated atmosphere (b) More humid soil
(c) Dry condition (d) Desert

128. Guttation is the process of elimination of water from plants. It occurs from the pores in leaves through which water comes out in the form of droplets or a specialized multicellular structure in leaves which excretes water droplets. The pores are called
(a) Stomata (b) Hydathodes (c) Lenticels (d) Wounds

129. Guttation is found mostly in
(a) Herbaceous plants (b) Shrubs
(c) Wood plants (d) None of these

130. Water lost by guttation is
(a) Pure (b) Mixed with salts
(c) Sometimes pure and sometimes impure (d) None of these

131. Guttation occurs in
(a) Morning (b) Night
(c) Evening (d) Morning 10 a.m.

132. Select from the following (in numbers) the correct function which are performed by transpiration.
(1) Creates transpiration pull for absorption and transport of water in plant.
(2) Transport minerals from the soil to all parts of the plant.
(3) Cools the leaf surface (sometime 10–15^{o}C).
(4) Supplies water for photosynthesis.
(5) Maintains the shape and structure of plants by keeping the cells turgid.
(a) 1 (b) 3 (c) 4 (d) 5

133. C_4 plants are more evolved than C_3 plants because
(a) C_4 plants are twice efficient in terms of carbon fixing.
(b) C_4 plants loose only half of its water as C_3 plants for same amount of CO_2 fixed.
(c) Both (a) and (b)
(d) None of these

134. Plants obtain most of its carbon from
(a) Atmosphere (b) Water (c) Soil (d) All of these

135. Minerals are mostly absorbed by
(a) Active transport (b) Facilitated diffusion
(c) Simple diffusion (d) All of these

136. Ions are absorbed from soil by
(a) Active transport (b) Passive transport
(c) Both (a) and (b) (d) None of these

137. Where is the control point for minerals, where a plant adjusts the quantity and types of solutes that reach the xylem?
(a) Epidermal cell (b) Cortical cell
(c) Endodermal cell (d) Pericycle cell

138. Endodermis actively transports ion in one direction because
(a) It is inner to epidermis
(b) Cell wall is suberized
(c) Cell wall is lignified
(d) Its cell membrane has special transport proteins

139. Chief sink of minerals are
(a) Apical and lateral meristem
(b) Young leafs and storage organs
(c) Developing flower, fruits and seeds
(d) All of these

140. Unloading of mineral occurs at the fine vein endings through
(a) Diffusion (b) Active uptake (c) Both (a) and (b) (d) None of these

141. All elements are remobilized except
(a) P (b) N (c) K (d) Ca

142. Which of the following helps in the transportation of minerals?
(a) Xylem (b) Phloem (c) Both (a) and (b) (d) None of these

143. Sink and source in sucrose transport may be reversed depending on
(a) Plant's need (b) Season (c) Both (a) and (b) (d) None of these

144. Phloem sap is mainly composed of
(a) Water + Glucose (b) Water + Fructose
(c) Water + Cellulose (d) Water + Sucrose

145. Which of the following is translocated through phloem?
(a) Sugar (b) Amino acid (c) Hormone (d) All of these

146. The accepted mechanism for the translocation of sugar from source to sink is called
(a) Pressure flow hypothesis (b) Mass flow hypothesis
(c) Transpiration pull hypothesis (d) Both (a) and (b)

147. What is the means of transport through which sucrose moves into sieve tube of source and out of sieve tube at sink?
(a) Simple diffusion (b) Facilitated diffusion
(c) Active transport (d) Passive transport

148. When sugar is added to the source water potential of sucrose _____ and when sugar is removed from sink, the water potential of sink _____.
(a) ↑es, ↑es (b) ↑es, ↓es (c) ↓es, ↓es (d) ↓es, ↑es

149. Which of the following experiment showed that food in plant is transported through phloem?
(a) Avena curvature experiment (b) Girdling experiment
(c) Bell-jar experiment (d) None

150. Select the incorrect statement from the following:
(a) The portion of bark above the ring in girdling experiment gets swollen after few weeks.
(b) Translocation in phloem is bidirectional.
(c) Phloem tissue is composed of sieve tube cells, which form long coloumns with holes in the walls called sieve plates.
(d) The process of loading at the source which produces a hypotonic condition in the phloem.

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

151. Assertion: Phloem is the principal food conducting tissue.
Reason: It has been recognized by girdling or ringing experiment.

152. Assertion: The water and mineral uptake by root hairs from the soil occurs through apoplast until it reaches the endodermis.
Reason: Casparian strips in endodermis are suberized.

153. Assertion: Imbibition is also diffusion.
Reason: The movement of water in the above process is along a concentration gradient.

154. Assertion: Pinus seeds cannot germinate and established without the presence of mycorrhaizae.
Reason: Mycorrhiza is a symbiotic association of a fungus with a root system.

155. Assertion: Water potential is new term for diffusion pressure deficit.
Reason: Both diffusion pressure deficit and water potential have a positive value.

156. Assertion: Most of the minerals must enter the root by active transport.
Reason: The concentration of minerals in the soil is usually lower than the concentration of minerals in roots.

157. Assertion: Plasmolysis will be severe if the process is in the order of limiting $\rightarrow$ incipient $\rightarrow$ evident.
Reason: Plasmolysis is endosmosis.

158. Assertion: The more the solute molecules in solution ,the lower (more negative) is the solute potential of solution.
Reason: For a solution at atmospheric pressure, water potential = solute potential.

159. Assertion: In apoplast, the water movement is through mass flow.
Reason: The apoplast does not provide any barrier to water movement.

160. Assertion: Transport saturates in facilitated diffusion.
Reason: Facilitated diffusion occurs through protien molecule.

161. Assertion: Light is a very important factor in transpiration.
Reason: It induces stomatal opening and darkness closing. Therefore, transpiration increases in light and decreases in dark.

162. Assertion: In rooted palnt, the transport in xylem of water and minerals is essentially multidirectional.
Reason: Organic compound and nutrient undergoes unidirectional transport only.

163. Assertion: Guttation liquid is found on the margins of leaves of herbaceous plants.
Reason: Hydathodes are found on the margins of herbaceous plant.

164. Assertion: Transpiration occurs when stomata are open.
Reason: Transpiration occurs only through stomata.

165. Assertion: Transport of sucrose from leaf to root is called translocation.
Reason: This is long distance transport through vascular system of plant.

166. Assertion: Movement by diffusion is passive process.
Reason: No energy expenditure takes place during diffusion.

167. **Assertion:** Molecules up to small size of protein can pass through outer membrane of plastids.
Reason: Outer membrane of plastids contain porins

168. **Assertion:** Water is often the limiting factor for plant growth and productivity.
Reason: Large amount of water is required by plants.

169. **Assertion:** Pure water has greatest water potential.
Reason: Pure water contain maximum free water molecule.

170. **Assertion:** All solutions have lower water potential than pure water.
Reason: All solutions have fewer free water molecule.

171. **Assertion:** Wood is use to split rocks by prehistoric man.
Reason: Imbibition of water by wood increases pressure by swelling help in splitting.

172. **Assertion:** Phloem translocates variety of organic and inorganic soluble.
Reason: Phloem is conducting tissue of plant.

173. **Assertion:** Most water flow in the root occurs through apoplast.
Reason: Cortical cells in root are loosely packed and offer no resistance to water movement.

174. **Assertion:** Endodermis is impervious to water
Reason: Endodermis contain band of suberised matrix called casparian strip.

175. **Assertion:** when soft herbaceous stem cut near the base from sharp blade, early in the morning, drop of solution ooze out from cut stem.
Reason: Root pressure develops in herbaceous stem.

176. **Assertion:** Root pressure does not account for the majority of water transport in tall trees.
Reason: They need transpiration pull for ascent of water.

PREVIOUS YEAR QUESTIONS

1. Transport of food material in higher plants takes place through

[AIPMT MAINS 2010]

(a) Companion cells (b) Transfusion tissues
(c) Tracheids (d) Sieve elements

2. Which one of the following structures between two adjacent cells is an effective transport pathway?

[AIPMT PRE 2010]

(a) Plasmodesmata (b) Plastoquinones
(c) Endoplasmic reticulum (d) Plasmalemma

3. Function of companion cells is

[AIPMT MAINS 2011]

(a) Providing energy to sieve elements for active transport.
(b) Providing water to phloem.
(c) Loading of sucrose into sieve elements by passive transport.
(d) Loading of sucrose into sieve elements.

4. Guttation is the result of

[AIPMT MAINS 2011]

(a) Diffusion (b) Transpiration
(c) Osmosis (d) Root pressure

5. Which one of the following is correctly matched?

[AIPMT PRE 2012]

(a) Passive transport of nutrients – ATP
(b) Apoplast – Plasmodesmata
(c) Potassium – Readily immobilization
(d) Bakane of rice seedlings – Folke K. Skoog

6. Which of the following criteria does not pertain to facilitated transport?

[AIPMT 2013]

(a) Requirement of special membrane proteins
(b) High selectivity
(c) Transport saturation
(d) Uphill transport

7. The osmotic expansion of a cell kept in water is chiefly regulated by

[AIPMT 2014]

(a) Mitochondria (b) Vacuoles
(c) Plastids (d) Ribosomes

8. Transpiration and root pressure cause water to rise in plants by

[AIPMT 2015]

(a) Pulling it upward (b) Pulling and pushing it respectively
(c) Pushing it upward (d) Pushing and pulling it respectively

9. In a ring girdled plant:

[AIPMT 2015]

(a) The shoot dies first (b) The root dies first
(c) The shoot and root dies together (d) Neither root nor shoot will die

10. A column of water within xylem vessels of tall trees does not break under its weight because of:

[RE-AIPMT 2015]

(a) Tensile strength of water (b) Lignification of xylem vessels
(c) Positive root pressure (d) Dissolved sugars in water

11. Root pressure develops due to:

[RE-AIPMT 2015]

(a) Low osmotic potential in soil (b) Passive absorption
(c) Increase in transpiration (d) Active absorption

12. A protoplast is a cell:

[RE-AIPMT 2015]

(a) Without nucleus (b) Undergoing division
(c) Without cell wall (d) Without plasma membrane

13. Water vapour comes out from the plant leaf through the stomatal opening. Through the same stomatal opening carbon dioxide diffuses into the plant during photosynthesis. Reason out the above statements using one of following options: [NEET - I, 2016]

(a) Both processes cannot happen simultaneously
(b) Both processes can happen together because the diffusion coefficient of Water and CO_2 is different
(c) The above processes happen only during night time
(d) One process occurs during time and the other at night

14. A few drops of sap were collected by cutting across a plant stem by a suitable method. The sap was tested chemically. Which one of the following test results indicates that it was phloem sap? [NEET - II, 2016]
(a) Alkaline (b) Low refractive index
(c) Absence of sugar (d) Acidic

NCERT EXEMPLAR QUESTIONS

1. Which of the following statements does not apply to reverse osmosis?
(a) It is used for water purification.
(b) In this technique, the pressure greater than osmotic pressure is applied to the system.
(c) It is a passive process.
(d) It is an active process.

2. Which one of following will not directly affect transpiration?
(a) Temperature (b) Light
(c) Wind speed (d) Chlorophyll content of leaves

3. The lower surface of leaf will have more number of stomata in a
(a) Dorsiventral leaf (b) Isobilateral leaf
(c) Both (a) and (b) (d) None of the above

4. The form of sugar transport through phloem is
(a) Glucose (b) Fructose (c) Sucrose (d) Ribose

5. The process of guttation takes place
(a) When the root pressure is high and the rate of transpiration is low.
(b) When the root pressure is low and the rate of transpiration is low.
(c) When the root pressure equals the rate of transpiration.
(d) When the root pressure as well as rate of transpiration are high.

6. Which of the following is an example of imbibition?
(a) Uptake of water by root hair.
(b) Exchange of gases in stomata.
(c) Swelling of seed when put in soil.
(d) Opening of stomata.

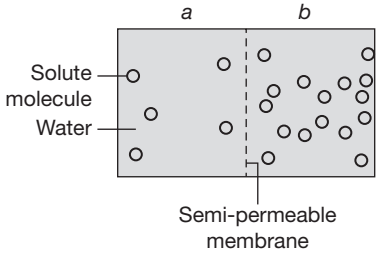
7. When a plant part undergoes senescence, the nutrients may be
(a) Exported (b) Withdrawn
(c) Translocated (d) None of the above

8. Water potential of pure water in standard temperature is equal to
(a) 10 (b) 20
(c) Zero (d) None of these

9. Choose the correct option: mycorrhiza is a symbiotic association of fungus with root system which helps in

(A) Absorption of water (B) Mineral nutrition
(C) Translocation (D) Gaseous exchange
(a) Only A (b) Only B
(c) Both A and B (d) Both B and C

10. Based on the figure given below which of the following statements is not correct?



(a) Movement of solvent molecules will take place from chamber a and b.
(b) Movement of solute will take place from a and b.
(c) Presence of semipermeable membrane is a prerequisite for this process to occur.
(d) The direction and rate of osmosis depends on both the pressure gradient and concentration gradient.

11. Match the following and choose the correct option

(a) Leaves	(i) Anti-transpirant
(b) Seed	(ii) Transpiration
(c) Roots	(iii) Negative osmotic potential
(d) Aspirin	(vi) Imbibition
(e) Plasmolysed cell	(v) Absorption

Options:
(a) (a)–(iii), (b)–(iv), (c)–(i), (d)–(ii), (e)–(v)
(b) (a)–(ii), (b)–(iv), (c)–(v), (d)–(i), (e)–(iii)
(c) (a)–(iii), (b)–(ii), (c)–(iv), (d)–(i), (e)–(v)
(d) (a)–(iii), (b)–(ii), (c)–(i), (d)–(iv), (e)–(v)

12. Mark the mismatched pair.
(a) Amyloplast – Store protein granule
(b) Elaioplast – Store oils or fats
(c) Chloroplasts – Contain chlorophyll pigments
(d) Chromoplasts – Store proteins

Answer Keys

Practice Questions

1. (d)	2. (d)	3. (a)	4. (d)	5. (d)	6. (a)	7. (d)	8. (a)	9. (b)	10. (d)
11. (a)	12. (a)	13. (d)	14. (c)	15. (b)	16. (a)	17. (d)	18. (a)	19. (b)	20. (c)
21. (c)	22. (d)	23. (c)	24. (c)	25. (c)	26. (a)	27. (d)	28. (d)	29. (d)	30. (d)
31. (d)	32. (c)	33. (b)	34. (d)	35. (a)	36. (c)	37. (c)	38. (a)	39. (a)	40. (c)
41. (b),	(a),	(d)	42. (c)	43. (b)	44. (c)	45. (d)	46. (c)	47. (c)	48. (a)	49. (b)
50. (a)	51. (d)	52. (a)	53. (c)	54. (b)	55. (d)	56. (a)	57. (c)	58. (a)	59. (a)
60. (a)	61. (a)	62. (a)	63. (a)	64. (a)	65. (d)	66. (a)	67. (b)	68. (a)	69. (d)
70. (c)	71. (d)	72. (c)	73. (d)	74. (d)	75. (d)	76. (c)	77. (d)	78. (d)	79. (d)
80. (d)	81. (a)	82. (c)	83. (b)	84. (d)	85. (c)	86. (b)	87. (d)	88. (c)	89. (d)
90. (b)	91. (a)	92. (c)	93. (d)	94. (d)	95. (d)	96. (d)	97. (a)	98. (a)	99. (a)
100. (d)	101. (a)	102. (a)	103. (b)	104. (b)	105. (b)	106. (c)	107. (b)	108. (c)	109. (d)
110. (a)	111. (b)	112. (d)	113. (b)	114. (a)	115. (d)	116. (d)	117. (c)	118. (b)	119. (c)
120. (a)	121. (d)	122. (b)	123. (c)	124. (b)	125. (b)	126. (c)	127. (a)	128. (b)	129. (a)
130. (b)	131. (a)	132. (d)	133. (c)	134. (a)	135. (a)	136. (c)	137. (c)	138. (b)	139. (d)
140. (c)	141. (d)	142. (c)	143. (c)	144. (d)	145. (d)	146. (d)	147. (c)	148. (d)	149. (b)
150. (d)									

Assertion and Reason Questions

151. (a)	152. (a)	153. (a)	154. (b)	155. (c)	156. (a)	157. (c)	158. (b)	159. (b)	160. (a)
161. (a)	162. (d)	163. (a)	164. (c)	165. (a)	166. (a)	167. (a)	168. (a)	169. (a)	170. (a)
171. (a)	172. (a)	173. (a)	174. (a)	175. (a)	176. (b)				

Previous Year Questions

1. (d)	2. (a)	3. (d)	4. (d)	5. (c)	6. (d)	7. (b)	8. (b)	9. (b)	10. (a)
11. (d)	12. (c)	13. (b)	14. (a)						

NCERT Exemplar Questions

1. (c)	2. (d)	3. (a)	4. (c)	5. (a)	6. (c)	7. (b)	8. (c)	9. (c)	10. (b)
11. (b)	12. (a)								

CHAPTER

12

Mineral Nutrition

PRACTICE QUESTIONS

Essential Mineral Elements

1. In 1860, _____ for the first time demonstrated the concept of hydroponics.
(a) Van Neil (b) Von Sachs (c) Arnon (d) Lundergarth

2. Hydroponics require
(a) Purified water (b) Impure water
(c) Mineral nutrient salt (d) Both (a) and (c)

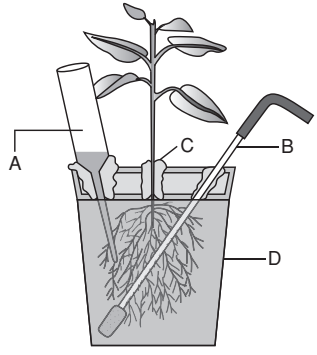
3. Hydroponic is a successfully employed technique for the commercial production of vegetables like
(a) Tomato (b) Seedless cucumber (c) Lettuce (d) All of these

4. Find the true/false statement from the following:
(a) Only 50 elements are found in different plants.
(b) In hydroponics, the nutrient solution must be adequately aerated to obtain optimum growth.
(c) Some plant species accumulate selenium.
(d) By hydroponics essential elements were identified and their deficiency symptoms were also discovered.

(a) FTTT (b) FFTT (c) FTFT (d) FFFT

5. Which one of the following is Arnon's criterion for the essentiality of element?
(a) In the absence of element, plants do not complete their life cycle or set the seeds.
(b) Deficiency of element cannot be met by supplying other element.
(c) The element must be directly involved in the metabolism of the plant.
(d) All the above

6. What indicates A to D in the given figure?



(a) A: Cotton, B: Aerating tube, C: Funnel for adding water and nutrients, D: Nutrient solution
(b) A: Funnel for adding water and nutrients, B: Aerating tube, C: Cotton, D: Nutrient solution
(c) A: Nutrient solution, B: Cotton, C: Funnel for adding water and solution, D: Aerating tube
(d) A: Cotton, B: Aerating tube, C: Nutrient solution, D: Funnel for adding water and nutrients

7. By some techniques _____ are able to detect the mineral at very low concentration.
(a) 10^{-12} gm/ml (b) 10^{-15} gm/ml (c) 10^{-10} gm/ml (d) 10^{-8} gm/ml

8. On which basis the nutrients are divided into macro and micro nutrients?
(a) Quantitative requirement (b) Qualitative requirement
(c) Both (a) and (b) (d) None of these

9. The following are macronutrients except
(a) N (b) P (c) S (d) Mn

10. The following are micronutrients except
(a) Zn (b) B (c) Mo (d) Ca

11. Select the total number of macronutrients from the following:
C, H, O, N, P, S, Cu, Zn, B, Cl, Mn, Ni, K, Ca, Mg, Mo
(a) 8 (b) 9 (c) 10 (d) 11

12. C, H, O is mainly obtained from
(a) Soil and H_2O (b) Soil only (c) H_2O and CO_2 (d) CO_2 only

13. What is the number of the absolutely essential elements for growth and metabolism of all plants?
(a) 14 (b) 17 (c) 21 (d) 23

14. Some beneficial elements required by higher plants are
(a) Na, Si, Co, Se (b) Na, Si, Os, I (c) Na, Co, Ir, At (d) Na, Si, W, Ag

15. The structural elements of cell are
(a) C, H, O, N (b) N, P, K, Ca (c) Ca, Mg, K (d) Ca, Mg, Fe, O

16. Select the correct match:

Column I		**Column II**
A. Mg^{2+}	–	1. Chlorophyll
B. P	–	2. ATP
C. Zn	–	3. Alcohol dehydrogenase
D. Mo	–	4. Nitrogenase

(a) A–2, B–1, C–3, D–4 (b) A–1, B–2, C–3, D–4
(c) A–4, B–1, C–2, D–3 (d) A–4, B–3, C–2, D–1

Metabolism of Nitrogen

17. Which element plays an important role in opening and closing of stomata?
(a) P (b) N (c) K (d) Ca

18. In how many broad categories can the essential elements be grouped on the basis of their diverse function?
(a) 1 (b) 2 (c) 3 (d) 4

19. Which essential nutrient in plant is required in greatest amount?
(a) N (b) P (c) K (d) Ca

20. Nitrogen is one of the major constituents of
(a) Protein (b) Nucleic acid
(c) Vitamins and hormones (d) All of these

21. Select the incorrect match:

Element		**Absorbable form**
(a) Nitrogen	–	NO_3^-, NO_2^-, NH_4^+,
(b) Sulphur	–	S^{2-}
(c) Iron	–	Fe^{3+}
(d) Boron	–	BO_3^{3-}, $B_4O_7^{2-}$

22. Which of the following is required for all phosphorylation reaction?
(a) N (b) Ca (c) P (d) K

23. Which of the following is the function of potassium?
(1) Cation–anion balance in cell
(2) Involved in protein synthesis
(3) Activation of enzyme
(4) Opening and closing of stomata
(5) Maintenance of turgidity of cell
(a) All except 1 (b) All except 1 and 2 (c) All except 3 (d) All of these

24. Which element is involved in the formation of mitotic spindle?
(a) N (b) P (c) Ca (d) K

25. The following functions are related to which element mainly?
(1) Activated enzyme of photosynthesis and respiration.
(2) Involved in synthesis of DNA and RNA.
(3) Helps to maintain the structure of ribosome.
(a) Ca (b) Mg (c) S (d) Fe

26. Which of the following group contains sulphur in all members?
(a) Thiamine, ferredoxin, aspartic acid (b) Biotin, coenzyme A, methionine
(c) Methionine, proline, leucine (d) DNA and RNA

27. Which of the following is true about iron?
(a) It is a constituent of ferredoxin and cytochrome.
(b) It activates catalase enzyme.
(c) It is essential for the formation of chlorophyll.
(d) All the above

28. Which element is related to the splitting of water in light reaction of photosynthesis?
(a) Mn (b) Mo (c) Fe (d) B

29. Match the column:

Column I		**Column II**
A. Zinc	–	1. Needed for the synthesis of Auxin
B. Copper	–	2. Essential for water splitting reaction
C. Boron	–	3. Pollen germination
D. Molybdenum	–	4. Component of nitrate reductase
E. Chlorine	–	5. Associated with enzyme involved in Redox reaction

(a) A–2, B–3, C–1, D–5, E–4 (b) A–1, B–2, C–3, D–4, E–5
(c) A–1, B–5, C–3, D–4, E–2 (d) A–5, B–4, C–3, D–2, E–1

30. Which element generally activates the carboxylase enzyme?
(a) Mo (b) Mn (c) Mg (d) Zn

31. The following functions are related to
(1) Uptake and the utilization of calcium
(2) Carbohydrate translocation
(3) Cell elongation and maturation
(4) Membrane functioning
(a) Ca (b) B (c) Mo (d) Zn

32. The element involved in splitting of water is
(a) Mn (b) Ca (c) Cl (d) All of these

33. Mn induced the deficiency of
(a) Fe (b) Mg (c) Ca (d) All of these

34. Which one of the following statement is incorrect?
(a) The first phase of mineral absorption is the rapid uptake of ions into free or outer space.
(b) In the second phase of uptake, the ions are slowly taken into inner space, the symplast of the cells.
(c) The movement of ion is usually called flux.
(d) The inward movement of ion outflux and outword movement of ion is called influx.

35. Ascent of mineral is mainly due to
(a) Xylem (b) Phloem (c) Pericycle (d) Cortex

36. The mineral available to plants is mainly obtained from
(a) Decay of other plants (b) Decay of other animals
(c) Weathering of rocks (d) None of these

37. The function of soil is to
(a) Supply mineral to plants (b) Harbour the nitrogen fixing bacteria
(c) Hold water and supply air to root (d) All of these

38. Fertilizer contains
(a) Micronutrient (b) Macronutrient (c) Both (a) and (b) (d) None of these

39. Nitrogen is limiting mineral for
(a) Natural ecosystem (b) Agro-ecosystem
(c) Both (a) and (b) (d) None of these

40. Conversion of N_2 to ammonia is known as
(a) Nitrogen fixation (b) Nitrification (c) Denitrification (d) Ammonification

41. Lightening and UV radiation can cause a reaction between nitrogen and oxygen and produces
(a) NO (b) NO_2 (c) N_2O (d) All of these

42. Decomposition of organic nitrogen of dead plants and animals into ammonia is called
(a) Nitrogen fixation (b) Nitrification
(c) Denitrification (d) Ammonification

43. What happens to ammonia formed by ammonification?
(a) Some gets volatilized
(b) Most of it gets converted into nitrate by soil bacteria
(c) Some will undergo biological nitrogen fixation
(d) Both (a) and (b)

44. $2NH_3 + 3O_2 \rightarrow 2NO_2^- + 2H^+ + 2H_2O$
The reaction can be caused by
(1) Nitrosomonas (2) Nitrococcus (3) Nitrobacter
(4) Pseudomonas (5) Thiobacillus
(a) 1 and 5 only (b) 1 and 2 only (c) 4 and 5 only (d) Only 3

45. $2NO_2^- + O_2 \rightarrow 2NO_3^-$
This process of nitrification is done by _____ bacteria.
(a) Pseudomonas (b) Thiobacillus (c) Nitrobacter (d) Nitrococcus

46. Nitrifying bacteria are
(a) Photoautotroph (b) Chemoautotroph (c) Heterotrophy (d) All of these

47. Nitrate present in the soil is also reduced to nitrogen by the process of denitrification it is carried out by
(a) Pseudomonas (b) Thiobacillus (c) Rhizobium (d) Both (a) and (b)

48. Reduction of nitrogen to ammonia by living organism is called
(a) Nitrification (b) Denitrification
(c) Biological nitrogen fixation (d) Ammonification

49. $N \equiv N \rightarrow NH_3$
This reaction is catalyzed by the enzyme
(a) Isomerase (b) Nitrogenase
(c) Carbonic anhydrase (d) Higase

50. Frankia produced nitrogen by fixing nodule on
(a) Lentils (b) Garden pea (c) Alnus (d) Broad bean

51. Which of the following statement is incorrect?
(a) Rhizobium and frankia are free living bacteria of soil.
(b) Rhizobium is rod shaped (Bacillus).
(c) Root nodule of pulse are pink due to the presence of leg-haemoglobin.
(d) Rhizobium and frankia can fix nitrogen as free living bacteria

52. Leg-haemoglobin means
(a) Low grade haemoglobin (b) Luminous haemoglobin
(c) Leguminous haemoglobin (d) Low level haemoglobin

53. The sequential stage for principal stages of nodule formation are
(1) Rhizobia multiply and colonies the surrounding roots.
(2) Rhizobia attached to epidermal and root hair cells.
(3) Root hair curl and bacteria invades root hair.
(4) Initiation of nodule formation in cortex.
(5) Infection thread is produced carrying bacteria to cortex.

(6) Bacteria released from thread into cells and causes their differentiation in specialized nitrogen fixing cells.
(7) Nodule formed is establish, a direct vascular connection with the host for exchange of nutrient.

(a) I → VII → II → VI → III → V → IV (b) II → III → IV → I → VII → V → VI
(c) VII → VI → IV → I → III → V → II (d) I → II → III → V → IV → VI → VII

54. Root nodule of leguminous plant contains
(a) Nitrogenase (b) Leg-haemoglobin (c) Both (a) and (b) (d) None of these

55. The enzyme nitrogenase is
(a) Mo-Fe protein (b) Mo-Mn protein (c) Mn-Fe protein (d) Cu-Fe protein

56. Which cells are divided for nodule formation?
(a) Inner cortex (b) Pericycle (c) Endodermis (d) Both (a) and (b)

57. For the production of 2 mol. NH_3 how much ATP is required in biological nitrogen fixation reaction (i. e., $N_2 \rightarrow 2NH_3$)?
(a) 4 (b) 8 (c) 16 (d) 32

58. Nitrogenase requires _____ condition for its activity.
(a) Aerobic (b) Anaerobic
(c) Ozonized environment (d) CO_2

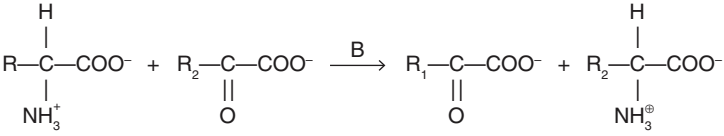
59. Which of the following is incorrect about nitrogen fixation in nodule?
(a) It is a high energy process.
(b) Leg-haemoglobin acts as oxygen scavenger.
(c) Mg is required as a cofactor for nitrogenase enzyme.
(d) This process uses atmospheric nitrogen but not atmospheric hydrogen directly.

60. Fats of NH_3 formed during biological nitrogen fixation is
(a) NH_3 protonated to form
(b) The NH_4^+ ion formed is used for reductive amination
(c) Glutamic acid is formed under reductive amination to undergo transamination.
(d) All of these

61. Which is the main amino acid that is used for transamination?
(a) Tyrosine (b) Proline (c) Glutamic acid (d) Alanine

62. (i) α-ketoglutaric acid + NH_4^+ + NADPH $\xrightarrow{A}$ glumate + H_2O + NADP

(ii)



What is A and B put on arrow?
(a) A–Glutamate dehydrogenase, B–Transaminase
(b) A–Transaminase, B–Glutamate dehydrogenase
(c) A–Nitrogenase, B–Transaminase
(d) A–Glumate aminase, B–Dehydrogenase

63. Select the incorrect statement from the following:
(a) The amides – asparagine and glutamine are found in plants as structural part of protein.
(b) Amides contain less nitrogen than amino acid.
(c) NH_2 radicle is transported to other parts via xylem.
(d) In soyabean, the fixed nitrogen is transported as ureides.

64. Ureides have
(a) High N/C ratio (b) Low N/C ratio (c) Any of these (d) None of these

65. Which of the following is incorrect about NH_4^+ ion?
(a) It is formed by the protonation of NH_3.
(b) Less toxic so it can be accumulated in plants.
(c) It is used to synthesize amino acid in plants.
(d) All the above

66. Select the order of true and false statements:
(a) Boron deficiency leads to stout axis.
(b) Every mineral element that is present in a cell is needed by the cell.
(c) Nitrogen as a nutrient element is highly immobile in the plants.
(d) It is very easy to establish the essentiality of micronutrients because they are required only in trace quantities.
(a) FFFT (b) FFTT (c) TTFF (d) TTTF

67. What is critical concentration?
(a) Concentration of essential element which causes flowering in plants.
(b) Concentration of essential element which is easily absorbed by plants.
(c) Concentration of essential element below which the plant growth is retarded.
(d) All the above

68. Select the order of true and false statements:
(1) Morphological changes which are indicative of certain element deficiencies are known as deficiency symptoms.
(2) For actively mobilized element, the deficiency symptoms first appear in older tissues.
(3) When element is relatively immobile, the deficiency symptom first appear in younger tissue.
(4) Mineral nutrition study of plant have great significance to agriculture and horticulture.
(a) FFFT (b) FFTT (c) TTFF (d) TTTT

69. Deficiency symptom of N, K and Mg appears in
(a) Young leaf (b) Meristematic tissue
(c) Young stem (d) Senescent leaves

70. Which elements are relatively immobilized?
(a) N and P (b) K and Mg (c) S and Ca (d) N and Mg

71. Deficiency symptom of plants includes
(a) Chlorosis and necrosis
(b) Stunted plant growth and inhibition of cell division
(c) Premature fall of leaves and buds
(d) All of these

72. Chlorosis is caused due to the deficiency of
(a) N, K, Mg (b) S, Fe, Mn (c) Zn and Me (d) All of these

73. Necrosis particularly leaf tissue is caused by
(a) Ca and Mg (b) Cu (c) K (d) All of these

74. Low level of N, K, S, Mo is caused by
(a) Chlorosis (b) Inhibition of cell division
(c) Both (a) and (b) (d) None of these

75. Delay in flowering occurs due to the deficiency of
(a) N (b) S (c) Mo (d) All of these

76. The technique of growing plants without soil in nutrient solutions is called
(a) Parthenogenesis (b) Hydroponics (c) Aquaculture (d) Tissue culture

77. Which of the following element is not essential for plants?
(a) Iron (b) Zinc (c) Potassium (d) Iodine

78. Inorganic nutrients are present in soil in the form of
(a) Molecules (b) Atoms
(c) Electrically charged ions (d) Parasite

79. Tracer elements are
(a) Microelements (b) Macroelements
(c) Radioisotopes (d) Vitamins

80. The death of stem and root tips occur due to the deficiency of
(a) Phosphorus (b) Calcium
(c) Nitrogen (d) Carbon

81. The plants requiring two metallic compounds (minerals) for chlorophyll synthesis are
(a) Fe and Ca (b) Fe and Mg
(c) Cu and Ca (d) Ca and K

82. Calcium can affect the
(a) Permeability of plasma membrane
(b) Hydration of colloids
(c) Translocation of carbohydrates and amino acids
(d) Development of root

83. Which of the following is not absorbed through soil?
(a) Carbon (b) Nitrogen (c) Potassium (d) All of these

84. Which of the following is considered to be the elements between macronutrients and micronutrients?
(a) Iron (b) Nitrogen
(c) Phosphorus (d) Manganese

85. The major role of phosphorus in plant metabolism is
(a) To generate metabolic energy
(b) To evolve oxygen during photosynthesis
(c) To evolve carbon dioxide during respiration
(d) To create anaerobic conditions

86. Phosphorus is a structural element in
(a) Fat (b) Starch (c) Nucleotide (d) Carbohydrate

87. The most abundent element present in the plants is
(a) Manganese (b) Iron (c) Carbon (d) Nitrogen

88. Photosynthetic photolysis of water takes place in the presence of
(a) Mn (b) Cl
(c) Both (a) and (b) (d) None of these

89. Copper is the component of
(a) Cytochrome oxidase (b) Plastocyanin
(c) Both (a) and (b) (d) None of these

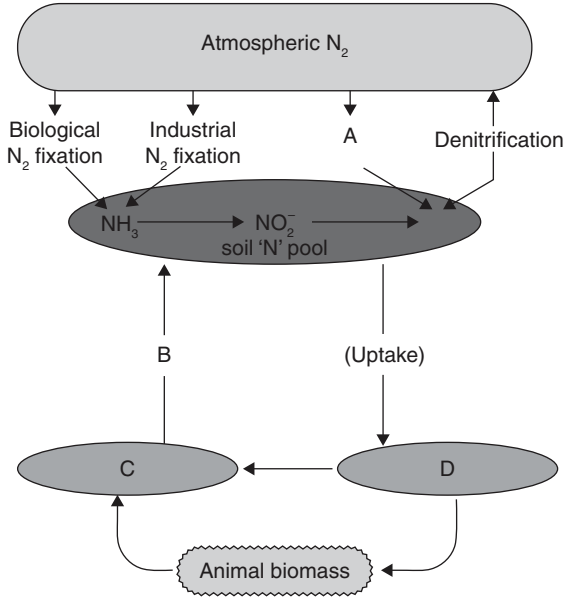
90. Which of the following element is a component of ferredoxin?
(a) Cu (b) Mn (c) Zn (d) Fe

91. Function of zinc is
(a) Synthesis of chlorophyll (b) Biosynthesis of IAA
(c) Closing of stomata (d) Oxidation of carbohydrate

92. The process by which minerals are absorbed is
(a) Active absorption (b) Passive absorption
(c) Both (a) and (b) (d) None of these

93. The active uptake of minerals by roots mainly depends on the
(a) Availability of oxygen (b) Light
(c) Temperature (d) Availability of carbon dioxide

94. Identify A to D in the given figure.



(a) A–Decaying biomass, B–Electrical N_2 fixation, C–Plant biomass, D–Ammonification
(b) A–Plant biomass, B–Decaying biomass, C–Ammonification, D–Electrical N_2 fixation
(c) A–Electrical N_2 fixation, B–Ammonification, C–Decaying biomass, D–Plant biomass
(d) A–Ammonification, B–Plant biomass, C–Electrical N_2 fixation, D–Decaying biomass

95. Nitrogen is a component of
(a) Protein (b) Chlorophyll
(c) Nucleic acid (d) All of these

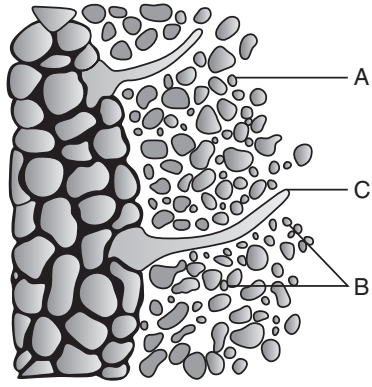
96. Which one of the following can fix atmospheric nitrogen directly?
(a) Pea (b) Brassica
(c) Castor (d) Petunia

97. Knot like bodies known as 'nodules' are found in the roots of groundnut plant it is produced by
(a) Azospirillum (b) Azotobacter
(c) Pseudomonas (d) Rhizobium

98. Nitrogen fixation means
(a) N_2 changes in NO_3^- (b) N_2 changes in NH_3
(c) N_2 change into nitrates (d) None of these

99. Nif genes occur in
(a) Rhizobium (b) Aspergillus
(c) Penicillium (d) Streptococcus

100. Identify A to C in the given figure.



(a) A–Bacteria, B–Root hair, C–Soil particles
(b) A–Root hair, B–Bacteria, C–Soil particles
(c) A–Root hair, B–Soil particles, C–Bacteria
(d) A–Soil particles, B–Bacteria, C–Root hair

101. Which of the following pigments is essential for the nitrogen fixation by leguminous plants?
(a) Anthocyanin (b) Phycocyanin
(c) Phycoerythrin (d) Leghaemoglobin

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

102. **Assertion:** Biological nitrogen fixation is a very high energy input process.
Reason: One molecule of ammonia formation requires 8 ATP during biological nitrogen fixation.

103. **Assertion:** Leguminous plants are nitrogen fixers.
Reason: Leguminous plants have rhizobium in their root nodules.

104. **Assertion:** The use of fertilizers greatly enhances the crop productivity.
Reason: Irrigation is very important in increasing crop productivity.

105. **Assertion:** Hydroponics is used for solution culture.
Reason: A balanced nutrient solution contains both essential and non-essential elements.

106. **Assertion:** Nitrogen is very essential for sustenance of life.
Reason: Plants cannot use atmospheric nitrogen directly.

107. **Assertion:** The movement of ion is usually called flux.
Reason: The concentration of essential elements below which the plant growth is retarded is termed as critical concentration.

108. **Assertion:** Iron takes part in the electron transport system of mitochondria.
Reason: Iron has no role in chlorophyll synthesis.

109. **Assertion:** Decomposition of organic nitrogen of dead plants and animals into ammonia is called ammonification.
Reason: Nitrate present in the soil is also reduced to nitrogen by the process of denitrification.

110. **Assertion:** Rhizobium fixes nitrogen in the symbiotic association with root nodules of leguminous plants only.
Reason: Biological nitrogen fixation is anaerobic process.

111. **Assertion:** Nitrogen fixing bacteria in legume root nodules survive in oxygen depleted cells of nodules.
Reason: Leghaemoglobin completely removes oxygen from the nodule cells.

112. **Assertion:** Deficiency of sulphur causes chlorosis in plants.
Reason: Sulphur is a constituent of chlorophyll, proteins and nucleic acids.

113. **Assertion:** S and Ca are immobile.
Reason: S and Ca are part of the structural component of cell and hence it is not easily released.

114. **Assertion:** Boron is required for the uptake and utilization of calcium ion.
Reason: Boron is not required for carbohydrate translocation.

115. **Assertion:** Iron is essential for the formation of chlorophyll.
Reason: It activates the catalase enzyme.

116. **Assertion:** Calcium is a constituent of middle lamella.
Reason: Calcium is required in mitotic division.

117. **Assertion:** Sulphur is present in two amino acids such as cysteine and methionine.
Reason: Vitamin (thiamine, biotin, coenzyme-A) and ferredoxin also contains sulphur.

118. **Assertion:** Deficiency of nitrogen is visible first in young leaves.
Reason: Nitrogen is relatively immobile.

119. **Assertion:** Nutritional adaptation is found in insectivorous plants.
Reason: They grow in N_2 deficient soil so to obtain nitrogen they eat and digest insect.

120. **Assertion:** Hydroponics is useful technique.
Reason: Hydroponics is use for identification of essential element and their deficiency symptoms.

121. **Assertion:** K^+ is useful for transpiration process.
Reason: K^+ ion help in opening and closing of stomata.

122. **Assertion:** Water splitting reaction in photosynthesis is essential for oxygen evolution.
Reason: $Mn2^+$, Cl^-, Ca^{2+} ions required for photolysis of water during photosynthesis.

123. **Assertion:** Sulphur is important constituent of amino acid eg. thiamine, biotin and coenzyme A.
Reason: Sulphur is use to form vitamin eg. cysteine and methionine

124. **Assertion:** Manganese toxicity leads to deficiency of iron and magnesium.
Reason: Manganese competes with iron and magnesium for uptake.

125. **Assertion:** Nitrogen is limiting nutrient for both natural and agricultural ecosystems.
Reason: Plant competes with microbes for limited nitrogen available in soil.

126. **Assertion:** Absorption of mineral is inhibited by anaerobic environment.
Reason: Absorption of mineral is mainly active absorption require oxygenic respiration for more energy.

127. **Assertion:** Calcium is essential for meristmetic cells
Reason: It involve in formation of spindle apparatus.

128. **Assertion:** Some prokaryotes can fix atmospheric nitrogen
Reason: Nitrogenase is exclusively present in some prokaryotes

129. **Assertion:** Rhizobium lives as aerobes under free living condition.
Reason: Nitrogenase is operational under aerobic condition.

PREVIOUS YEAR QUESTIONS

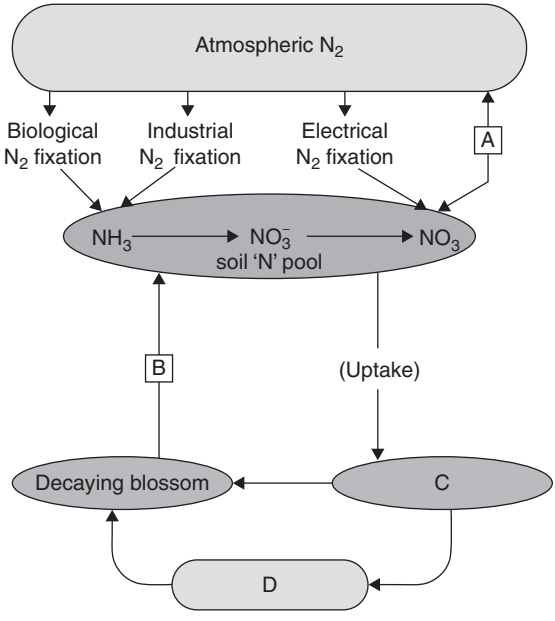
1. Leguminous plants are able to fix atmospheric nitrogen through the process of symbiotic nitrogen fixation. Which one of the following statements is not correct during this process of nitrogen fixation?

[AIPMT MAINS 2010]

(a) Leghaemoglobin scavenges oxygen and it is pinkish in colour.
(b) Nodules act as sites for nitrogen fixation.
(c) The enzyme nitrogen catalyses the conversion of atmospheric N_2 to NH_3.
(d) Nitrogenase is insensitive to oxygen.

2. Study the cycle shown below and select the option which gives the correct word for all the four blanks A, B, C and D.

[AIPMT MAINS 2010]



(a) A: Nitrification, B: Ammonification, C: Animals, D: Plants
(b) A: Denitrification, B: Ammonification, C: Plants, D: Animals
(c) A: Nitrification, B: Denitrification, C: Animals, D: Plants
(d) A: Denitrification, B: Nitrification, C: Plants, D: Animals

3. The genetically-modified (GM) brinjal in India has been developed for

[AIPMT PRE 2010]

(a) Insect-resistance
(b) Enhancing Shelf life
(c) Enhancing mineral content
(d) Drought-resistance

4. An element playing important role in nitrogen fixation is

[AIPMT PRE 2010]

(a) Molybdenum (b) Copper
(c) Manganese (d) Zinc

5. Which one of the following is not a micronutrient?

[AIPMT PRE 2010]

(a) Molybdenum (b) Magnesium
(c) Zinc (d) Boron

6. The free-living, anaerobic nitrogen-fixer is

[AIPMT PRE 2010]

(a) Beijerinckia (b) Rhodospirillum
(c) Rhizobium (d) Azotobacter

7. The common nitrogen-fixer in paddy fields is

[AIPMT PRE 2010]

(a) Rhizobium (b) Azospirillum
(c) Oscillatoria (d) Frankia

8. Which one of the following is not an essential mineral element for plants while the remaining three are?

[AIPMT MAINS 2011]

(a) Iron (b) Manganese
(c) Cadmium (d) Phosphorus

9. The function of leghaemoglobin in the root nodules of legumes is

[AIPMT PRE 2011]

(a) Oxygen removal (b) Nodule differentiation
(c) Expression of nif gene (d) Inhibition of nitrogenase activity

10. Nitrifying bacteria

[AIPMT PRE 2011]

(a) Convert free nitrogen to nitrogen compounds
(b) Convert proteins into ammonia
(c) Reduce nitrates to free nitrogen
(d) Oxidize ammonia to nitrates

11. Which one of the following elements in plants is not remobilized?

[AIPMT PRE 2011]

(a) Calcium (b) Potassium
(c) Sulphur (d) Phosphorus

12. An organism used as a biofertilizer for raising soyabean crop is

[AIPMT PRE 2011]

(a) Azospirillum (b) Rhizobium
(c) Nostoc (d) Azotobacter

13. For its action, nitrogenase requires

[AIPMT MAINS 2012]

(a) Light (b) Mn^{2+}
(c) Super oxygen radicals (d) High input of energy

14. For its activity, carboxypeptidases requires

[AIPMT MAINS 2012]

(a) Iron (b) Niacin
(c) Copper (d) Zinc

15. Read the following four statements (A to D):
(A) Both, photophosphorylation and oxidative phosphorylation involves the uphill transport of protons across the membrane.
(B) In dicot stems, a new cambium originates from the cells of pericycle at the time of secondary growth.
(C) Stamens in flowers of Gloriosa and Petunia are polyandrous.
(D) Symbiotic nitrogen-fixers occur in free-living state also in soil.

[AIPMT MAINS 2012]

How many of the above statements are right?
(a) Three (b) Four (c) One (d) Two

16. The best defined function of Manganese in green plants is

[AIPMT PRE 2012]

(a) Photolysis of water (b) Calvin cycle
(c) Nitrogen fixation (d) Water absorption

17. Which one of the following is a wrong statement?

[AIPMT PRE 2012]

(a) Anabaena and Nostoc are capable of fixing nitrogen in free-living state also.
(b) Root nodule forming nitrogen fixers live as aerobes under free-living conditions.
(c) Phosphorus is a constituent of cell membranes, certain nucleic acids and all proteins.
(d) Nitrosomonas and Nitrobacter are chemoautotrophs.

18. The most abundant intracellular cation is

[AIPMT PRE 2012]

(a) Na^+ (b) Ca^+ (c) H^+ (d) K^+

19. The first stable product of fixation of atmospheric nitrogen in leguminous plants is

[AIPMT PRE 2012]

(a) NO_2^- (b) Ammonia
(c) NO_3^- (d) Glutamate

20. Deficiency symptoms of nitrogen and potassium are visible first in

[AIPMT 2014]

(a) Senescent leaves (b) Young leaves
(c) Roots (d) Buds

21. A few normal seedlings of tomato were kept in a dark room. After a few days they were found to have become white coloured like albinos. Which of the following terms will you use to describe them?

[AIPMT 2014]

(a) Mutated (b) Embolised
(c) Etiolated (d) Defoliated

22. Mineral known to be required in large amounts for plant growth include:

[AIPMT 2015]

(a) Phosphorus, potassium, sulphur, calcium
(b) Calcium, magnesium, manganese, copper

(c) Potassium, phosphorus, selenium, boron
(d) Magnesium, sulphur, iron, zinc

23. Which one gives the most valid and recent explanation for stomatal movements? [AIPMT 2015]
(a) Transpiration
(b) Potassium influx and efflux
(c) Starch hydrolysis
(d) Guard cell photosynthesis

24. The oxygen evolved during photosynthesis comes from water molecules. Which one of the following pairs of elements is involved in this reaction? [RE-AIPMT 2015]
(a) Manganese and Potassium
(b) Magnesium and Molybdenum
(c) Magnesium and Chlorine
(d) Manganese and Chlorine

25. During biological nitrogen fixation, inactivation of nitrogenase by oxygen poisoning is prevented by: [RE-AIPMT 2015]
(a) Xanthophyll
(b) Carotene
(c) Cytochrome
(d) Laghaemoglobin

26. In which of the following all three are macronutrients? [NEET - I, 2016]
(a) Boron, zinc, manganese
(b) Iron, copper, molybdenum
(c) Molybdenum, magnesium, manganese
(d) Nitrogen, nickel, phosphorus

27. Which is essential for the growth of root tip? [NEET - II, 2016]
(a) Fe
(b) Ca
(c) Mn
(d) Zn

NCERT EXEMPLAR QUESTIONS

1. Which one of the following roles is not the characteristic of an essential element?
(a) Being a component of biomolecules.
(b) Changing the chemistry of soil.
(c) Being a structural component of energy related chemical compounds.
(d) Activation or inhibition of enzymes.

2. Which one of the following statements can best explain the term critical concentration of an essential element?
(a) Essential element concentration below which the plant growth is retarded.
(b) Essential element concentration below which the plant growth becomes stunted.
(c) Essential element concentration below which the plant remains in the vegetative phase.
(d) None of these

3. Deficiency symptoms of an element tend to appear first in young leaves. It indicates that the element is relatively immobile. Which one of the following elemental deficiency would show such symptoms?
(a) Sulphur
(b) Magnesium
(c) Nitrogen
(d) Potassium

4. Which one of the following symptoms is not due to manganese toxicity in plants?
(a) Calcium translocation in shoot apex is inhibited
(b) Deficiency in both Iron and Nitrogen is induced
(c) Appearance of brown spot surrounded by chlorotic veins.
(d) None of these

5. Reaction carried out by N_2 metabolising microbes include

(A) $2NH_3 + 3O_2 \longrightarrow 2NO_2^- + 2H^+ + 2H_2O$ (i)

(B) $2NO_2 + O_2 \longrightarrow 2NO_3^-$ (ii)

Which of the following statements about these equations is not true?
(a) Step (i) is carried out by Nitrosomonas or Nitrococcus
(b) Step (ii) is carried out by Nitrobacter
(c) Both steps (i) and (ii) can be called nitrification
(d) bacteria carrying out these steps are usually photoautotrophs.

6. With regard to the Biological Nitrogen Fixation by Rhizobium in association with soyabean, which one of the following statement/statements does not hold true
(a) Nitrogenase may require oxygen for its functioning
(b) Nitrogenase is Mo–Fe protein
(c) Leghaemoglobin is a pink coloured pigment
(d) Nitrogenase helps to convert N_2 gas into two molecules to ammonia.

7. Match the element with its associated functions/roles and choose the correct among given below.

(A) Boron	(i) Splitting of H_2O to liberate O_2 during photosynthesis
(B) Manganese	(ii) Needed for synthesis of auxins
(C) Molybdenum	(iii) Component of nitrogenase
(D) Zinc	(iv) Pollen germination
(E) Iron	(v) Component of ferredoxin

Options:
(a) (A)–(i), (B)–(ii), (C)–(iii), (D)–(iv), (E)–(v)
(b) (A)–(iv), (B)–(i), (C)–(iii), (D)–(ii), (E)–(v)
(c) (A)–(iii), (B)–(ii), (C)–(iv), (D)–(v), (E)–(i)
(d) (A)–(ii), (B)–(iii), (C)–(v), (D)–(i), (E)–(iv)

8. Plants can be grown in (Tick the incorrect option)
(a) Soil with essential nutrients
(b) Water with essential nutrients
(c) Either water or soil with essential nutrients
(d) Water or soil without essential nutrients

Answer Keys

Practice Questions

1. (b)	2. (d)	3. (d)	4. (a)	5. (d)	6. (b)	7. (d)	8. (a)	9. (d)	10. (d)
11. (b)	12. (c)	13. (b)	14. (a)	15. (a)	16. (b)	17. (c)	18. (d)	19. (a)	20. (d)
21. (b)	22. (c)	23. (d)	24. (c)	25. (b)	26. (b)	27. (d)	28. (a)	29. (c)	30. (d)
31. (b)	32. (d)	33. (d)	34. (d)	35. (a)	36. (c)	37. (d)	38. (c)	39. (c)	40. (a)
41. (d)	42. (d)	43. (d)	44. (b)	45. (c)	46. (b)	47. (d)	48. (c)	49. (b)	50. (c)
51. (d)	52. (c)	53. (d)	54. (c)	55. (a)	56. (d)	57. (c)	58. (b)	59. (c)	60. (d)
61. (c)	62. (a)	63. (b)	64. (a)	65. (b)	66. (a)	67. (c)	68. (d)	69. (d)	70. (c)
71. (d)	72. (d)	73. (d)	74. (c)	75. (d)	76. (b)	77. (d)	78. (c)	79. (c)	80. (b)
81. (b)	82. (a)	83. (a)	84. (a)	85. (a)	86. (c)	87. (c)	88. (c)	89. (c)	90. (d)
91. (b)	92. (c)	93. (a)	94. (c)	95. (d)	96. (a)	97. (d)	98. (b)	99. (a)	100. (d)
101. (d)									

Assertion and Reason Questions

102. (a)	103. (a)	104. (b)	105. (c)	106. (b)	107. (b)	108. (c)	109. (b)	110.(a)	111. (d)
112. (c)	113. (a)	114. (a)	115. (b)	116. (b)	117. (b)	118. (d)	119. (a)	120. (a)	121. (a)
122. (b)	123. (d)	124. (b)	125. (a)	126. (a)	127. (a)	128. (a)	129. (c)		

Previous Year Questions

1. (d)	2. (b)	3. (a)	4. (a)	5. (b)	6. (b)	7. (c)	8. (a)	9. (a)	10. (d)
11. (a)	12. (b)	13. (d)	14. (d)	15. (d)	16. (a)	17. (c)	18. (d)	19. (b)	20. (a)
21. (c)	22. (a)	23. (b)	24. (d)	25. (d)	26. (b)	27. (b)			

NCERT Exemplar Questions

1. (b)	2. (a)	3. (a)	4. (b)	5. (d)	6. (a)	7. (b)	8. (d)

CHAPTER

13

Photosynthesis in Higher Plants

PRACTICE QUESTIONS

Photosynthesis

1. Photosynthesis is a
(a) Physical process (b) Chemical process
(c) Physico–chemical process (d) Physiological process

2. All living forms on earth depend on _____ for energy.
(a) Sun (b) Hydrothermal vent (c) Volcanic eruption (d) Moon

3. During photosynthesis, light energy is used to synthesize
(a) Inorganic compound (b) Organic compound
(c) Both (a) and (b) (d) None of these

4. Photosynthesis is important because
(a) It is the primary source of all food on earth
(b) It is responsible for the release of O_2
(c) Both (a) and (b)
(d) None of these

5. Select the incorrect statement from the following:
(a) All animals including human depend on plant for their food.
(b) The use of energy from sunlight by plants doing photosynthesis is the basis of life on earth.
(c) Green plants carry out photosynthesis.
(d) None of the above

6. Which of the following is required for photosynthesis?
(a) CO_2 (b) Chlorophyll (c) Light (d) All of these

7. An experiment using two leaves, a variegated leaf or a leaf that was covered with black paper and one that was exposed to light on testing these leaves for starch shows that photosynthesis occurs only in _____ part of leaf in the_____ of sunlight
(a) non-green, presence (b) green, presence
(c) non-green, absence (d) green, absence

8. Half leaf experiment proved that _____ is required for photosynthesis.
(a) Carbon dioxide (b) Chlorophyll (c) Light (d) Oxygen

9. Which of the following substance is used in half leaf experiment to absorb CO_2?
(a) HCl (b) KOH (c) HNO_3 (d) H_2SO_4

10. _____ in 1770 performed a series of experiments that revealed the essential role of air in growth of green plants.
(a) Jan Ingenhousz (b) Joseph Priestley
(c) Von Sachs (d) Cornelius Van Niel

11. Bell Jar experiment was performed by
(a) Jan Ingenhousz (b) Joseph Priestley
(c) Von Sachs (d) Cornelius Van Niel

12.

Priestley's experiment

Which of the following does Priestly conclude on the basis of above experiment?
(a) Burning candle or animal that breathes air, somehow, damages the air.
(b) Plants restore to the air, whatever breathing animal and burning candles remove.
(c) Both (a) and (b)
(d) Light is essential for it.

13. Find the method used to light the candle in bell jar experiment without disturbing the setup.
(a) Removing bell jar slowly and light the candle
(b) Creating a hole in bell jar
(c) Using hand lens
(d) Through a sudden replacement by another enlightened candle

14. Who proved that light is essential for plant process that purifies foul air by placing priestly and setup once in light and once in dark?
(a) Jan Ingenhousz (b) Joseph Priestley
(c) Von Sachs (d) Cornelius Van Niel

15. ___A___ performed an elegant experiment with an ___B___ plant to show that in bright sunlight, small bubble, were formed around the ___C___ parts, while in dark they do not die.

	A	**B**	**C**
(a)	Ingenhousz	Aquatic	Green
(b)	Ingenhousz	Terrestrial	Green
(c)	Priestly	Aquatic	Green
(d)	Priestly	Aquatic	Non-green

16. Which of the following proved that green part could release O_2 by his experiment on an acquatic plant?
(a) Jan Ingenhousz (b) Joseph Priestley
(c) Von Sachs (d) Cornelius Van Niel

17. The stored form of glucose in plant is
(a) Inulin (b) Sucrose (c) Starch (d) Glycogen

18. Who provided the evidence for the production of glucose when plants grow?
(a) Jan Ingenhousz (b) Joseph Priestley
(c) Von Sachs (d) Cornelius Van Niel

19. Von Sachs studies shows that
(a) Green substance in plants is located in special bodies within the plant cell.
(b) Glucose is made in green part of plant.
(c) Glucose is usually stored as starch.
(d) All the above

20. The first action spectrum of photosynthesis is described often as an experiment of
(a) Jan Ingenhousz (b) Joseph Priestley
(c) Von Sachs (d) Engelmann

21. Which of the following is incorrect about the experiment performed by T. W. Engelmann?
(a) Cladophora (a green algae) is used.
(b) Suspension of aerobic bacteria is used.
(c) Bacteria accumulated mainly in the region of orange and green part of the light spectrum.
(d) Prism was used to split light into its spectral component.

22. A first action spectrum of photosynthesis was described on the basis of experiment performed by T. W. Engelmann on _____ algae.
(a) Green (b) Red (c) Brown (d) All of these

23. Which of the following pigments resemble the action spectrum produced on the basis of Engelmann experiment?
A. Chlorophyll a B. Chlorophyll b C. Xanthophyll D. Carotenoids
(a) A and C only (b) A and B only (c) Only A (d) C and D only

24. Who demostrated that photosynthesis is essentially a light-dependent reaction in which hydrogen from a suitable oxidizable compound reduces CO_2 to carbohydrates?
(a) Engelmann (b) Von Sachs (c) C. B. Van Niel (d) Jan Ingenhousz

25. Van Neil performed the experiment O_2 on
(a) Purple and Green bacteria (b) Green algae
(c) Green plants (d) Fungus

26. Van Neil was a
(a) Physicist (b) Microbiologist (c) Biochemist (d) Chemist

27. Which of the following reaction expresses Van Niel reaction for photosynthesis?

(a) $CO_2 + H_2O \xrightarrow{\text{Light}} [CH_2O] + O_2$

(b) $2H_2A + CO_2 \xrightarrow{\text{Light}} 2A + CH_2O + H_2O$

(c) $6CO_2 + 12H_2O \xrightarrow{\text{Light}} C_6H_{12}O_6 + 6H_2O + 6O_2$

(d) $6CO_2 + 6H_2O \xrightarrow{\text{Light}} C_6H_{12}O_6 + 6O_2$

28. What are the probable oxidation production of H_2S in purple and green sulphur bacteria?
(a) Sulphur (b) Sulphate (c) Both (a) and (b) (d) None of these

29. The correct equation of photosynthesis is

(a) $CO_2 + H_2O \xrightarrow{\text{Light}} [CH_2O] + O_2$

(b) $2H_2A + CO_2 \xrightarrow{\text{Light}} 2A + CH_2O + H_2O$

(c) $6CO_2 + 12H_2O \xrightarrow{\text{Light}} C_6H_{12}O_6 + 6H_2O + 6O_2$

(d) $6CO_2 + 6H_2O \xrightarrow{\text{Light}} C_6H_{12}O_6 + 6O_2$

30. By using a _____ isotope it can be proved that O_2 is released from water during photosynthesis

(a) Radioactive (b) Heavy (c) Both (a) and (b) (d) None of these

31. Photosynthesis is a

(a) Single-step process (b) Two-step process
(c) Three-step process (d) Multi-step process

32. Photosynthesis occurs in

(a) Green leaf (b) Green stem (c) Guard cells (d) All of these

33. Within chloroplast, the membranous system is made up of

(a) Grana (b) Stroma lamellae
(c) Stroma (d) Both (a) and (b)

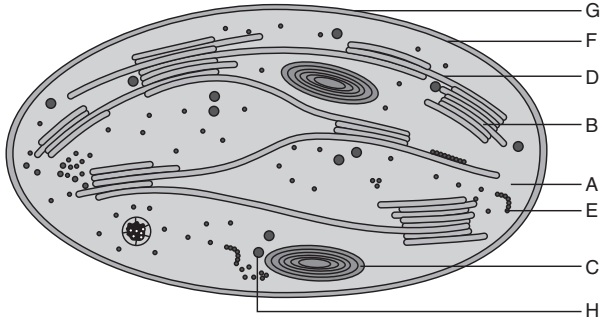
34. Calvin cycle is termed as dark reaction because it

(a) Is not dependent on light for CO_2 fixation in stroma
(b) Occurs in dark
(c) Is by convention only
(d) Requires light

35. Where does light reaction occur in chloroplast?

(a) Membrane system (grana) (b) Stroma
(c) Both (a) and (b) (d) None of these

36. Identify A to H in the given figure.



(a) A–Stroma, B–Grana, C–Starch granule, D–Stromal lamella, E–Ribosomes, F–Inner membrane, G–Outer membrane, H–Lipid droplet

(b) A–Lipid droplet, B–Stroma, C–Ribosomes, D–Outer membrane, E–Grana, F–Stromal lamella, G–Starch granule, H–Inner membrane

(c) A–Starch granule, B–Ribosomes, C–Outer membrane, D–Lipid droplet, E–Grana, F–Stroma, G–Stromal lamella, H–Inner membrane
(d) A–Inner membrane, B–Outer membrane, C–Stroma, D–Stromal lamella, E–Ribosomes, F–Grana, G–Lipid droplet, H–Starch granule

37. Which of the following is correct about light reaction?
(a) Light is required (b) ATP is produced during reaction
(c) NADPH is produced during reaction (d) All of these

38. Find out the incorrect statement from the following:
(a) Dark reaction depends on the product formed by light reaction.
(b) In stroma, enzymatic reactions incorporates CO_2 into the plant leading to the synthesis of sugar.
(c) Purple and green sulphur bacteria use H_2S as hydrogen donor.
(d) There is no division of labour in chloroplast.

39. Match the column:

	Pigment			**Colour (in chromatogram)**
A.	Chlorophyll a	–	i)	Bright or blue green
B.	Chlorophyll b	–	ii)	Yellow
C.	Xanthophylls	–	iii)	Yellow to Green
D.	Carotenoids	–	iv)	Yellow to yellow–orange

(a) A–i, B–ii, C–iii, D–iv (b) A–i, B–iii, C–ii, D–iv
(c) A–ii, B–i, C–iii, D–iv (d) A–iii, B–ii, C–i, D–iv

40. The chief pigment associated with photosynthesis is
(a) Chlorophyll b (b) Chlorophyll a (c) Xanthophyll (d) Carotenoid

41. Which light is absorbed more by Chlorophyll 'a'?
(a) Yellow and green (b) Red and blue
(c) Yellow and orange (d) Yellow and red

42. Which light shows higher rate of photosynthesis?
(a) Yellow and green (b) Red and blue
(c) Yellow and orange (d) Yellow and red

43. Light reaction and photochemical phase includes
(a) Light absorption
(b) Water splitting and release of oxygen
(c) ATP and NADPH formation
(d) All of these

44. Which of the following is incorrect about photosystem?
(a) There are two photosystem (PS I and PS II).
(b) PS I and PS II are named in sequence of their discovery.
(c) LHC is made up of hundred of pigment molecules which are bounded proteins.
(d) Each photosystem has all the pigments (Except one molecule of chlorophyll 'b').

45. Select the correct sequence of electron transfer in Z-scheme of light reaction:
(a) e^- Acceptor → ETS (made of cytochrome) → PSII → $NADP^+$ → PSI → e^- Acceptor
(b) PSII → e^- Acceptor → ETS (made of cytochrome) → PSI → e^- Acceptor → $NADP^+$
(c) ETS (made of cytochrome) → PSI → e^- Acceptor → PSII → e^- Acceptor → $NADP^+$
(d) e^- Acceptor → PSI → PSII → e^- Acceptor → ETS (made of cytochrome) → $NADP^+$

46. In Z-scheme, Z-shape is formed when
(a) Carriers are placed uphill
(b) Carriers are placed downhill
(c) Carriers are placed in sequence on a redox potential scale
(d) None of the above

47. Where water splitting complex associated with PS II is situated?
(a) Inner side of chloroplast outer membrane
(b) Inner side of thylakoid membrane
(c) Outer side of thylakoid membrane
(d) Inner side of chloroplast outer membrane

48. Where are the protons and O_2 formed likely to be released?
(a) Lumen of thylakoid (b) Outside of thylakoid membrane
(c) In stroma (d) None of these

49. Phosphorylation occurs in
(a) Mitochondria (b) Chloroplast (c) Cytoplasm (d) All of these

50. Oxidative phosphorylation occurs in
(a) Mitochondria (b) Chloroplast (c) Cytoplasm (d) All of these

51. The place where cyclic flaw of electrons occur:
(a) Thylakoid of grana (b) Stroma
(c) Stroma lamellae (d) All of these

52. Stroma lamellae lacks all except
(a) PS II (b) NADP reductase
(c) PS I (d) Water splitting complex

53. Which of the following is incorrect about cyclic photophosphorylation?
(a) Only PS I is involved.
(b) It occurs only when light of wavelength beyond 680 nm is available for excitation.
(c) Only synthesis of ATP occurs.
(d) Synthesis of $NADPH + H^+$ occurs.

54. What is the processes that creates proton gradient across thylakoid membrane?
(a) Splitting of water molecule on inner side of membrane (towards lumen).
(b) H^+ carrier transport H^+ ion from stroma to lumen.
(c) NADH reductase removes H^+ ion from stroma for reduction of $NADP^+$.
(d) All the above

55. During light reaction
(a) pH of stroma ↓es (b) pH of lumen ↑es
(c) pH of lumen ↓es (d) pH of stroma has no effect

56. Which acts as a transmembrane channel?
(a) F_0 of ATPase (b) F_1 of ATPase
(c) Both (a) and (b) (d) None of these

57. Chemiosmosis requires
(a) Membrane (b) Proton pump
(c) Proton gradient (d) All of these

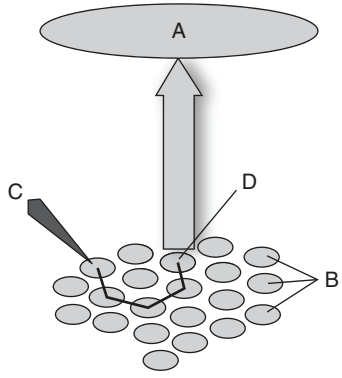
58. Which type of phosphorylation takes place in photosynthesis?
(a) Cyclic (b) Non-cyclic
(c) Both (a) and (b) (d) None of these

59. Unidirectional flow of electrons in photophosphorylation takes place in
(a) Cyclic (b) Non-cyclic
(c) Pseudocyclic (d) All of these

60. In light reaction of photosynthesis, the chlorophyll is subjected to
(a) Destruction (b) Permanent reduction
(c) Oxidation and reduction (d) Neutralization

61. Photosynthetic pigments in chloroplast are embedded in the membrane of
(a) Thylakoids (b) Photoglobin
(c) Matrix (d) Envelope of chloroplast

62. Identify A to D in the given figure.



(a) A–Primary acceptor, B–Pigment molecules, C–Photon, D–Reaction centre
(b) A–Photon, B–Primary acceptor, C–Reation centre, D–Pigment molecules
(c) A–Pigment molecules, B–Primary acceptor, C–Photon, D–Reaction centre
(d) A–Reaction centre, B–Primary acceptor, C–Pigment molecules, D–Photon

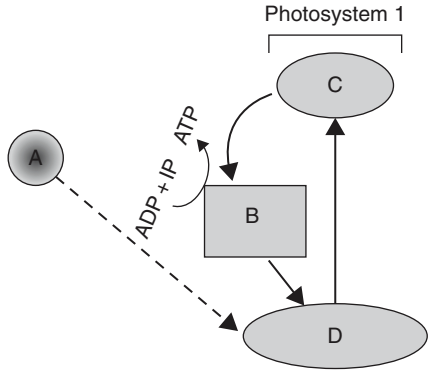
63. Which of the following wavelength occurs in red part of the spectrum?
(a) 470 nm (b) 390 nm (c) 680 nm (d) 830 nm

64. The process for which manganese and chloride ions are required in
(a) Photolysis of water
(b) For transfer of H^+ ion to NADP
(c) For transfer of charge of hydroxyl ion to chlorophyll
(d) None of the above

65. What is the absorption maxima of P-700?
(a) 700 Å (b) 683 nm (c) 700 cm (d) 700 nm

66. $NADPH_2$ is generated through
(a) Glycolysis (b) Photosystem I
(c) Photosystem II (d) Anaerobic respiration

67. Identify A to D in the given figure.



(a) A–e^- acceptor, B–Light, C–Chlorophyll P700, D–Electron transport system
(b) A–Light, B–Electron transport system, C–e^- acceptor, D–Chlorophyll P700
(c) A–Electron transport system, B–e^- acceptor, C–Chlorophyll P700, D–Light
(d) A–Chlorophyll P700, B–Electron transport system, C–Light, D–e^- acceptor

68. Quantasomes are present in
(a) Pigment system I (b) Pigment system II
(c) Both (a) and (b) (d) None of these

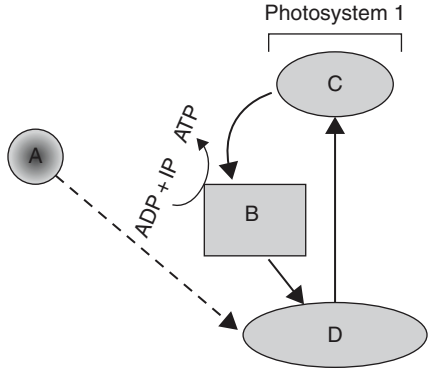
69. Which of the chlorophyll type ejects the electron during photophosphorylation?
(a) Chlorophyll 'b' (b) Chlorophyll 'a'
(c) Chlorophyll 'a' and 'b' (d) Xanthophyll

70. In cyclic photophosphorylation which one of the following is formed?
(a) ATP (b) NADP and ATP
(c) $NADH_2$ and O_2 (d) $NADPH_2$, ATP and O_2

71. Where does the primary photochemical reaction occur in chloroplast/Where does the light reaction of photosynthesis takes place?
(a) Stroma
(b) Edoplasmic reticulum
(c) Quantasome or thylakoids (Grana)
(d) Inner membrane of chloroplast

72. The trapping centre of light energy in photosystem I is
(a) P-660 (b) P-680
(c) P-700 (d) P-720

73. What indicates A to D in the given figure?



(a) A–e^- acceptor, B–Electron transport system, C–Chlorophyll P700, D–Light
(b) A–Electron transport system, B–e^- acceptor, C–Light, D–Chlorophyll P700
(c) A–Chlorophyll P700, B–Electron transport system, C–Light, D–e^- acceptor
(d) A–Light, B–Electron transport system, C–e^- acceptor, D–Chlorophyll P700

74. Pigment system I conducts
(a) Cyclic photophosphorylation
(b) Non-cyclic photophosphorylation
(c) Both (a) and (b)
(d) None of these

75. Pigment system II is concerned with
(a) Photolysis of water
(b) Reduction of CO_2
(c) Flowering
(d) None of these

76. Photophosphorylation is a process in which
(a) Light energy is converted into chemical energy in the form of ATP.
(b) NADP is formed
(c) Chemical energy is used to produce ATP
(d) CO_2 is reduced to carbohydrate

77. The reaction centre for PS I and PS II are
(a) P_{700} and P_{680} respectively
(b) P_{680} and P_{700} respectively
(c) P_{580} and P_{700} respectively
(d) P_{700} and P_{580} respectively

78. Results of light reaction is/are
(a) Only ATP
(b) Only $NADPH_2$
(c) ATP and $NADPH_2$
(d) Only FAD

79. Biosynthetic phase of life uses all except _____ that is produced in photochemical phase.
(a) ATP (b) NADPH (c) O_2 (d) None of these

80. If light is available for a given duration and then again made unavailable, the biosynthetic process will
(a) Continue for long duration
(b) Continue for unlimited time
(c) Continue for short duration
(d) Will stop immediately

81. Which of the following is correct about biosynthetic phase?
(a) C_{14} isotope is used to find out this pathway
(b) Calvin worked on this pathway
(c) Melvin Calvin used photosynthetic algae for this pathway
(d) All the above

82. The similarity between C_3 and C_4 pathway is:
(a) Both are equally efficient.
(b) Organic acid is formed as the first product of CO_2 fixation.
(c) Both requires one type of cell to occur.
(d) Both takes place in all the plants.

83. Which pathway takes place in all photosynthetic plant?
(a) C_3 (b) C_4 (c) Both (a) and (b) (d) None of these

84. For easy understanding, the Calvin cycle is divided into how many stages?
(a) 1 (b) 2 (c) 3 (d) 4

85. Calvin cycle includes
(a) Carboxylation (b) Reduction
(c) Regeneration of RuBP (d) All of these

86. Which process of Calvin cycle requires RuBP?
(a) Carboxylation (b) Reduction (c) Regeneration (d) None of these

87. Reduction process of Calvin cycle requires how many ATP and NADPH for the reduction of one molecule of CO_2?
(a) 2 mole ATP and 3 mole NADPH (b) 2 mole ATP and 2 mole NADPH
(c) 1 mole ATP and 2 mole NADPH (d) 3 mole ATP and 2 mole NADPH

88. How many moles of ATP is required to regenerate one mole of RuBP?
(a) 1 (b) 2 (c) 3 (d) 4

89. The first stable product of Calvin cycle has
(a) 2 carbon atoms (b) 3 carbon atoms (c) 4 carbon atoms (d) 6 carbon atoms

90. In dark reaction, the first reaction is
(a) Carboxylation (b) Decarboxylation (c) Dehydrogenation (d) Deamidation

91. In C_4 plants, CO_2 combines with PEP in the presence of
(a) PEP carboxylase (b) RuBP carboxylase (c) RuBP oxygenase (d) Hydrogenase

92. Dark reaction of photosynthesis is called so because it
(a) Can also occur in dark (b) Does not require light energy
(c) Cannot occur during day time (d) Occurs more rapidly at night

93. The initial enzyme of Calvin cycle is
(a) Ribulose 1, 5 diphosphate carboxylase (b) Triose phosphate dehydrogenase
(c) Phosphofructokinase (d) Cytochrome oxidase

94. During photosynthesis, when PGA is changed into phosphoglyceraldehyde, which of the following reaction occurs?
(a) Oxidation (b) Reduction (c) Electrolysis (d) Hydrolysis

95. Ribulose diphosphate carboxylase enzyme catalyses the carboxylation reaction between
(a) Oxaloacetic acid and acetyl CoA
(b) CO_2 and ribulose 1, 5 diphosphate
(c) Ribulose diphosphate and phosphoglyceraldehyde
(d) PGA and dihydroxyacetone phosphate

96. Calvin cycle occurs in
(a) Chloroplasts (b) Cytoplasm (c) Mitochondria (d) Glyoxysomes

97. In C_3 plants, the first stable product of photosynthesis during dark reaction is
(a) 3-phosphoglyceric acid (b) Phosphoglyceraldehyde
(c) Maleic acid (d) Oxaloacetic acid

98. How many Calvin cycle forms one hexose molecule?
(a) 2 (b) 6 (c) 4 (d) 8

99. In which plant Calvin experimented the radioactive isotopy to discover the stable product of C_3 cycle?
(a) Chlorella (b) Cycas (c) Carrot (d) Tobacco

100. Mesophyll chloroplast of which plant alone is capable of synthesizing starch or sucrose?
(a) C_3 plant (b) C_4 plant
(c) Both (a) and (b) (d) Neither C_3 nor C_4

101. The enzymes of dark reaction in C_4 plants are found in
(a) Bundle sheath chloroplast (b) Mesophyll chloroplast
(c) Both (a) and (b) (d) None of these

102. In C_4 plants, the mesophyll cells are connected with bundle sheath cells with the help of
(a) Cytoplasmic connection (b) Special connecting tissues
(c) Plasmodesmata (d) Connection is not essential

103. In case of C_4 pathway, CO_2 combines with
(a) PGA (b) PEP
(c) RuDP (d) RMP

104. Which one is a C_4 plant?
(a) Papaya (b) Pea (c) Potato (d) Maize

105. C_4 plants are also known as
(a) Hatch and Slack type (b) Calvin type
(c) Calvin and Bassham type (d) Emerson type

106. In C_4 plants, Calvin cycle occurs in
(a) Stroma of bundle sheath chloroplast
(b) Mesophyll chloroplast
(c) Grana of bundle sheath chloroplast.
(d) Does not occur as CO_2 is fixed mainly by PEP and no CO_2 is left for the Calvin cycle.

107. Tropical plant like sugarcane show high efficiency of CO_2 fixation because of
(a) Calvin cycle (b) Hatch and Slack cycle
(c) EMP pathway (d) TCA cycle

108. Which of the following cycle shows oxaloacetic acid as the first stable product?
(a) Calvin cycle (b) Hatch and Slack cycle
(c) C_2 cycle (d) None of these

109. Kranz type of anatomy is found in
(a) C_2 plants (b) C_3 plants (c) C_4 plants (d) CAM plants

110. C_4 plants are adapted to
(a) Hot and dry climate (b) Temperate climate
(c) Cold and dry climate (d) Hot and humid climate

111. Which one of the following is wrong in relation to photorespiration?
(a) It is a characteristic of C_3 plants (b) It occurs in chloroplasts
(c) It occurs in day time only (d) It is a characteristic of C_4 plants

112. How many types of photosynthetic cells occur in C_4 plant?
(a) One type (b) Two types (c) Four types (d) Eight types

113. Which of the following cells of C_4 plants are prominently loaded with starch?
(a) Epidermal cells (b) Mesophyll cells
(c) Bundle sheath cells (d) All of these

114. The number of carboxylation in C_4 cycle is/are
(a) 1 (b) 2 (c) 5 (d) 3

115. Photorespiration takes place in
(a) Chloroplast, mitochondria
(b) Mitochondria, peroxisome
(c) Chloroplasts, peroxisome, mitochondria
(d) Chloroplasts, cytoplasm, mitochondria

116. Photorespiration is called
(a) C_2 cycle (b) C_3 cycle (c) C_4 cycle (d) None of these

117. The first reaction in photorespiraton is
(a) Carboxylation (b) Decarboxylation (c) Oxygenation (d) Phosphorylation

118. C_4 plant is characterized by
(a) High tolerance to temperature (b) Lacks process of photorespiration
(c) Greater productivity of biomass (d) All of these

119. Bundle sheath cells have these following characters except
(a) Large in size
(b) Large number of chloroplast
(c) Thick wall impervious to gaseous exchange
(d) With intercellular spaces

120. Primary CO_2 acceptor in C_4 plant occurs in
(a) Inner layer cells of bundle sheath (b) Outer layer cells of bundle sheath
(c) Mesophyll cells (d) None of these

121. Bundle sheath cells are rich in
(a) RuBisCO (b) PEP case (c) Both (a) and (b) (d) None of these

122. Which of the following is correct about photorespiration?
(a) Wasteful process (b) ATP is utilized (c) Release of CO_2 (d) All of these

123. During photorespiration
(a) RuBisCO binds with O_2
(b) Phosphoglycerate and phosphoglycolate is formed
(c) Sugar is not synthesized
(d) All the above

124. Photorespiration does not takes place in C_4 plant because
(a) O_2 is not released in C_4 plant during photosynthesis.
(b) Intracellular concentration of CO_2 is high in bundle sheath and it ensures RuBisCO function as carboxylase.
(c) They are found in cold environment.
(d) Stomata in them opens during night.

125. External factor affecting photosynthesis are
(a) Sunlight and temperature (b) CO_2 concentration
(c) Water (d) All of these

126. Internal factor affecting photosynthesis are
(a) Number and size of leaf
(b) Age of leaf and orientation
(c) Internal CO_2 concentration and amount of chlorophyll
(d) All the above

127. Internal factor of plant depends on
(a) Growth of plant (b) Genetic predisposition
(c) Both (a) and (b) (d) None of these

128. Which is a limiting factor?
(a) Green leaf (b) Optimal light
(c) Optimal CO_2 (d) Low temperature

129. Photosynthesis is affected by
(a) Quality of light (b) Intensity of light (c) Duration of light (d) All of these

130. Light saturation occurs at _____ of the fall sunlight.
(a) 2% (b) 5% (c) 10% (d) 20%

131. Light may be a limiting factor for
(a) plants in dense forest (b) plant in temperate forest
(c) plant in grassland (d) all

132. What is the relationship between CO_2 fixation and incident light at low intensities?
(a) Linear (b) Parabola (c) Hyperbola (d) None

133. Select the incorrect statement from the following:
(a) At high intensities, both C_3 and C_4 plants shows increase in the rate of photosynthesis by increasing CO_2 concentration.
(b) C_4 plants shows saturation at 360 µl/L.
(c) C_3 plant shows saturation beyond 450 µl/L.
(d) Productivity of tomatoes and ball papers cannot be increased by enriching environment by CO_2.

134. Select the incorrect statement from the following:
(a) Dark reaction is more sensitive to temperature.
(b) Light reaction is less sensitive to temperature.
(c) C_4 plant responds to higher temperature and C_3 plant have lower optimum temperature.
(d) Tropical plant have lower optimum temperature for photosynthesis.

135. Water stress leads to
(a) Closing of stomata
(b) Wilting of leaves
(c) Reduced activity of leaf
(d) All of these

136. Which factor indirectly affects the process of photosynthesis?
(a) Light
(b) Temperature
(c) CO_2 concentration
(d) Water

137. Photosynthesis takes place
(a) Only in sunlight
(b) Only in yellow light
(c) In the visible light obtained from any source
(d) Only in very high intensity of light

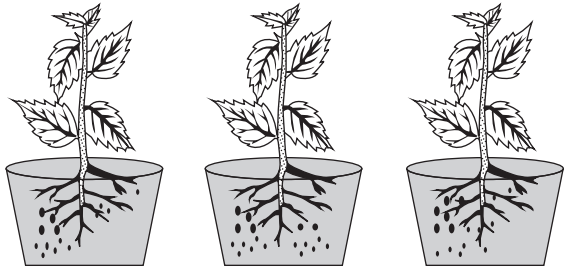
138. Photo-oxidation of chlorophyll is called
(a) Intensification
(b) Chlorosis
(c) Solarization
(d) Defoliation

139. Which one of the following is not a limiting factor for photosynthesis?
(a) Oxygen
(b) Carbon dioxide
(c) Chlorophyll
(d) Light

140. If a plant is kept in 300 ppm CO_2 concentration, what will happen to it?
(a) The plant will die soon.
(b) The plant will grow but will not die.
(c) The plant will show normal photosynthesis.
(d) Respiration will be greatly decreased.

141. What will be the effect of intermittent light on photosynthesis?
(a) It will increase
(b) It will decrease
(c) Nothing will happen
(d) Process will stop

142. The diagram below shows three plants with identical leaf surface areas:



Assuming all other conditions were identical for all three plants, which of the plants would likely to photosynthesize slowest and fastest.
(a) Y slowest, Z fastest
(b) Z slowest, X fastest
(c) X slowest, Z fastest
(d) Z slowest, Y fastest

143. Main factor which limits the rate of photosynthesis on a clear day is
(a) chlorophyll (b) light (c) CO_2 (d) water

144. Blackman's law of limiting factor is applied to
(a) growth
(b) respiration
(c) transpiration
(d) photosynthesis

145. Which factor is not limited to normal conditions for photosynthesis?
(a) Air (b) CO_2
(c) Water (d) Chlorophyll

146. The first product of CO_2 fixation in Hatch and Slack (C_4) cycle in plants is formation of
(a) oxaloacetate by carboxylation of phosphoenol pyruvate (PEP) in bundle sheath cells
(b) phosphoglyceric acid in mesophyll cells
(c) bundle sheath cells
(d) oxaloacetate by carboxylation of phosphoenol pyruvate (PEP) in the mesophyll cells

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

147. **Assertion:** C_4 pathway of CO_2 fixation is found in some tropical plants.
Reason: In this pathway CO_2 is fixed by 3C compound.

148. **Assertion:** Six molecules of CO_2 and twelve molecules of $NADPH^+ + H^+$ and 18 ATP are used to form one hexose molecule.
Reason: Light reaction results in the formation of ATP and $NADPH_2$ and oxygen.

149. **Assertion:** The first CO_2 fixation product was a C–organic compound.
Reason: The use of radioactive C^{14} in algal photosynthesis studied led to this discovery.

150. Assertion: There is a decrease in photosynthesis, if the photosynthetic cells are illuminated by light of P_{680} nm or more wavelength.
Reason: In red drop phenomenon the rate of photosynthesis decreases.

151. Assertion: CAM plants lack structural compartmentation of leaf, as found in C_4 plants.
Reason: Stomata of CAM plants are open during the night.

152. Assertion: Plants utilizing the first RuBP in CO_2 fixations are called C_3 plants.
Reason: Plants utilizing the first PEP in CO_2 fixations are called C_2 plants.

153. Assertion: Cyclic pathway of photosynthesis first appeared in some eubacterial species.
Reason: Oxygen started accumulating in the atmosphere after the non-cyclic pathway of photosynthesis evolved.

154. Assertion: The stromal thylakoids are rich in both PS I and PS II.
Reason: The granal membranes are rich in ATP synthetase.

155. Assertion: Cyclic photophosphorylation synthesizes NADPH.
Reason: NADPH synthesized in cyclic photophosphorylation is not associated with ATP formation.

156. Assertion: Oxidative phosphorylation requires oxygen.
Reason: Oxidative photophosphorylation occurs in chloroplast.

157. Assertion: Each molecule of ribulose-1, 5-bisphosphate fixes one molecule of CO_2.
Reason: Three molecules of NADPH and two ATP are required for the fixation of one molecule of CO_2.

158. Assertion: Regeneration of CO_2 acceptor molecule RuBP is crucial if the cycle is to continue uninterrupted.
Reason: The regeneration steps require one ATP for phosphorylation to form RuBP.

159. Assertion: C_4 photosynthetic pathway is more efficient than the C_3 pathway.
Reason: Photorespiration is suppressed in C_4 plants.

160. Assertion: Dark reaction is light independent reaction.
Reason: Dark reaction doesn't require product formed in light reaction.

161. Assertion: Accessory pigment helps to make photosynthesis more efficient.
Reason: Accessory pigment helps to absorb different wavelengths of light.

162. Assertion: Photolysis of water occur on inner side of the membrane of thylakoid.
Reason: Water splitting complex is associated with PSII which is physically located on inner side of thylakoid Membrane.

163. Assertion: Synthesis of ATP from ADP in chloroplast is called photophosphorylation.
Reason: This phosphorylation in chloroplast occurs in presence of light.

164. **Assertion:** Proton produced by the splitting of water accumulate with in the lumen of thylakoid.
Reason: Spitting of water molecule takes place on inner side of the membrane of thylakoid.

165. **Assertion:** Calvin cycle is referred as C_3 pathway
Reason: In Calvin cycle the first product of CO_2 fixation is a C_3 acid (PGA).

166. **Assertion:** To make one molecule of glucose 6 turns of the Calvin cycle required
Reason: One turn of Calvin cycle fix one molecule of CO_2

167. **Assertion:** Photorespiration is a wasteful process.
Reason: It results in CO_2 release with the utilization of ATP and there is no synthesis of ATP or NADPH

168. **Assertion:** Light is rarely a limiting factor in most of plant.
Reason: Light saturation occur at 10% of the full sunlight.

169. **Assertion:** Current availability of CO_2 in atmosphere is limiting to C_4 plant.
Reason: C_3 plants more efficiently fix CO_2 than C_4 plants.

170. **Assertion:** Dark reaction is controlled by temperature.
Reason: Dark reaction is enzymatic reaction.

171. **Assertion:** Photosynthesis occurs only in green parts of plants.
Reason: Green part of plant contains chlorophyll.

172. **Assertion:** Chemosynthetic pathway occur in stroma of chloroplast
Reason: Enzyme required for chemosynthetic pathway present in stroma.

PREVIOUS YEAR QUESTIONS

1. Read the following four statements (1), (2), (3) and (4) and select the right option having both correct statements.

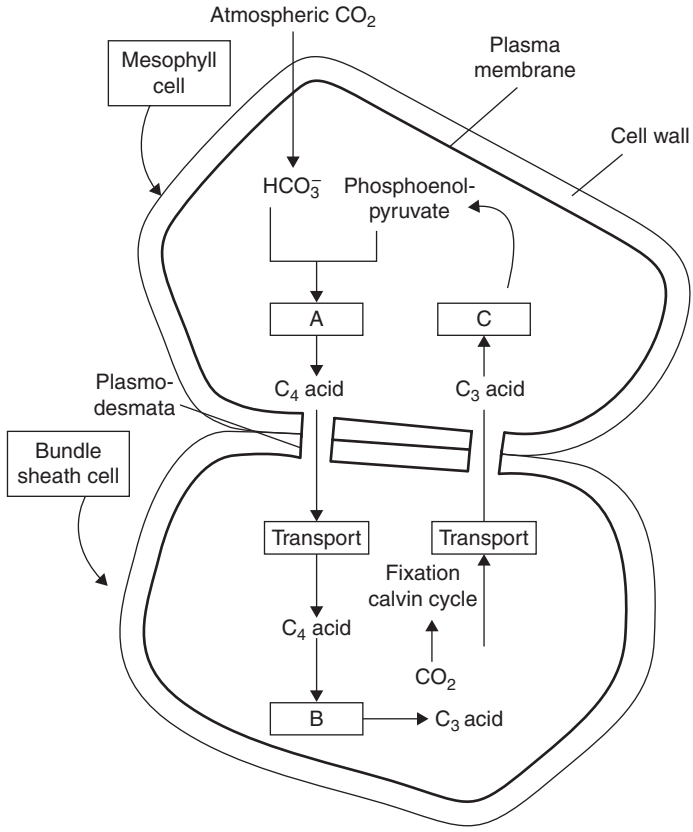
[AIPMT MAINS 2010]

Statements:
(1) Z scheme of light reaction takes place in the presence of PS I only.
(2) Only PS I is functional in cyclic photophosphorylation.
(3) Cyclic photophosphorylation results into synthesis of ATP and $NADPH_2$
(4) Stromal lamellae lacks PS II as well as NADP.

(a) (2) and (4)
(b) (1) and (2)
(c) (2) and (3)
(d) (3) and (4)

2. Study the pathway given below:

[AIPMT MAINS 2010]



In which of the following options, correct words for all the three blanks A, B and C are indicated?

(a) A: Decarboxylation, B: Reduction, C: Regeneration
(b) A: Fixation, B: Transamination, C: Regeneration
(c) A: Fixation, B: Decarboxylation, C: Regeneration
(d) A: Carboxylation, B: Decarboxylation, C: Reduction

3. PGA as the first CO_2 fixation product was discovered in the photosynthesis of [AIPMT PRE 2010]

(a) Bryophyte
(b) Gymnosperm
(c) Angiosperm
(d) Alga

4. C_4 plants are more efficient in photosynthesis than C_3 plants due to [AIPMT PRE 2010]

(a) Higher leaf area
(b) Presence of larger number of chloroplasts in the leaf cells
(c) Presence of thin cuticle
(d) Lower rate of photorespiration

5. CAM helps the plants in [AIPMT PRE 2011]

(a) Secondary growth (b) Disease resistance
(c) Reproduction (d) Conserving water

6. Which one of the following is essential for photolysis of water?
[AIPMT MAINS 2011]

(a) Manganese (b) Zinc
(c) Copper (d) Boron

7. A process that makes more important difference between C_3 and C_4 plants is
[AIPMT PRE 2012]

(a) Transpiration (b) Glycolysis
(c) Photosynthesis (d) Photorespiration

8. The correct sequence of cell organelles during photorespiration is
[AIPMT PRE 2012]

(a) Chloroplast, Golgibodies, Mitochondria
(b) Chloroplast, Rough Endoplasmic Reticulum, Dictyosomes
(c) Chloroplast, Mitochondria, Peroxisome
(d) Chloroplast, Vacuole, Peroxisome

9. In photosynthesis, the light-independent reactions take place at
[RE-AIPMT 2015]

(a) Photosystem I (b) Photosystem II
(c) Stromal matrix (d) Thylakoid lumen

10. Emerson's enhancement effect and Red drop have been instrumental in the discovery of:
[NEET - I, 2016]

(a) Photophosphorylation and non-cyclic electron transport
(b) Two photosystems operating simultaneously
(c) Photophosphorylation and cyclic electron transport
(d) Oxidative phosphorylation

11. In a chloroplast the highest number of protons is found in:
[NEET - I, 2016]

(a) Stoma (b) Lumen of thylakoids
(c) Inter membrane space (d) Antennae complex

12. A plant in your garden avoids photorespiratory losses, has improved water use efficiency shows high rates of photosynthesis at high temperatures and has improved efficiency of nitrogen utilization. In which of the following physiological groups would you assign this plant?
[NEET - I, 2016]

(a) C_3 (b) C_4
(c) CAM (d) Nitrogen

13. The process which makes major difference between C3 and C4 plants is
[NEET - II, 2016]

(a) Calvin cycle (b) Photorespiration
(c) Respiration (d) Glycolysis

NCERT EXEMPLAR QUESTIONS

1. Which metal ion is a constituent of chlorophyll?
(a) Iron (b) Copper
(c) Magnesium (d) Zinc

2. Which pigment acts directly to convert light energy into chemical energy?
(a) Chlorophyll a (b) Chlorophyll b
(c) Xanthophyll (d) Carotenoid

3. Which range of wavelength (in nm) is called Photosynthetically Active Radiation (PAR)?
(a) 100 to 390 (b) 390 to 430
(c) 400 to 700 (d) 760 to 10000

4. Which light range is most effective in photosynthesis?
(a) Blue (b) Green
(c) Red (d) Violet

5. Chemosynthetic bacteria obtain energy from
(a) Sun (b) Infra-red rays
(c) Organic substances (d) Inorganic chemicals

6. Energy required for ATP synthesis in PSII comes from
(a) Proton gradient (b) Electron gradient
(c) Reduction of glucose (d) Oxidation of glucose

7. During light reaction in photosynthesis, which of the following are formed?
(a) ATP and sugar (b) Hydrogen, O_2 and sugar
(c) ATP, hydrogen donor and O_2 (d) ATP, hydrogen and O_2 donor

8. Dark reaction in photosynthesis is so called because
(a) It can occur in dark also. (b) It does not depend on light energy.
(c) It cannot occur during day light. (d) It occurs more rapidly at night.

9. PEP is a primary CO_2 acceptor in
(a) C_4 plants (b) C_3 plants
(c) C_2 plants (d) Both C_3 and C_4 plants

10. Splitting of water is associated with
(a) Photosystem I (b) Lumen of thylakoid
(c) Both photosystems I and II (d) Inner surface of thylakoid membrane

11. The correct sequence of flow of electrons in the light reaction is
(a) PS II, plastoquinone, cytochromes, PS I ferredoxin
(b) PS I, plasotquinone, cytochromes, PS II ferredoxin
(c) PS I, ferredoxin, PS II
(d) PS I, plastoquinone, cytochromes, PS II ferredoxin.

12. The enzyme that is not found in a C_3 plant is
(a) RuBP carboxylase (b) PEP carboxylase
(c) NADP reductase (d) ATP synthase

13. The reaction that is responsible for the primary fixation of CO_2 is catalysed by
(a) RuBP carboxylase
(b) PEP carboxylase
(c) RuBP carboxylase and PEP carboxylase
(d) PGA synthase

14. When CO_2 is added to PEP, the first stable product synthesised is
(a) Pyruvate (b) Glyceraldehyde–3–phosphate
(c) Phosphoglycerate (d) Oxaloacetate

Answer Keys

Practice Questions

1. (c)	2. (a)	3. (b)	4. (c)	5. (d)	6. (d)	7. (b)	8. (a)	9. (b)	10. (b)
11. (b)	12. (c)	13. (c)	14. (a)	15. (a)	16. (a)	17. (c)	18. (c)	19. (d)	20. (d)
21. (c)	22. (a)	23. (b)	24. (c)	25. (a)	26. (b)	27. (b)	28. (c)	29. (c)	30. (a)
31. (d)	32. (d)	33. (d)	34. (c)	35. (a)	36. (a)	37. (d)	38. (d)	39. (b)	40. (b)
41. (b)	42. (b)	43. (d)	44. (d)	45. (b)	46. (c)	47. (b)	48. (a)	49. (b)	50. (a)
51. (c)	52. (c)	53. (d)	54. (d)	55. (c)	56. (a)	57. (d)	58. (c)	59. (b)	60. (b)
61. (a)	62. (a)	63. (c)	64. (a)	65. (d)	66. (b)	67. (b)	68. (c)	69. (b)	70. (a)
71. (c)	72. (c)	73. (d)	74. (c)	75. (a)	76. (a)	77. (a)	78. (c)	79. (c)	80. (c)
81. (d)	82. (b)	83. (a)	84. (c)	85. (d)	86. (a)	87. (b)	88. (a)	89. (b)	90. (a)
91. (a)	92. (b)	93. (a)	94. (b)	95. (b)	96. (a)	97. (a)	98. (b)	99. (a)	100. (a)
101. (c)	102. (c)	103. (b)	104. (d)	105. (a)	106. (a)	107. (b)	108. (b)	109. (c)	110. (a)
111. (d)	112. (b)	113. (c)	114. (b)	115. (c)	116. (a)	117. (c)	118. (d)	119. (d)	120. (c)
121. (a)	122. (d)	123. (d)	124. (b)	125. (d)	126. (d)	127. (c)	128. (d)	129. (d)	130. (c)
131. (a)	132. (a)	133. (d)	134. (d)	135. (d)	136. (d)	137. (c)	138. (c)	139. (a)	140. (c)
141. (a)	142. (d)	143. (c)	144. (d)	145. (d)	146. (d)				

Assertion and Reason Questions

147. (b)	148. (b)	149. (a)	150. (b)	151. (b)	152. (c)	153. (b)	154. (d)	155. (d)	156. (c)
157. (c)	158. (b)	159. (a)	160. (d)	161. (a)	162. (a)	163. (a)	164. (a)	165. (a)	166. (a)
167. (a)	168. (a)	169. (d)	170. (a)	171. (a)	172. (a)				

Previous Year Questions

1. (a)	2. (c)	3. (d)	4. (d)	5. (d)	6. (a)	7. (d)	8. (c)	9. (c)	10. (b)
11. (b)	12. (b)	13. (b)							

NCERT Exemplar Questions

1. (c)	2. (a)	3. (c)	4. (c)	5. (d)	6. (a)	7. (c)	8. (a)	9. (a)	10. (d)
11. (a)	12. (b)	13. (c)	14. (d)						

This page is intentionally left blank.

CHAPTER

14

Respiration in Plants

PRACTICE QUESTIONS

Glycolysis

1. Partial oxidation of glucose without the help of oxygen into pyruvic acid is known as
(a) Glycolysis (b) Kreb's cycle (c) ETS (d) All of these

2. The scheme of glycolysis is given by
(a) Embden (b) Meyerhof (c) Parnas (d) All of these

3. Which of the following is correct about glycolysis (EMP pathway)?
(a) It is a common path for aerobic and anaerobic respiration.
(b) It occurs in cytoplasm.
(c) O_2 is not required for this process.
(d) All the above

4. Number of controlled steps required in glycolysis are:
(a) 1 (b) 5 (c) 10 (d) 15

5. In plant the end product of photosynthesis is
(a) Sucrose (b) Starch (c) Glycogen (d) Glucose

6. The enzyme which converts sucrose to glucose and fructose.
(a) Maltase (b) Invertase (c) Lactase (d) Hexokinase

7. Glucose $\rightarrow$ Glu-6-phosphate occurs due to the enzyme
(a) Hexokinase (b) Oxidase (c) Hydrolase (d) Lysase

8. Common to all living organism is
(a) Kreb's cycle (b) EMP pathway (c) ETC (d) All of these

9. 1 molecule of glucose on glycolysis produces
(a) 2 molecule of pyruvic acid (b) 1 molecule of pyruvic acid
(c) 2 molecule of CO_2 (d) 2 molecule of O_2

10. Which of the following is a energy yielding process?
(a) 2-phosphoglycerate to 2-phosphoenolpyruvate
(b) Frutose to fructose-6-phosphate
(c) Phosphoenolpyruvic acid to pyruvic acid
(d) Fructose 1, 6-bisphosphate to PGAL and DHAP

Fermentation

11. Yeast poisons themselves to death when alcohol concentration reaches to _____ in alcoholic fermentation.
(a) 2% (b) 10% (c) 13% (d) 20%

12. Lactic acid fermentation occurs in
(a) Some bacteria (b) Muscle cell under anaerobic condition
(c) Both (a) and (b) (d) Aerobic condition

13. How much percentage of energy is released in fermentation?
(a) < 1% (b) < 7% (c) > 10% (d) > 20%

14. Which of the following relation shows substrate level phosphorylation?
(a) Citric acid → α-ketoglutaric acid
(b) Malic acid → oxaloacetic acid
(c) α-ketoglutaric acid → Succinyl-CoA
(d) Succinyl-CoA → Succinic acid

15. Which of the following is a '5C' compound?
(a) Oxaloacetic acid (b) Citric acid
(c) α-ketoglutaric acid (d) Succinic acid

16. At how many places in Kreb's cycle NADH + H^+ is formed?
(a) 1 (b) 2 (c) 3 (d) 4

17. At how many places in Kreb's cycle $FADH_2$ is formed?
(a) 1 (b) 2 (c) 3 (d) 4

18. ETS is present in
(a) Stroma (b) Matrix of mitochondria
(c) Inner membrane of mitochondria (d) Outer membrane of mitochondria

19. Match the column:

Column I		**Column II**
A. NADH dehydrogenase	–	1. Complex IV
B. Cytochrome bc_1	–	2. Complex III
C. Cytochrome aa_3	–	3. Complex I
D. ATP synthase	–	4. Complex V

(a) A–1, B–2, C–3, D–4 (b) A–3, B–2, C–1, D–4
(c) A–4, B–1, C–3, D–2 (d) A–1, B–4, C–2, D–3

20. Ubiquinone transfer its electron to
(a) Complex II (b) Complex I (c) Cytochrome c (d) Matrix

21. Which of the following is correct about cytochrome?
(a) Small protein attaches to the outer surface of inner membrane of mitochondria.
(b) Act as mobile carrier.
(c) Transfers electron between complex III and IV.
(d) All the above

The Respiratory Balance Sheet

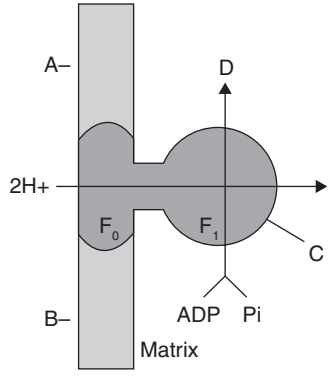
22. 1 molecule of NADH gives rise to _____ molecules of ATP, while 1 molecule of $FADH_2$ gives _____ molecule of ATP
(a) 3, 2 (b) 2, 3 (c) 2, 2 (d) 3, 3

23. O_2 acts as
(a) Terminal hydrogen acceptor (b) Terminal electron acceptor
(c) Both (a) and (b) (d) None of these

24. Which type of phosphorylation occurs in mitochondria?
(a) Oxidative phosphorylation (b) Substrate level phosphorylation
(c) Photophosphorylation (d) Both (a) and (b)

25. When $12H^+$ pass through F_0-F_1 particle, how many ATPs are produced?
(a) 6 ATP (b) 4 ATP (c) 8 ATP (d) 10 ATP

26. Identify A, B, C and D in the given figure.



(a) A–Outer side, B–Inner mitochondrial membrane, C–Inner membrane part, D–ATP
(b) A–Inner membrane part, B–Outer side, C–Inner mitochondrial membrane, D–ATP
(c) A–ATP, B–Inner membrane part, C–Outer side, D–Inner mitochondria membrane
(d) A–Inner mitochondrial membrane, B–ATP, C–Outer side, D–Inner membrane part

27. To form a respiratory balance sheet, the calculations can be made on certain assumptions like
(a) There is a sequential pathway functioning like glycolysis, TCA cycle and ETS following one after another.
(b) NADH formed in glycolysis is transferred to mitochondria and undergoes oxidative phosphorylation.
(c) None of the intermediates in the pathway are utilized to synthesize any other compound and glucose is being respired no other alternative substrate are entering in the pathway at any of the intermediary stages.
(d) All the above

28. How many molecules of ATP are produce by oxidation of 1 molecule of glucose?
(a) 30 (b) 36 (c) 4 (d) 40

29. Which of the following is incorrect about fermentation?
(a) It accounts for the partial breakdown of glucose.
(b) Net gain is only 2 ATP.
(c) The NADH to NAD^+ formation reaction is vigorous.
(d) It occurs in cytoplasm.

30. Respiratory pathway is best defined as
(a) Catabolic pathway (b) Anabolic pathway
(c) Amphibolic pathway (d) None of these

31. Glycerol enters the respiratory pathway at
(a) Glu-6–phosphate (b) PGA (c) PGAL (d) PEP

32. Amino acid enters in the respiratory pathway at
(a) Kreb's cycle (b) Pyruvate
(c) Acetyl CoA (d) Any of these

33. Fatty acid for entry into Kreb's cycle is degraded to
(a) Pyruvate (b) Citric acid (c) Acetyl-CoA (d) PGA

34. RQ for tripalmitin is
(a) 0.8 (b) 0.7 (c) 0.9 (d) 0.5

35. RQ for protein is
(a) 0.8 (b) 0.7 (c) 0.9 (d) 0.5

36. RQ for carbohydrate is
(a) 0.7 (b) 0.9 (c) 1 (d) 0.4

37. Conversion of pyruvic acid into ethyl alcohol is facilitated by
(a) Carboxylase (b) Dehydrogenase
(c) Decarboxylase and dehydrogenase (d) Phosphatase

38. Fermentation is represented by the equation
(a) $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + 673$ k cal
(b) $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2 + 18$ k cal
(c) $6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light}} C_6H_{12}O_6 + 6H_2O + 6O_2$
(d) $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

39. Anaerobic respiration takes place in the
(a) Mitochondria (b) Cytoplasm (c) Lysosomes (d) ER

40. What is the total gain of energy during anaerobic respiration?
(a) One molecule of ATP (b) Two molecules of ATP
(c) Four molecules of ATP (d) Eight molecules of ATP

41. Cyanide resistant pathway is
(a) Anaerobic respiration (b) Aerobic respiration
(c) Both (a) and (b) (d) None of these

42. Energy accumulating in ATP is
(a) Disulphide bond (b) Hydrogen bonds
(c) High energy phosphate bond (d) Ester bond

43. In plants, respiration takes place
(a) Only in leaves during night (b) Only in leaves during day
(c) In all living cells (d) None of these

44. In both aerobic and anaerobic respiration which same product is formed?
(a) Lactic acid (b) Pyruvic acid (c) Citric acid (d) Organic acid

45. Which of the following is the reverse of photosynthesis?
(a) Respiration (b) Protein synthesis (c) Fat synthesis (d) All of these

46. The process of phosphorylation takes place in
(a) Glycolysis (b) Kreb's cycle (c) HMP pathway (d) All of these

47. Match the given below organelles with their function:

Column I		**Column II**
A. Kreb's cycle	–	1. Stalked particles of mitochondria
B. Photorespiration	–	2. Cytoplasm
C. Oxidative phosphorylation	–	3. Peroxisomes
D. Glycolysis	–	4. Inner surface of membrane of mitochondria

(a) A–2, B–3, C–4, D–1 (b) A–1, B–2, C–3, D–4
(c) A–4, B–3, C–1, D–2 (d) A–3, B–2, C–4, D–1

48. Match the name of scientist with his work:

Column I		**Column II**
A. PPP (Pentose Phosphate Pathway)	–	1. Kuhne
B. Demonstration of fermentation	–	2. Kreb's
C. TCA cycle	–	3. Warburg–Dickens
D. Glycolysis	–	4. Embden Mayerhof Parnas

(a) A–1, B–2, C–3, D–4 (b) A–2, B–4, C–3, D–1
(c) A–1, B–2, C–4, D–3 (d) A–3, B–1, C–2, D–4

49. Match the correct answers with the type of respiration and respiratory substrates:

Column I		**Column II**
A. Respiration	–	1. Proteins
B. Floating respiration	–	2. Starch
C. Cytoplasmic respiration	–	3. Carbohydrates
D. Protoplasmic respiration	–	4. Lactose

(a) A–3, B–2, C–1, D–4 (b) A–2, B–3, C–4, D–1
(c) A–1, B–2, C–3, D–4 (d) A–2, B–4, C–1, D–3

50. The energy yielded as a result of total oxidation of one glucose molecule during cellular respiration is to convert
(a) 34 molecules of ADP into 34 molecules of ATP
(b) 30 molecules of ADP into 30 molecules of ATP
(c) 36 molecules of ADP into 36 molecules of ATP
(d) 32 molecules of ADP into 32 molecules of ATP

51. The connecting link among glycolysis, Kreb's cycle and beta-oxidation of fatty acid is
(a) Pyruvic acid (b) Acetyl-CoA (c) Acetaldehyde (d) Citric acid

52. Which of the following is the source of respiration?
(a) Stored food (b) RNA (c) DNA (d) ATP

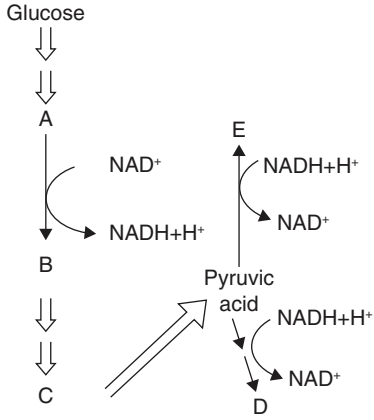
53. From the substrate level, how many phosphorylation ATP are produced?
(a) 2 (b) 6 (c) 10 (d) 8

54. Select the incorrect statement:
(a) Plants have no special system for breathing or gaseous exchange.
(b) Acetyl-CoA enter in TCA cycle running in matrix of mitochondria.
(c) The RQ depends upon the type of respirarory substance used during respiration.
(d) In fermentation, the complete oxidation of glucose occur in some bacteria.

55. The aerobic respiration yields
(a) $8NADH_2$, $2FADH_2$, 2ATP
(b) $10NADH_2$, $2FADH_2$, 38ATP
(c) $12NADH_2$, 30ATP, H_2O
(d) $10NADH_2$, $2FADH_2$, 2GTP, 2ATP

56. How many ATP are used/required in glycolysis or for the complete phosphorylation of a glucose molecule?
(a) 4 (b) 2 (c) 6 (d) 8

57. Identify A to E in the given figure.



(a) A–Phosphoenol Pyruvic acid, B–Lactic acid, C–3-Phosphoglyceric acid, D–Ethanol + CO_2, E–Glyceraldehyde 3-Phosphate
(b) A–Glyceraldehyde 3-Phosphate, B–3-Phosphoglyceric acid, C–Phosphoenol Pyruvic acid, D–Ethanol + CO_2, E–Lactic acid
(c) A–Lactic acid, B–Ethanol + CO_2, C–Glyceraldehyde 3-Phosphate, D–Phosphoenol Pyruvic acid, E–3-Phosphoglyceric acid
(d) A–3-Phosphoglyceric acid, B–Phosphoenol Pyruvic acid, C–Lactic acid, D–Glyceraldehyde 3-Phosphate, E–Ethanol + CO_2

58. Isomerization takes place in
(a) Glycolysis (b) Kreb's cycle
(c) Oxidative phosphorylation (d) None of these

59. In cellular respiration, O_2 is used as a final receptor of
(a) ATP and NADH (b) H and e- (c) Fe (d) Cytochrome

60. The first stage in respiration is
(a) Aerobic oxidation of pyruvic acid (b) Liberation of CO_2
(c) Glycolysis (d) Electron transport system

61. Besides the net gain of 2 ATP molecules in glycolysis which other molecules are simultaneously formed?
(a) $FADH_2$ (b) $NADPH_2$ (c) $NADH_2$ (d) $FAMH_2$

62. The total ATP production during EMP pathway is
(a) 24 ATP molecules (b) 8 ATP molecules
(c) 38 ATP molecules (d) 6 ATP molecules

63. Glycolysis takes place in
(a) Mitochondria (b) Cytoplasm
(c) Both mitochondria and cytoplasm (d) Vacuole

64. Pyruvate (pyruvic acid) dehydrogenase is used in converting
(a) Pyruvate to glucose
(b) Glucose to pyruvate
(c) Pyruvic acid to lactic acid
(d) Pyruvate (pyruvic acid) to acetyl-CoA

65. The number of molecules of pyruvic acid formed from one molecule of glucose at the end of glycolysis is
(a) 1 (b) 2 (c) 3 (d) 4

66. What is the other name of glycolysis?
(a) EMP pathway (b) TCA pathway
(c) HMS pathway (d) None of these

67. The common phase between aerobic and anaerobic respiration is called
(a) Tricarboxylic acid cycle (b) Oxidative phosphorylation
(c) Embden, Meyerhoff, Parnas cycle (d) Kreb's cycle

68. The oxidation of one $NADH_2$ yields
(a) 18 ATP (b) 6 ATP (c) 3 ATP (d) 2 ATP

69. The end product of glycolysis is
(a) acetyl-CoA (b) Citric acid (c) Pyruvic acid (d) Fumaric acid

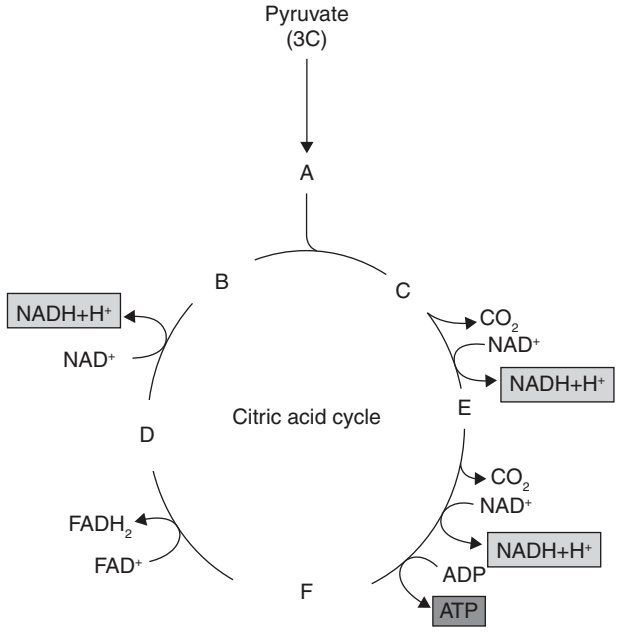
70. The first step of glycolysis is:
(a) Breakdown of glucose
(b) Phosphorylation of glucose
(c) Conversion of glucose into fructose
(d) Dehydrogenation of glucose

71. Which of the following is the correct sequence of glycolysis?
(a) G 6–P $\rightarrow$ PEP $\rightarrow$ 3–PGAL $\rightarrow$ 3–PGA
(b) G 6–P $\rightarrow$ 3–PGAL $\rightarrow$ 3–PGA $\rightarrow$ PEP
(c) G 6–P $\rightarrow$ PEP $\rightarrow$ 3–PGA $\rightarrow$ 3–PGAL
(d) G 6–P $\rightarrow$ 3–PGA $\rightarrow$ 3–PGAL $\rightarrow$ PEP

72. Which intermediate compound is involved in the synthesis of amino acids?
(a) Malic acid (b) Citric acid
(c) α-ketoglutaric acid (d) Isocitric acid

73. In ATP molecule, the energy is stored in
(a) Chemical bonds (b) Hydrogen bonds
(c) Carbon bonds (d) Pyrophosphate bonds

74. What indicates A to F in the given figure?



(a) A–Oxaloacetic acid (4C), B–Malic acid (4C), C–Succinic acid (4C), D–Acetyl coenzyme A (2C), E–Citric acid (6C), F–α-ketoglutaric acid
(b) A–α-ketoglutaric acid, B–Citric acid (6C), C:Oxaloacetic acid (4C), D–Succinic acid (4C), E–Acetyl coenzyme A (2C), F–Malic acid (4C)
(c) A–Acetyl coenzyme A (2C), B–Oxaloacetic acid (4C), C–Citric acid (6C), D–Malic acid (4C), E–α-ketoglutaric acid, F–Succinic acid (4C)
(d) A–Succinic acid (4C), B–Acetyl coenzyme A (2C), C–Malic acid, D–α-ketoglutaric acid, E–Citric acid (6C), F–Oxaloacetic acid (4C)

75. Kreb's cycle is termed as the aerobic phase of respiration because
(a) It consumes oxygen
(b) Oxygen acts as a catalyst
(c) Aerobic conditions are essential for the continued operation of electron transport system
(d) All the above

76. Between which of the following stages, GTP is formed by substrate level phosphorylation?
(a) Succinate to fumarate (b) Ketoglutarate to succinate
(c) Oxalosuccinate to glutarate (d) Fumarate to malate

77. How many molecules of ATP are produced per molecule of $FADH_2$ oxidized?
(a) One (b) Two (c) Three (d) Four

78. A molecule of ATP is formed when electron passes from
(a) Cyt c to Cyt a (b) Cyt a to Cyt c (c) Cyt b to Cyt c_1 (d) Cyt c to Cyt b

79. Kreb's cycle is also known as
(a) Glyoxylate cycle (b) EMP pathway (c) Citric acid cycle (d) Glycolate cycle

80. The link between glycolysis and Kreb's cycle is
(a) Citric acid (b) Acetyl-CoA (c) Succinic acid (d) Oxaloacetic acid

81. The reaction of Kreb's cycle take place
(a) In cytoplasm (b) In endoplasmic reticulum
(c) In matrix of mitochondria (d) On the surface of mitochondrion

82. Oxidative phosphorylation occurs in the
(a) Outer membrane of mitochondria (b) Inner membrane of mitochondria
(c) Stroma of chloroplast (d) Grana of chloroplast

83. Which of the following is the correct sequence in Kreb's cycle?
(a) Isocitric acid → Oxalosuccinic acid → α–ketoglutaric acid
(b) Oxalosuccinic acid → Isocitric acid → α–ketoglutaric acid
(c) α–ketoglutaric acid → Isocitric acid → Oxalosuccinic acid
(d) Isocitric acid → α–ketoglutaric acid → Oxalosuccinic acid

84. In how many steps, CO_2 is released in aerobic respiration of pyruvic acid?
(a) One (b) Six (c) Three (d) Twelve

85. The formation of acetyl coenzyme–A from pyruvic acid is the result of its
(a) Reduction (b) Dehydration
(c) Dephosphorylation (d) Oxidative decarboxylation

86. Oxidative phosphorylation and photophosphorylation both require the electron carrier
(a) Cytochrome (b) Oxygen (c) Carbon dioxide (d) Water

87. In an electron transport chain, in terminal oxidation, the cytochrome which donates electrons to O_2 is
(a) Cytochrome b (b) Cytochrome c (c) Cytochrome a_3 (d) Cytochrome a

88. The last or terminal cytochrome in respiratory chain is
(a) Cyt b (b) Cyt a_3 (c) Cyt a (d) Cyt c

89. The correct sequence of electron acceptor in ATP synthesis is
(a) Cyt a a_3 b c (b) Cyt b c a a_3 (c) Cyt b c a_3 a (d) Cyt c b a a_3

90. In Kreb's cycle, the FAD precipitates as electron acceptor during the conversion of
(a) Succinyl CoA to succinic acid (b) α-ketoglutarate to succinyl CoA
(c) Fumaric acid to maleic acid (d) Succinic acid to fumaric acid

91. RQ for glucose is
(a) 1 (b) 0.5 (c) 2 (d) 0.05

Respiratory Quotient

92. With which of the following fatty acid the value of RQ is one?
(a) Acetic acid (b) Oleic acid (c) Stearic acid (d) Palmitic acid

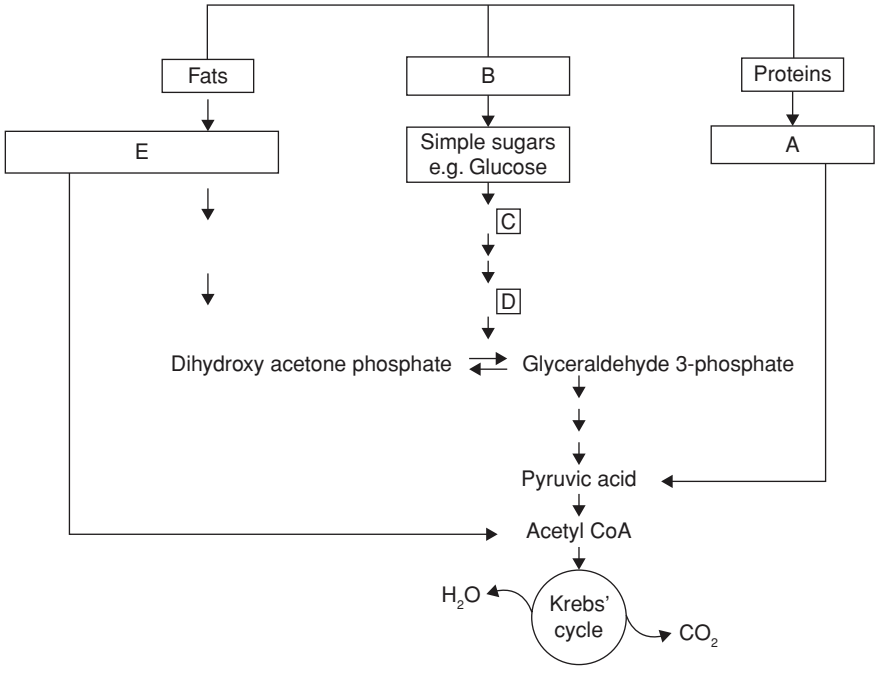
93. RQ is defined as
(a) Ratio between CO_2 liberated and O_2 taken
(b) Volume of oxygen taken
(c) Volume of carbon dioxide liberated
(d) Ratio between oxygen taken and fat utilized

94. RQ of fatty substances is generally
(a) Unity (b) Less than one
(c) Greater than one (d) Zero

95. RQ of sprouting potato tubers will be
(a) 1 (b) < 1 (c) > 1 (d) 0

96. RQ in anaerobic respiration is
(a) 0 (b) $\propto$ (c) 1 (d) > 1

97. What do alphabets A to E indicates in following figures?



(a) A–Glucose 6-phosphate, B–Fatty acids and glycerol, C–Carbohydrate, D–Amino acid, E–Fructose 1, 6-bisphosphate
(b) A–Fatty acids and glycerol, B–Glucose 6-phosphate, C–Amino acid, D–Carbohydrates, E–Fructose 1, 6-bisphosphate
(c) A–Fructose 1, 6-bisphosphate, B–Amino acid, C–Glucose 6-phosphate, D–Fatty acids and glycerol, E–Carbohydrate
(d) A–Amino acid, B–Carbohydrate, C–Glucose 6-phosphate, D–Fructose 1, 6-bisphosphate, E–Fatty acids and glycerol

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

98. **Assertion:** Glycolysis occurs in cytoplasm.
Reason: Enzymes for glycolysis are found in cytoplasm.

99. **Assertion:** Power house of cell is mitochondria.
Reason: ATP is produced in mitochondria.

100. **Assertion:** The inner membrane of mitochondria contains enzymes of Kreb's cycle
Reason: The mitochondrial matrix contains systems involving electron transport.

101. **Assertion:** Respiration is an amphibolic pathway.
Reason: Respiratory pathway is involved in both catabolism and anabolism.

102. **Assertion:** The breakdown of glucose to pyruvic acid is called glycolysis.
Reason: For complete oxidation of glucose organism adopt Kreb's cycle.

103. **Assertion:** Substrate level phosphorylation is present in glycolysis.
Reason: Substrate level phosphorylation causes synthesis of ATP.

104. **Assertion:** Under anaerobic conditions, pyruvate gives rise to lactate in some bacteria.
Reason: Under anaerobic condition, pyruvate gives rise to acetyl-CoA.

105. **Assertion:** When carbohydrates are used as substrate and are completely oxidized, the RQ will be 1.
Reason: Equal amount of CO_2 and O_2 are evolved and consumed during the above process.

106. **Assertion:** In ETS the ultimate acceptor of electrons is O_2.
Reason: Substrate level phosphorylation also occurs in Kreb's cycle.

107. **Assertion:** F_1 particles are present in the inner mitochondrial membrane.
Reason: The passage of protons through the channel is coupled to the catalytic site of the F_1 component for the production of ATP.

108. **Assertion:** Food has to be translocated to all non green parts of plant.
Reason: Non-green part can't synthesize their food.

109. **Assertion:** Glucose is a respiratory substrate.
Reason: Glucose is oxidised during process of cellular respiration.

110. **Assertion:** In cellular respiration, energy from respiratory substrate released in single step.
Reason: Only one enzyme is used for respiration.

111. **Assertion:** ATP acts as energy currency of cell.
Reason: ATP broken down whenever and wherever energy needs to be utilized.

112. **Assertion:** Plants only posses lenticels for gaseous exchange.
Reason: Plants are devoid of stomata.

113. **Assertion:** Oxidation of glucose occurs in multiple steps.
Reason: It enables released energy can be coupled to ATP synthesis.

114. **Assertion:** Glycolysis is referred as EMP pathway
Reason: The scheme of glycolysis was given by Embden, Meyerhof and Parnas.

115. **Assertion:** In glycolysis glucose undergo partial oxidation
Reason: In glycolysis CO_2 is formed at the end.

116. **Assertion:** Kerb's cycle is referred as aerobic respiration
Reason: In Kerb's cycle glucose is completely oxidised to CO_2 and H_2O

117. **Assertion:** Oxidation of one molecule of NADH gives rise to 3 ATP molecules.
Reason: Oxidation of one molecule of $FADH_2$ gives rise to 2 ATP molecules.

118. **Assertion:** Fermentation and aerobic respiration generate different amount of ATP.
Reason: Fermentation leads to partial breakdown of glucose where as aerobic respiration lead to complete breakdown of glucose into CO_2 and H_2O which generate more amount of energy.

119. **Assertion:** Respiratory pathway now a day called as amphibolic pathway.
Reason: Respiratory pathway is involved in both catabolism and anabolism.

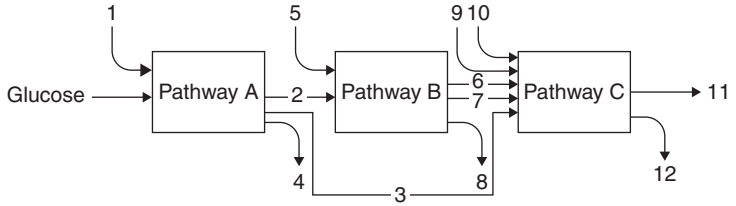
PREVIOUS YEAR QUESTIONS

1. The energy releasing metabolic process in which the substrate is oxidized without an external electron acceptor is called

[AIPMT PRE 2010]

(a) Glycolysis (b) Fermentation
(c) Aerobic respiration (d) Photorespiration

2. The three boxes in this diagram represent the three major biosynthetic pathways in aerobic respiration. Arrows represent net reactions or products.



Arrows numbered 4, 8 and 12 can all be: [AIPMT 2013]
(a) NADH (b) ATP (c) H_2O (d) FAD^+ or $FADH_2$

3. Which of the metabolites is common to respiration mediated breakdown of fats, carbohydrates and proteins?

[AIPMT 2013]

(a) Glucose 6 - phosphate (b) Fructose 1,6–bisphosphate
(c) Pyruvic acid (d) Acetyl-CoA

4. In which one of the following processes CO_2 is not released?
[AIPMT 2014]
(a) Aerobic respiration in plants
(b) Aerobic respiration in animals
(c) Alcoholic fermentation
(d) Lactate fermentation

5. Cytochromes are found in
[AIPMT 2015]
(a) Matrix of mitochondria
(b) Outer wall of mitochondria
(c) Cristae of mitochondria
(d) Lysosomes

6. Which of the following biomolecules is common to respiration mediated breakdown of fats, carbohydrates and proteins? [NEET - I, 2016]
(a) Fructose 1, 6 bisphosphate
(b) Pyruvic acid
(c) Acetyl Co-A
(d) Glucose -6-phosphate

NCERT EXEMPLAR QUESTIONS

1. The ultimate electron acceptor of respiration in an aerobic organism is
(a) Cytochrome
(b) Oxygen
(c) Hydrogen
(d) Glucose

2. Phosphorylation of glucose during glycolysis is catalysed by
(a) Phosphoglucomutase
(b) Phosphoglucoisomerase
(c) Hexokinase
(d) Phosphorylase

3. Pyruvic acid, the key product of glycolysis, can have many metabolic fates. Under aerobic condition it forms
(a) Lactic acid
(b) $CO_2 + H_2O$
(c) Acetyl CoA + CO_2
(d) Ethanol + CO_2

4. Electron Transport System (ETS) is located in the mitochondrial
(a) Outer membrane
(b) Inter membrane space
(c) Inner membrane
(d) Matrix

5. Which of the following exhibits the highest rate of respiration?
(a) Growing shoot apex
(b) Germinating seed
(c) Root tip
(d) Leaf bud

6. Choose the correct statement:
(a) Pyruvate is formed in the mitochondrial matrix.
(b) During the conversion of succinyl Co-A to succinic acid a molecule of ATP is synthesized.
(c) Oxygen is vital in respiration for removal of hydrogen.
(d) There is complete breakdown of glucose in fermentation

7. Mitochondria are called powerhouses of the cell. Which of the following observations supports this statement?
(a) Mitochondria synthesise ATP.
(b) Mitochondria have a double membrane.
(c) The enzymes of the Krebs cycle and the cytochromes are found in mitochondria.
(d) Mitochondria are found in almost all plants and animal cells.

8. The end product of oxidative phosphorylation is
(a) NADH (b) Oxygen (c) ADP (d) ATP + H_2O

9. Match the following and choose the correct option from those given.

	Column A		Column B
(A)	Molecular oxygen	(i)	α – Ketoglutaric acid
(B)	Electron acceptor	(ii)	Hydrogen acceptor
(C)	Pyruvate dehydrogenase	(iii)	Cytochrome C
(D)	Decarboxylation	(iv)	Acetyl CoA

(a) (A) – (ii), (B) – (iii), (C) – (iv), (D) – (i) (b) (A) – (iii), (B) – (iv), (C) – (ii), (D) – (i)
(c) (A) – (ii), (B) – (i), (C) – (iii), (D) – (iv) (d) (A) – (iv), (B) – (iii), (C) – (i), (D) – (ii)

Answer Keys

Practice Questions

1. (a)	2. (d)	3. (d)	4. (c)	5. (a)	6. (b)	7. (a)	8. (b)	9. (a)	10. (c)
11. (c)	12. (c)	13. (b)	14. (d)	15. (c)	16. (c)	17. (a)	18. (c)	19. (b)	20. (c)
21. (d)	22. (a)	23. (c)	24. (d)	25. (a)	26. (a)	27. (d)	28. (b)	29. (c)	30. (c)
31. (c)	32. (d)	33. (c)	34. (b)	35. (c)	36. (c)	37. (c)	38. (b)	39. (b)	40. (b)
41. (a)	42. (c)	43. (c)	44. (b)	45. (a)	46. (d)	47. (c)	48. (d)	49. (b)	50. (c)
51. (b)	52. (a)	53. (b)	54. (d)	55. (b)	56. (b)	57. (b)	58. (a)	59. (b)	60. (c)
61. (c)	62. (b)	63. (b)	64. (d)	65. (b)	66. (a)	67. (c)	68. (c)	69. (c)	70. (b)
71. (b)	72. (c)	73. (d)	74. (c)	75. (c)	76. (b)	77. (b)	78. (c)	79. (c)	80. (b)
81. (c)	82. (b)	83. (a)	84. (c)	85. (d)	86. (a)	87. (c)	88. (b)	89. (b)	90. (d)
91. (a)	92. (a)	93. (a)	94. (b)	95. (a)	96. (b)	97. (d)			

Assertion and Reason Questions

98. (a)	99. (a)	100. (d)	101. (a)	102. (b)	103. (b)	104. (c)	105. (a)	106. (b)	107. (b)
108. (a)	109. (a)	110. (d)	111. (a)	112. (d)	113. (a)	114. (a)	115. (c)	116. (a)	117. (b)
118. (a)	119. (a)								

Previous Year Questions

1. (b)	2. (b)	3. (d)	4. (d)	5. (c)	6. (c)

NCERT Exemplar Questions

1. (b)	2. (c)	3. (c)	4. (c)	5. (b)	6. (c)	7. (a)	8. (d)	9. (a)

CHAPTER

15

Plant Growth and Development

PRACTICE QUESTIONS

Growth

1. What occurs due to the plants growth and development?
(a) Leaves, flowers, fruits, etc., arise in an orderly pattern
(b) Increase in girth
(c) Falling of leaves and fruits
(d) All the above

2. Development consists of
(a) Growth (b) Differentiation (c) Both (a) and (b) (d) None of these

3. Which of the following is correct about the development of a mature plant from a zygote?
(a) Follows a precise and ordered succession of events
(b) Only differentiation occurs
(c) Occurs due to environmental effect only
(d) None of the above

4. What kinds of factors govern a plant's developmental process?
(a) Intrinsic factors (b) Extrinsic factors (c) Both (a) and (b) (d) None of these

5. All cells of the plants are descendants of
(a) Zygote (b) Seeds (c) gametes (d) Both (b) and (c)

6. Appearance and fall of fruits occurs due to
(a) Hormonal influence (b) Growth and development
(c) Differentiation (d) Both (a) and (b)

7. Which is one of the most fundamental and conspicuous characteristic of living being?
(a) Development (b) Differentiation (c) Maturation (d) Growth

8. What is an irreversible permanent increase in size of an organ or its part or even of an individual cell?
(a) Development (b) Differentiation (c) Growth (d) Maturation

9. Growth is accompanied by
(a) Anabolism (b) Catabolism (c) Both (a) and (b) (d) None of these

10. Metabolism occurs on the expense of
(a) Nutrition (b) Water (c) Energy (d) Hormones

11. If expansion of leaf occurs, it is known as
(a) Swelling (b) Imbibitions (c) Differentiation (d) Growth

12. Why the growth of a plant is unique?
(a) The plant retains the capacity of unlimited growth.
(b) The plant can regenerate the same characters.
(c) There is no change in offspring's characters.
(d) None of the above

13. The unique ability to retain the capacity of growth in plants is due to the presence of
(a) Lifetime differentiation
(b) Activator hormones
(c) Chlorophyll to utilize energy lifetime
(d) Meristems at certain locations

14. What is the special feature of meristem?
(a) It is present in every tissue (b) Its capacity to divide
(c) Its capacity to self-perpetuate (d) Both (b) and (c)

15. Cells that further make up the plant body _____.
(a) Loose capacity to divide (b) Loose capacity to grow
(c) Loose capacity to differentiate (d) None of these

16. Continued growth due to activity of meristem is which type of growth?
(a) Closed growth (b) Open growth (c) Both (a) and (b) (d) None of these

17. Meristems are found in
(a) Root apex (b) Shoot apex (c) Both (a) and (b) (d) None of these

18. Meristems are responsible for _____
(a) Secondary growth (b) Primary growth (c) Both (a) and (b) (d) None of these

19. What is the contribution of meristem in growth of plant?
(a) Elongation along the axis (b) Differentiation
(c) Both (a) and (b) (d) None of these

20. Secondary growth of plant occurs due to _____
(a) Lateral meristems (b) Vascular cambium
(c) Cork cambium (d) All of these

21. At cellular level, growth is an
(a) Increase in cytoplasm (b) Increase in size
(c) Increase in nuclear size (d) Increase in protoplasm

22. Which of the following is not the parameter for measuring growth?
(a) Wet weight (b) Dry weight (c) Volume (d) Cell member

23. One single maize root apical meristem can give rise to how many cells per hour?
(a) 17500 (b) >17500 (c) <17500 (d) None of these

24. By how many times, the cells of watermelon increase in size?
(a) 3,15,000 (b) 3,50,000 (c) 3,25,000 (d) 3,17,000

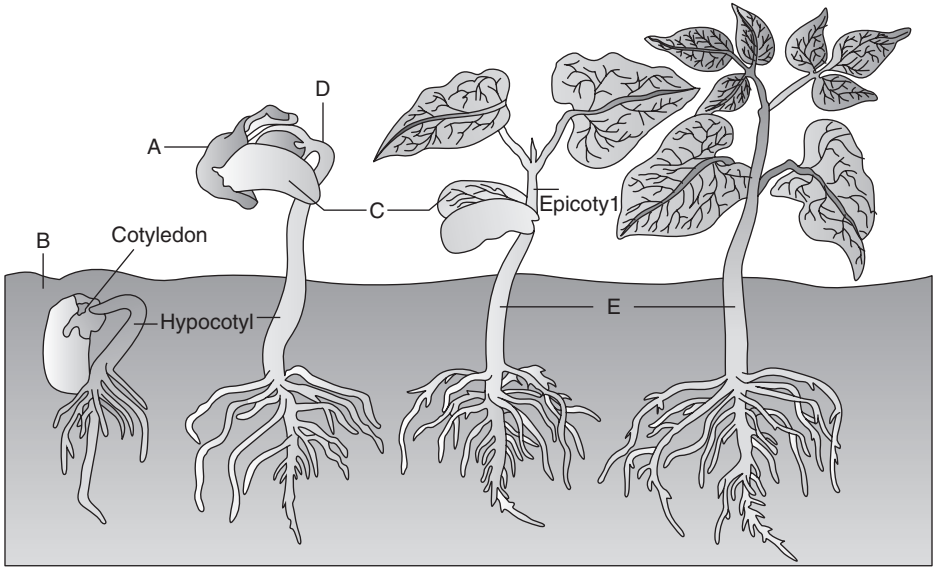
25. In question 23 and 24 respectively growth can be expressed as increase in cell.
(a) Size, number (b) Volume, size (c) Number, size (d) Size, volume

26. Growth of pollen tube is measured in terms of
(a) Weight (b) Width (c) Volume (d) Length

27. Growth of a dorsiventral leaf can be measured in terms of _____
(a) Length (b) Width (c) Volume of cells (d) Surface area

28. Which of the following are phases of growth?
(a) Meristemation (b) Elongation (c) Maturation (d) All of these

29. Identify A, B, C, D and E in the given figure.



(a) A–Epicotyl hook, B–Soil line, C–Cotyledons, D–Hypocotyl, E–Seed coat
(b) A–Soil line, B–Seed coat, C–Hypocotyl, D–Epicotyl hook, E–Cotyledons
(c) A–Seed coat, B–Soil line, C–Cotyledons, D–Epicotyl hook, E–Hypocotyl
(d) A–Hypocotyl, B–Seed coat, C–Epicotyl hook, D–Cotyledons, E–Soil line

30. Which of the following represent meristematic phase of growth?
(a) Root apex (b) Shoot apex
(c) Both (a) and (b) (d) None of these

31. Which of the following are characteristics of the cells in meristematic region?
(a) Rich in protoplasm (b) Large nuclei
(c) Thin plasma membrane (d) Both (a) and (b)

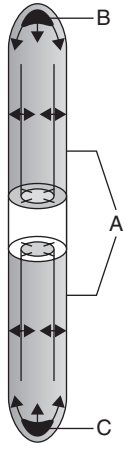
32. Which of the following is not the characteristics of cell wall of meristematic cells?
(a) Primary in nature (b) Cellulosic
(c) Abundant plasmodesmata (d) None of these

33. Where can we find cells representing the phases of elongation?
(a) Root Apex (b) Shoot Apex
(c) Cells proximal to both (d) All of these

34. Which of the following is not the characteristic of the cells in elongation phase?
(a) Cell enlargement (b) New cell wall deposition
(c) Decrease in volume (d) Both (a) and (b)

35. Cells proximal to the phase of elongation show _____.
(a) Meristematic phase (b) Maturative phase
(c) Elongation phase (d) All of these

36. What is A, B and C in the given figure?



(a) A–Shoot apical meristem, B–Root apical meristem, C–Vascular cambium
(b) A–Vascular cambium, B–Root apical meristem, C–Shoot apical meristem
(c) A–Root apical meristem, B–Vascular cambium, C–Shoot apical meristem
(d) A–Vascular cambium, B–Shoot apical meristem, C–Root apical meristem

37. Cells of maturative phase show
(a) Thickening of walls (b) Protoplasmic modification
(c) Both (a) and (b) (d) None of these

38. Increased growth per unit time is called
(a) Growth rate (b) Growth speed (c) Both (a) and (b) (d) None of these

39. The growth rate shows an increase that can be
(a) Mathematical (b) Arithmetic (c) Geometrical (d) Both (b) and (c)

40. In arithmetic growth, other than daughter cells, what happens to the other cells?
(a) They undergo maturation (b) They undergo differentiation
(c) Both (a) and (b) (d) They undergo continuous cell division

41. Examples of arithmetic growth is/are
(a) Root elongation (b) Increase in girth (c) Both (a) and (b) (d) None of these

42. Slow initial growth is called
(a) Log phase (b) Lag phase
(c) Exponential phase (d) None of these

43. The rapidly increase in growth after showing initial period is called
(a) Log phase (b) Leg phase (c) Both (a) and (b) (d) None of these

44. What is the speciality of the cells after mitotic cell division in geometric growth?
(a) Thickened cell wall (b) Occurring of well organized growth
(c) Retaining the ability to divide (d) None of these

45. Stationary phase occurs due to
(a) Increase in distance (b) Limited nutrient supply
(c) Thickening of cell wall (d) None of these

46. Geometrical growth graphically shows
(a) Linear curve (b) Sigmoid curve (c) Both one by one (d) Straight line

47. Living organism growing in a natural environment can be found graphically by the presence of
(a) Sigmoid curve (b) Linear curve (c) Straight line (d) All of these

48. Sigmoid curve is typical for which components of plant body?
(a) Cells (b) Tissue (c) Organs (d) All of these

49. Exponential growth can be expressed as
(a) $W_1 = W_0 e^{rt}$ (b) $W_0 = W_1 e^{rt}$ (c) $W_1 = W_0 e^{\Delta rt}$ (d) None of these

50. In the expression of exponential growth 'e' stands for (Question number 50-52 with respect to equation in question number 49)
(a) Exponential growth rate (b) Base of natural log
(c) Relative growth rate (d) Change in size

51. In expression of exponential growth 'r' is referred to as
(a) Growth rate (b) Efficiency index
(c) Both (a) and (b) (d) Time of growth

52. The final size, i.e., W_1 depends principally on
(a) W_0 (b) r (c) t (d) e

53. Quantitative comparisons can be made by
(a) Absolute growth rate (b) Relative growth rate
(c) Both (a) and (b) (d) None of these

54. Measurement and comparison of total growth per unit time is called
(a) Absolute growth rate (b) Relative growth rate
(c) Both (a) and (b) (d) None of these

55. The growth of the given system per unit time which is expressed on a common basis or per unit initial parameter is known as
(a) Absolute growth rate (b) Relative growth rate
(c) Both (a) and (b) (d) None of these

56. Which of the following are not essential elements for growth?
(a) Water (b) Oxygen (c) Both (a) and (b) (d) None of these

57. Cell enlargement mainly requires
(a) Oxygen (b) Water (c) Nutrients (d) None of these

58. Extension of growth is supported by
(a) Oxygen (b) Turgidity (c) Osmosis (d) Imbibitions

59. Plant growth and further development is intimately linked to
(a) Oxygen requirement (b) Maintaining temperature
(c) Water status (d) None of these

60. How does water help enzymatic activities needed for growth?
(a) Water maintains pH (b) Water maintains temperature
(c) Water provides ions (d) Water provides medium

61. What helps in releasing the metabolic energy essential for growth activities?
(a) Oxygen (b) Water (c) Nutrients (d) None of these

62. What are required for the synthesis of protoplasm and act as source of energy?
(a) Oxygen (b) Micronutrients (c) Macronutrients (d) Both (b) and (c)

63. What can affect phases/stages of growth?
(a) Temperature (b) Light (c) Gravity (d) All of these

64. The process of derivation of cells from meristems and maturation to perform specific function is known as _____
(a) Regeneration (b) Dedifferentiation
(c) Redifferentiation (d) differentiation

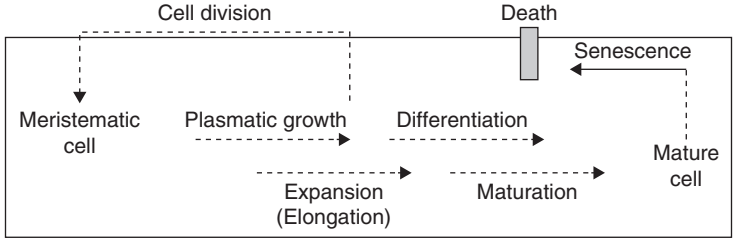
65. During differentiation, what kind of changes take place?
(a) Structural (b) Functional
(c) Both (a) and (b) (d) None of these

66. What changes would occur in a cell to form a treachery element?
(a) Loose their protoplasm
(b) Strong, elastic, lignocelluloses secondary cell wall
(c) Both (a) and (b)
(d) None of these

67. What is the phenomenon of dedifferentiation?
(a) Regaining the capacity to divide
(b) Loosing the capacity to divide
(c) Loosing the capacity to divide after regaining
(d) All of these

68. What is re-differentiation?
(a) Regaining the capacity to divide
(b) Loosing the capacity to divide
(c) Loosing the capacity to divide after regaining
(d) All of these

69. Identify A, B, C and D in the given figure.

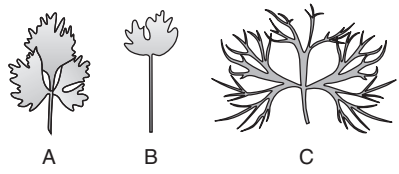


Sequence of developmental process in a plant cell.

(a) A–Cell division, B–Senescence, C–Plasmatic growth, D–Mature cell
(b) A–Meristematic cell, B–Plasmatic growth, C–Maturation, D–Senescence
(c) A–Mature cell, B–Maturation, C–Senescence, D–Meristematic cell
(d) A–Maturation, B–Cell division, C–Meristematic cell, D–Differentiation

70. What kind of differentiation is seen in plants?
(a) Open (b) Close (c) Primary (d) All of these

71. Identify the part of A, B and C in this figure.



(a) A–Water habitat, B–Juvenile, C–Terrestrial habitat
(b) A–Juvenile, B–Terrestrial habitat, C–Water habitat
(c) A–Terrestrial habitat, B–Juvenile, C–Water habitat
(d) A–Juvenile, B–Water habitat, C–Terrestrial habitat

72. Cells positioned away from root apical meristems, differentiate as
(a) Epidermis (b) Root cap (c) Both (a) and (b) (d) None of these

73. All those changes which an organism goes through during its life cycle from germination of the seed to senescence is termed as
(a) Growth (b) Differentiation (c) Development (d) None of these

74. On whose response the plasts follow different pathways to form different kind of structures?
(a) Environment (b) Phases of life (c) Both (a) and (b) (d) None of these

75. The ability of plants to follow different pathways in response to environment or phases of life to form different kind of structures is called?
(a) Adaptation (b) Differentiation (c) Maturation (d) Plasticity

76. In which of the following plant the leaves of juvenile plant are different in shape than those in mature plants?
(a) Cotton (b) Coriander (c) Larkspur (d) All of these

77. Leaves of which plant show environmental heterophylly?
(a) Cotton (b) Coriander (c) Larkspur (d) Buttercup

78. The phenomenon of environmental heterophyll is also called
(a) Adaptation (b) Maturation (c) Plasticity (d) Growth

79. What is the sum of growth and differentiation?
(a) Plasticity (b) Development (c) Maturation (d) All of these

80. Development in plants is mainly controlled by _____
(a) Intrinsic factor (b) Extrinsic factor (c) Both (a) and (b) (d) None of these

81. Intrinsic factor for plant development includes
(a) Intercellular (b) Intracellular (c) Both (a) and (b) (d) None of these

82. Inter cellular factor required for development in plant include _____
(a) Chemical regulators (b) Genetic
(c) Both (a) and (b) (d) None of these

83. Intracellular factor required for development in plant include
(a) Chemical regulators (b) Genetic
(c) Both (a) and (b) (d) None of these

84. Extrinsic factor for plant development includes _____
(a) Light (b) Temperature (c) Water (d) All of these

85. Nutrition is included in which phase of plant development?
(a) Former (b) Latter
(c) Both (a) and (b) (d) None of these

86. Oxygen is exchanged in which phase of plant development?
(a) Former (b) Latter (c) Both (a) and (b) (d) None of these

87. Which of the following is not a characteristic of a PGR?
(a) They are large
(b) Simple molecules
(c) They are of diverse chemical composition
(d) None of the above

88. Match the following for PGR.

Column I		**Column II**
A. IAA	–	i. Carotenoids
B. Kinetin	–	ii. Terpenes
C. ABA	–	iii. Indole compounds
D. GA_3	–	iv. Adenine derivatives

(a) (A–iii) (B–iv) (C–i) (D–ii) (b) (A–i) (B–iii) (C–ii) (D–iv)
(c) (A–iv) (B–ii) (C–iii) (D–i) (d) (A–ii) (B–i) (C–iv) (D–iii)

89. N^6–furfurylamino purine is which derivative?
(a) Indole compounds (b) Adenine
(c) Terpenes (d) Carotenoids

90. How many of the following are phytohormones?
ABA, C_2H_4, IAA, GA_3, ABA
(a) 2 (b) 3 (c) 4 (d) 5

91. Which of the following is not a plant growth promoter?
(a) Auxins (b) Gibberellins (c) Ethylene (d) Abscisic acid

92. Who initiated the discovery of plant growth hormones?
(a) Charles Darwin (b) Francis Darwin (c) Both (a) and (b) (d) None of these

93. According to Charles Darwin, which plant would help in the discovery of PGH?
(a) Larkspur (b) Buttercup (c) Canary grass (d) All of these

94. Coleoptiles responded to _____
(a) Light (b) Water (c) Touch (d) All of these

95. As a response to stimuli the coleoptiles caused _____
(a) Bending (b) Flowering (c) Budding (d) All of these

96. Auxins are discovered by
(a) Charles Darwin (b) Francis Darwin
(c) F. W. Went (d) Both (a) and (b)

97. *Gibberella fujikuroi* causes what disease in rice plants?
(a) Foolish seeding (b) Bikaner (c) Both (a) and (b) (d) None of these

98. Who repotted that the symptoms reappeared in uninfected plants treated with sterile filtrate of giberella fungus?
(a) E. Kurosawa (b) F. Skoog (c) Both (a) and (b) (d) None of these

99. Callus from which plant was observed by miller?
(a) Tomato (b) Tobacco (c) Rice plant (d) None of these

100. Addition of what to auxins in nutrients medium causes proliferation of callus?
(a) DNA (b) Yeast extract (c) Coconut milk (d) All of these

101. Who crystallized cytokinin?
(a) Skoog and miller (b) Charles Darwin (c) Both (a) and (b) (d) F. W. Went

102. Skoog and miller termed cytokinin as
(a) Cytokinesis (b) Kinetin (c) Both (a) and (b) (d) None of these

103. Which three different kinds of inhibitors were found in mid-1960s?
(a) Inhibitor–A, Abscission–II and dormin
(b) Inhibitor–B, Abscission–II and dormin
(c) Inhibitor–A, Abscission–III and dormin
(d) Inhibitor–B, Abscission–III and dormin

104. All individually found inhibitors in mid-1960s were later named as
(a) Gibberellic acid (b) Auxin (c) Abscisic acid (d) None of these

105. The volatile substance causing ripening of unripened bananas?
(a) Abscisic acid (b) Auxin (c) Ethylene (d) Terpenes

106. The only gaseous PGR is _____
(a) IBA (b) Kinetin (c) Terpenes (d) Ethylene

107. The Greek meaning of 'Auxein' is _____
(a) To flower (b) To seed (c) To grow (d) To enlarge

108. Auxin was first isolated from _____
(a) Frog's wine (b) Zeatin (c) Human wine (d) None of these

109. The name 'Auxin' was given to which chemical?
(a) Indole-3-acetic acid (b) Indole-6-acetic acid
(c) Indole-3-butyric acid (d) Indole-6-butyric acid

110. How many of the following auxins are obtained from plants?
IAA, IBA, NAA, 2, 4–D
(a) 1 (b) 2 (c) 3 (d) 4

111. NAA stands for _____.
(a) Nitroacetic acid (b) Nitro aceto acetate
(c) Naphthaleneacetic acid (d) Naphthaloaceto acetic acid

112. 2, 4–D stands for _____
(a) 2, 4–Dichlorophenoxy acetate (b) 2, 4–Dextrophenoxy acetate
(c) 2, 4–Diphosphenoxy acetate (d) 2, 4–Dichloromethoxy acetate

113. Synthetic auxins are extesively used in
(a) Agriculture (b) Horticulture (c) Both (a) and (B) (d) None of these

114. Natural auxins are extensively used in
(a) Agriculture (b) Horticulture (c) Both (a) and (B) (d) None of these

115. Which effect of auxin is applied worldwide for plant propagation?
(a) Apical dominance (b) Herbicidal action
(c) Initiate rooting in stem cutting (d) None of these

116. Auxins promote flowering in
(a) Tomatoes (b) Pineapples (c) Oranges (d) None of these

117. What prevents the fruit and leaf to drop in early?
(a) ABA (b) IAA (c) NAA (d) Both (b) and (c)

118. What promotes the abscission of older mature leaf?
(a) Abscisic acid (b) Auxin (c) Ethylene (d) Cytokinins

119. In most of the higher plants, the growing apical bud inhibits the growth of lateral bud. This phenomena is called
(a) Apical tolerance (b) Axial intolerance
(c) Apical ordinance (d) Apical dominance

120. What can help removing apical dominance?
(a) Removal of shoot tips (b) Provide plants with a lot of auxin
(c) Both (a) and (B) (d) None of these

121. The process of removal of shoot tip to avoid apical dominance is called _____
(a) Autotomy (b) Decapitation (c) Both (a) and (B) (d) Capitation

122. Decapitation is widely used for
(a) Tea plantation (b) Hedge making (c) Both (a) and (B) (d) None of these

123. Which of the following PGR can induce parthenocarpy?
(a) IBA (b) 2, 4–D (c) Terpenes (d) Kinetin

124. Auxins induce parthenocarpy in which plants?
(a) Tomato (b) Pineapple (c) Apple (d) All of these

125. Which of the following PGR is widely used as herbicide?
(a) Auxin (b) Gibberellic acid (c) Cytokinins (d) All of these

126. Which of the following PGR is widely used to kill dicotyledonous weeds?
(a) IAA (b) NAA (c) 2, 4–D (d) ABA

127. 2, 4–D does not show herbicidal action on
(a) Chicory led ones (b) Monocotyledonous
(c) Mature dicotyledonous (d) Mature monocotyledonous

128. Auxin 2, 4–D is used for what?
(a) To remove weeds from farms by formers
(b) To remove weeds from lawn by gardeners
(c) To induce flowering in horticulture
(d) All of these

129. Auxin helps in what?
(a) Controlling phloem differentiation (b) Controlling xylem differentiation
(c) Cell division (d) Both (b) and (c)

130. How many varieties of gibberellins reported from widely different variety of organisms?
(a) 100 (b) 120 (c) 145 (d) 140

131. Different types of gibberellins is reported from what kind of organisms?
(a) Fungi (b) Higher plants (c) Both (a) and (b) (d) None of these

132. Which of the following was first reported gibberellins to be discovered?
(a) GA_1 (b) GA_2 (c) GA_3 (d) GA_4

133. What is the chemical natural of all the gas?
(a) Basic (b) Acidic (c) Neutral (d) Slightly basic

134. Gibberellins bring about what kind of change in plants?
(a) Morphological (b) Physiological (c) Genetical (d) None of these

135. Which ability of gibberellins is used to increase the length of grape stalks?
(a) Ability to increase apically (b) Ability to increase in length of axis
(c) Ability to avoid apical dominance (d) All of these

136. How does gibberellins not change the quality of an apple?
(a) Make it sweeter (b) Elongate it in size
(c) Improve its shape (d) All of these

137. How can gibberellins help to extend the market period?
(a) It delays senescence (b) Increases ripening period
(c) Increases flowering time (d) All of these

138. In the form of sugar, sugarcane stores what?
(a) Proteins (b) Carbohydrates (c) Glycoproteins (d) None of these

139. On spraying gibberellins on sugarcane crops what major change will it bring?
(a) Increase sweetness (b) Increase length of stem
(c) Increase root strength (d) All of these

140. Spraying of gibberellins over sugarcane can increase the yield by how much?
(a) 20 tonnes/acre (b) 20 kg/acre
(c) 20 quintet/acre (d) None of these

141. What change does it bring in juvenile conifers when sprayed with gas?
(a) Hastens maturity period (b) Hastens germination period
(c) Hastens dormancy period (d) None of these

142. Spraying of gas on juvenile conifers causes
(a) Early flowering (b) Early germination
(c) Early seed production (d) All of these

143. Cytokinins have specific effects on
(a) Cytokinosis (b) cytokinesis (c) Cytoketosis (d) Cytolysis

144. In what form the cytokinins were discovered?
(a) Terpenes (b) Toluenes (c) Kinetin (d) None of these

145. Gibberellins promotes bolting in which plants?
(a) Beet (b) Cabbage (c) Both (a) and (b) (d) None of these

146. Kinetin is _____
(a) Cytokinins (b) Modified form of adenine
(c) Purine (d) All of these

147. Kinetin was first discovered from
(a) Corn kernels (b) Autoclaved herring sperm DNA
(c) Coconut milk (d) All of these

148. Naturally kinetin occurs in
(a) Coconut milk (b) Pineapple (c) Corn (d) None of these

149. The naturally available cytokinin like substance is
(a) Kinetin (b) Zeatin (c) Both (a) and (b) (d) None of these

150. Zeatin was isolated from what?
(a) Corn kernels (b) Coconut milk (c) Both (a) and (b) (d) None of these

151. Where are natural cytokinins synthesized?
(a) Areas of rapid cell division (b) Areas undergoing differentiation
(c) Both (a) and (b) (d) None of these

152. How many of the following PGRs help to overcome apical dominance?
Auxins, Gibberellins, Cytokinins, Ethylene
(a) 1 (b) 2 (c) 3 (d) 4

153. How many of the following PGRs help in delay of senescence?
Auxins, Gibberellins, Cytokinins, Ethylene
(a) 1 (b) 2 (c) 3 (d) 4

154. A plant tissue is undergoing senescence, which PGR would be found in it?
(a) Auxins (b) Gibberellins (c) Cytokinins (d) Ethylene

155. Large amounts of ethylene is synthesized in
(a) Ripening fruit (b) Newly grown leaf
(c) Apex (d) Axial bud

156. What are the influences of ethylene on plants?
(a) Horizontal growth of seedlings (b) Swelling of the axis
(c) Apical hook formation in dicot seedling (d) All of these

157. What is the of effect of ethylene on plant organs, especially leaves and flowers?
(a) Promotes abscission (b) Promotes senescence
(c) Both (a) and (b) (d) None of these

158. What is the effect of ethylene on ripening fruit?
(a) Increases rate of growth (b) Increase in rate of respiration
(c) Both (a) and (b) (d) None of these

159. Rise in the rate of respiration is called
(a) Respiratory climax (b) Respiratory rise
(c) Respiratory climactic (d) None of these

160. Which of the following PGR is used to break seed and bud dormancy?
(a) Auxins (b) Gibberellins (c) Cytokinins (d) Ethylene

161. Ethylene initiates germination in which seed?
(a) Mustard (b) Peanut (c) Both (a) and (b) (d) None of these

162. Sprouting of potato tubers is initiated by which of the following PGR?
(a) Cytokinin (b) Ethylene (c) Both (a) and (b) (d) None of these

163. How does ethylene help plants to increase their absorption surface?
(a) Promotes growth of root (b) Promotes formation of root hair
(c) Both (a) and (b) (d) None of these

164. Ethylene is used to initiate flowering and for synchronizing fruit set in which fruit?
(a) Apple (b) Pineapple (c) Banana (d) All of these

165. Ethylene induces flowering in which fruit?
(a) Mango (b) Apple (c) Pineapple (d) All of these

166. Which of the following is the most widely used PGR in agriculture?
(a) IAA (b) ABA (c) GA_3 (d) Ethylene

167. Which of the following is a characteristic of ethephon?
(a) Readily absorbed (b) Transported within the plant
(c) Releases ethylene slowly (d) All of these

168. Ethephon hastens fruit ripening in
(a) Mango (b) Tomato
(c) Apple (d) Both (b) and (c)

169. Ethephon accelerates abscission in flowers and fruits like
(a) Cherry (b) Walnut (c) Cotton (d) All of these

170. How does ethephon increase the yield of cucumber?
(a) Promotes senescence (b) Promotes female flowers
(c) Promotes male flowers (d) Both (a) and (b)

171. For which role ABA was discovered?
(a) Abscission (b) Dormancy (c) Both (a) and (b) (d) Ripening fruits

172. What are the actions of ABA?
(a) General plant growth inhibitor
(b) Inhibitor of plant metabolism
(c) Stimulates the closure of stomata in epidermis
(d) All of these

173. Why is ABA called stress hormone?
(a) Removes various stresses from plant
(b) Increase tolerance of plant to various kind of stresses
(c) Both (a) and (b)
(d) None of these

174. ABA plays an important role in all except
(a) Seed development (b) Maturation (c) Dormancy (d) Germination

175. What is/are the factors that depicts unfavorable growth of seeds?
(a) Desiccation (b) Air (c) Carbon dioxide (d) All of these

176. ABA is antagonist to
(a) IBA (b) IAA (c) GA_2 (d) All of these

177. All are types of roles played by PGR except
(a) Individualistic (b) Synergistic (c) Both (a) and (b) (d) None of these

178. Which of the following events are controlled by extrinsic factors via PGR?
(a) Vernalisation (b) Flowering (c) Dormancy (d) All of these

179. All are extrinsic factors for growth and development except
(a) Temperature (b) Light (c) Both (a) and (b) (d) Nutrition

180. What kind of plants require the exposure to light for a period exceeding a well defined critical duration?
(a) Short day plants (b) Day-neutral plants
(c) Long day plants (d) None of these

181. What kind of plants require the exposure to light for a period less than critical duration?
(a) Short day plants (b) Day-neutral plants
(c) Long day plants (d) None of these

182. Plants with no such correlation between exposure to light duration and induction of flower response are called
(a) Long day plant (b) Day-neutral plants
(c) Short day plant (d) None of these

183. What is more important of these?
(a) Light period (b) Dark period
(c) Both (a) and (b) (d) None of these

Photoperiodism

184. According to Hypothesis, which substances are responsible for photoperiodism?
(a) Hormonal substance (b) Abscisic acid
(c) Gibberellins (d) All of these

185. When flowering is either quantitatively or qualitatively dependent or exposure to low temperature it is called ____ phenomenon.
(a) Photoperiodism (b) Thermoperiodism
(c) Vernalization (d) Dormancy

186. Which of the plants don't have winter and spring varieties?
(a) Wheat (b) Rice (c) Barley (d) Rye

187. When are winter varieties planted?
(a) Spring (b) Winter (c) Autumn (d) All of these

188. When is the harvesting of winter varieties done?
(a) Spring (b) Winter (c) Mid-summer (d) Autumn

189. Biennials are what kind of plants?
(a) Dicarpous (b) Monocarpic (c) Polycarpic (d) None of these

190. Which of the following are examples of common biennials?
(a) Carrot (b) Cabbages (c) Sugarbeet (d) All

191. Cold treatment to biennial plants will stimulate what kind of response?
(a) Photo hastens (b) Photoropism (c) Photoperiodism (d) All

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

192. **Assertion:** Plant retains the capacity for unlimited growth throughout their life.
Reason: This ability of the plants is due to the presence of meristem at certain location of body.

193. **Assertion:** A sigmoid curve is a characterstic of living organism growing in a natural environment.
Reason: Sigmoid curve is an S shaped curve.

194. **Assertion:** Auxin induces parthenocarpy in tomatoes.
Reason: 2,4 –D is used as herbicides.

195. **Assertion:** GA increase the yield in sugarcane.
Reason: GA causes increase in length of sugarcane stem.

196. **Assertion:** Cytokinin delays the leaf senescence.
Reason: Cytokinin promotes nutrient mobilization.

197. **Assertion:** ABA increases the tolerance of plant to various kinds of stresses.
Reason: ABA stimulates the closure of stomata in the epidermis.

198. **Assertion:** Ethylene increases the yield in cucumber.
Reason: Ethylene promotes female flower in cucumber.

199. **Assertion:** Ethylene is a simple liquid PGR.
Reason: Etylene inhibits sprouting of potato tuber.

200. **Assertion:** The pigment which causes photoperiodic stimulus is called phytochrome.
Reason: Chemically phytochrome is a starch and lipid.

201. **Assertion:** Floral initiation is done by hormonal substance.
Reason: Hormonal substance is translocated from flowers to leaves.

202. **Assertion:** Vernalization refers specially to the promotion of flowering by a period of low temprature.
Reason: Vernalization also seen in biennial plants.

203. **Assertion:** Auxins have been used extensively in agriculture and horticulture.
Reason: They help to initiate rooting in stem cuttings.

204. **Assertion:** A plant hormone is a growth regulator.
Reason: Growth regulators promote or inhibit the growth.

205. **Assertion:** Expansion of a leaf is growth.
Reason: It is irreversible process

206. **Assertion:** Plant posses open form of growth
Reason: Plant has meristmetic tissues

207. **Assertion:** Growth in plant is measurable
Reason: We can measure growth of pollen tube in terms of its length

208. **Assertion:** Secondary xylem is example of redifferentiated cells.
Reason: Secondary xylem develops from dedifferentiated cells.

209. **Assertion:** Discovery of all 5 PGRs have been accidental
Reason: PGRs are simple molecules of diverse chemical composition

210. **Assertion:** Auxins used for plant propagation.
Reason: They help to initiate rooting in stem cuttings.

211. **Assertion:** In tea plantation hedge making is occur by decapitation.
Reason: Removal of apical bud usually results in the growth of lateral buds.

212. **Assertion:** GA_3 is used to speed up the melting process in brewing industries
Reason: GA_3 leads to synthesis of α-amylase hydrolysing enzyme which is responsible for partial hydrolysis of starch.

213. **Assertion:** Ripened banana inhibit the ripening of stored unripe banana.
Reason: Ripened banana release ethylene which inhibit ripening process

214. **Assertion:** Generally plant without leaf is unable to produce flower
Reason: Leaves are site of perception of light for flowering

215. **Assertion:** ABA is known as stress hormone
Reason: ABA increases the tolerance of plants to several kinds of stresses.

216. **Assertion:** 2, 4 D is selective weedicide
Reason: 2, 4 D is widely used to kill dicotyledonous weeds and doesn't affect mature monocotyledonous plant.

217. **Assertion:** GAs leads to early seed production in conifers
Reason: GAs hastens maturity period in juvenile conifers.

218. **Assertion:** Ethylene helps the plants to increase their surface area for absorption.
Reason: Ethylene promotes root growth and root hair formation.

PREVIOUS YEAR QUESTIONS

1. One of the commonly used plant growth hormone in tea plantation is
[AIPMT MAINS 2010]

(a) Ethylene (b) Abscisic acid
(c) Zeatin (d) Indole-3-acetic acid

2. Root development is promoted by
[AIPMT MAINS 2010]

(a) Abscisic acid (b) Auxin (c) Gibberellins (d) Ethylene

3. Phototropic curvature is the result of uneven distribution of
[AIPMT PRE 2010]

(a) Gibberellin (b) Phytochrome
(c) Cytokinins (d) Auxin

4. Photoperiodism was first characterized in
[AIPMT PRE 2010]

(a) Tobacco (b) Potato (c) Tomato (d) Cotton

5. Through their effect on plant growth regulators, what do the temperature and light control in the plants?

[AIPMT MAINS 2012]

(a) Flowering
(b) Closure of stomata
(c) Fruit elongation
(d) Apical dominance

6. Vernalization stimulates flowering in

[AIPMT MAINS 2012]

(a) Turmeric
(b) Carrot
(c) Ginger
(d) Zamikand

7. Which one of the following generally acts as an antagonist to gibberellins?

[AIPMT MAINS 2012]

(a) Ethylene (b) ABA (c) IAA (d) Zeatin

8. During seed germination its stored food is mobilized by

[AIPMT 2013]

(a) Ethylene
(b) Cytokinin
(c) ABA
(d) Gibberellin

9. Dr F. Went noted that if coleoptiles tips were removed and placed on agar for one hour, the agar would produce a bending when placed on one side of freshly cut coleoptile stumps. Of what significance is this experiment?

[AIPMT 2014]

(a) It made possible the isolation and exact identification of auxin.
(b) It is the basis for quantitative determination of small amounts of growth promoting substances.
(c) It supports the hypothesis that IAA is auxin.
(d) It demonstrated polar movement of auxins.

10. Which one of the following growth regulators is known as 'stress hormone'?

[AIPMT 2014]

(a) Abscisic acid
(b) Ethylene
(c) GA3
(d) Indole acetic acid

11. What causes a green plant exposed to the light on only one side, to bend toward the source of light as it grows?

[AIPMT 2015]

(a) Green plants need the right light to perform photosynthesis.
(b) Green plants seek light because they are phototropic.
(c) Light stimulates plant cells on the lighted side to grow faster.
(d) Auxin accumulates on the shaded side, stimulating greater cell elongation there.

12. Typical growth curve in plants is

[AIPMT 2015]

(a) Sigmoid
(b) Linear
(c) Stair steps shaped
(d) Parabolic

13. Which of the following enhances or induces fusion of protoplast?

[AIPMT 2015]

(a) Sodium chloride and potassium chloride
(b) Polyethylene glycol and sodium nitrate

(c) IAA and kinetin
(d) IAA and gibberellins

14. Auxin can be bioassayed by [RE-AIPMT 2015]
(a) Hydroponics (b) Potometer
(c) Lettuce hypocotyl elongation (d) Avena coleoptile curvature

15. The Avena curvature is used for bioassay of: [NEET - I, 2016]
(a) ABA (b) GA_3
(c) IAA (d) Ethylene

16. Oxidative phosphorylation is [NEET - II, 2016]
(a) oxidation of phosphate group in ATP
(b) addition of phosphate group to ATP
(c) Formation of ATP by energy released from electrons removed during substrate oxidation
(d) Formation of ATP by transfer of phosphate group from a substrate to ADP

NCERT EXEMPLAR QUESTIONS

1. Ethylene is used for
(a) Retarding ripening of tomatoes (b) Hastening of ripening of fruits
(c) Slowing down ripening of apples (d) Both (b) and (c)

2. Coconut milk contains
(a) ABA (b) Auxin
(c) Cytokinin (d) Gibberellin

3. The effect of apical dominance can be overcome by which of the following hormone
(a) IAA (b) Ethylene
(c) Gibberellin (d) Cytokinin

4. Match the following:

(A) IAA	(i) Herring sperm DNA
(B) ABA	(ii) Bolting
(C) Ethylene	(iii) Stomatal closure
(D) GA	(iv) Weed–free lawns
(E) Cytokinins	(v) Ripening of fruits

Options:
(a) (A) – (iv), (B) – (iii), (C) – (v), (D) – (ii), (E) – (i)
(b) (A) – (v), (B) – (iii), (C) – (iv), (D) – (ii), (E) – (i)
(c) (A) – (iv), (B) – (i), (C) – (v), (D) – (iii), (E) – (ii)
(d) (A) – (v), (B) – (iii), (C) – (ii), (D) – (i), (E) – (iv)

5. Apples are generally wrapped in waxed paper to
(a) Prevent sunlight for changing its colour.
(b) Prevent aerobic respiration by checking the entry of O_2.
(c) Prevent ethylene formation due to injury.
(d) Make the apples look attractive.

6. Growth can be measured in various ways. Which of these can be used as parameters to measure growth?
(a) Increase in cell number
(b) Increase in cell size
(c) Increase in length and weight
(d) All the above

7. The term synergistic action of hormones refers to
(a) When two hormones act together but bring about opposite effects.
(b) When two hormones act together and contribute to the same function.
(c) When one hormone affects more than one function.
(d) When many hormones bring about any one function.

8. Plasticity in plant growth means that
(a) Plant roots are extensible
(b) Plant growth is dependent on the environment
(c) Stems can extend
(d) None of these

9. To increase the sugar production in sugarcanes, they are sprayed with
(a) IAA
(b) Cytokinin
(c) Gibberellin
(d) Ethylene

10. ABA acts antagonistic to
(a) Ethylene
(b) Cytokinin
(c) Gibberellic acid
(d) IAA

11. Monocarpic plants are those which
(a) Bear flowers with one ovary
(b) Flower once and die
(c) Bear only one flower
(d) All the above

12. The photoperiod in plants is perceived at
(a) Meristem
(b) Flower
(c) Floral buds
(d) Leaves

Answer Keys

Practice Questions

1. (d)	2. (c)	3. (a)	4. (c)	5. (a)	6. (d)	7. (d)	8. (c)	9. (c)	10. (c)
11. (d)	12. (a)	13. (d)	14. (d)	15. (a)	16. (d)	17. (c)	18. (c)	19. (a)	20. (d)
21. (d)	22. (a)	23. (b)	24. (b)	25. (c)	26. (d)	27. (d)	28. (d)	29. (c)	30. (c)
31. (d)	32. (d)	33. (c)	34. (c)	35. (b)	36. (d)	37. (c)	38. (a)	39. (d)	40. (c)
41. (a)	42. (b)	43. (a)	44. (c)	45. (b)	46. (b)	47. (a)	48. (d)	49. (a)	50. (b)
51. (c)	52. (a)	53. (c)	54. (a)	55. (b)	56. (d)	57. (b)	58. (b)	59. (c)	60. (d)
61. (a)	62. (d)	63. (d)	64. (d)	65. (c)	66. (c)	67. (a)	68. (c)	69. (b)	70. (a)
71. (c)	72. (b)	73. (c)	74. (c)	75. (d)	76. (d)	77. (d)	78. (c)	79. (b)	80. (c)
81. (c)	82. (a)	83. (b)	84. (d)	85. (b)	86. (a)	87. (a)	88. (a)	89. (b)	90. (d)
91. (d)	92. (c)	93. (c)	94. (a)	95. (a)	96. (c)	97. (c)	98. (a)	99. (b)	100. (d)
101. (a)	102. (b)	103. (b)	104. (c)	105. (c)	106. (d)	107. (c)	108. (c)	109. (a)	110. (b)
111. (c)	112. (a)	113. (c)	114. (c)	115. (c)	116. (b)	117. (d)	118. (b)	119. (d)	120. (a)

121. (b) 122. (c) 123. (b) 124. (a) 125. (a) 126. (c) 127. (b) 128. (b) 129. (d) 130. (a)
131. (c) 132. (c) 133. (b) 134. (b) 135. (b) 136. (a) 137. (a) 138. (b) 139. (b) 140. (a)
141. (a) 142. (c) 143. (b) 144. (c) 145. (c) 146. (d) 147. (b) 148. (d) 149. (c) 150. (c)
151. (a) 152. (d) 153. (b) 154. (b) 155. (d) 156. (a) 157. (d) 158. (c) 159. (b) 160. (c)
161. (d) 162. (b) 163. (b) 164. (c) 165. (b) 166. (a) 167. (d) 168. (d) 169. (d) 170. (d)
171. (b) 172. (c) 173. (d) 174. (b) 175. (d) 176. (a) 177. (c) 178. (d) 179. (d) 180. (d)
181. (c) 182. (a) 183. (b) 184. (d) 185. (a) 186. (c) 187. (b) 188. (c) 189. (c) 190. (b)
191. (d)

Assertion and Reason Questions

192. (c) 193. (a) 194. (b) 195. (b) 196. (a) 197. (a) 198. (a) 199. (a) 200. (d) 201. (c)
202. (c) 203. (b) 204. (b) 205. (a) 206. (a) 207. (a) 208. (a) 209. (b) 210. (a) 211. (a)
212. (a) 213. (d) 214. (a) 215. (a) 216. (a) 217. (a) 218. (a)

Previous Year Questions

1. (c) 2. (b) 3. (d) 4. (a) 5. (a) 6. (b) 7. (b) 8. (d) 9. (b) 10. (a)
11. (d) 12. (a) 13. (b) 14. (d) 15. (c) 16. (c)

NCERT Exemplar Questions

1. (b) 2. (c) 3. (d) 4. (a) 5. (b) 6. (d) 7. (b) 8. (b) 9. (c) 10. (c)
11. (b) 12. (d)

This page is intentionally left blank.

Unit
V

Human Physiology

Students Note

Unit V includes human physiology. This unit includes topics which fascinates all biology students. In this section you need to focus on anatomy and physiology of organ system. Concentrate on data related to various organ systems like heart rate respiratory rate, cardiac output, and the amount of urea excreted in 24 hours. Special emphasis is given to nervous and endocrine system. Since the last two years, diagram based questions are frequently asked .from this unit, so do carefully study the diagram-based questions given in this book. This unit comprises an equivalent of 10–14 questions in AIPMT paper.

This page is intentionally left blank.

CHAPTER

16

Digestion and Absorption

PRACTICE QUESTIONS

Digestive System

1. The process of conversion of complex food substances to simple absorbable forms is called
(a) Egestion (b) Digestion (c) Ingestion (d) Assimilation

2. The major components of our food are
(a) Carbohydrates (b) Proteins (c) Fats (d) All of these

3. Which of the following substances do not get digested in our digestive system?
(a) Carbohydrates (b) Proteins and fats
(c) Vitamins and minerals (d) All of these

4. Which of the following are important for our body but required in less amount?
(a) Vitamins and minerals (b) Proteins
(c) Fats (d) Carbohydrates

5. Which of the following is a function of food?
(a) Providing energy to the body
(b) Providing organic materials for growth and repair of tissues
(c) Providing organic materials for repair of tissues
(d) All of these

6. Digestion in our body takes place by means of
(a) Biochemical method (b) Mechanical method
(c) Both of the above (d) Chemical method

7. Which of the following molecules are not utilized by our body in their original form?
(a) All biomacromolecule
(b) All biomicromolecule
(c) Biomolecules having molecular weight less than 1000 dalton
(d) All of these

8. Human digestive system consists of
(a) Alimentary canal (b) Associated glands
(c) Both (a) and (b) (d) Gastrointestinal tract only

9. The role of water in our body is to
(a) Act as medium for transport of substances
(b) Provide medium for all metabolic reactions
(c) Prevent dehydration of body
(d) All of these

10. The anterior opening of alimentary canal is
(a) Anus (b) Mouth (c) Vestibule (d) Pupil

11. The posterior opening of alimentary canal is
(a) Anus (b) Mouth (c) Vestibule (d) Pupil

12. Teeth of human are
(a) Thecodont (b) Diphyodont (c) Heterodont (d) All of these

13. If tooth is embedded in a socket of jaw bone then it is known as
(a) Thecodont (b) Diphyodont (c) Heterodont (d) All of these

14. Marasmus is found in
(a) Infant (b) Adult (c) Old age person (d) All of these

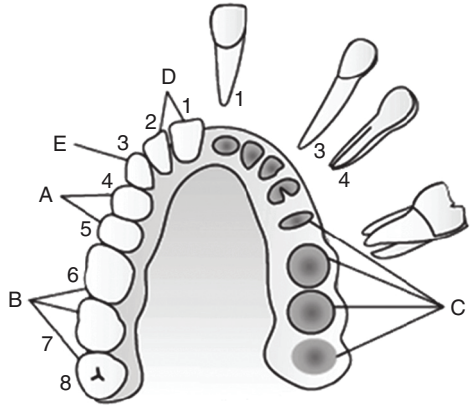
15. In majority of mammals, including human, two sets of teeth get formed during their life time. These teeth are called
(a) Thecodont (b) Hetrodont (c) Diphyodont (d) Lophodont

16. An adult human has 32 permanent teeth which are of four different types and are called
(a) Thecodont (b) Heterodont (c) Diphyodont (d) Lophodont

17. Arrangement of teeth in each half of the upper and lower jaw in the order I, C, PM, M is represented by
(a) Dental formula (b) Odontology (c) Dentology (d) Enamel

18. The dental formula of human is
(a) $\frac{0033}{3133}$ (b) $\frac{1003}{1003}$ (c) $\frac{2123}{2123}$ (d) $\frac{3131}{3121}$

19. Identify A, B, C, D and E in the given figure.



(a) A–Molars, B–Incisor, C–Premolars, D–Canine, E–Socket of jaw
(b) A–Premolars, B–Socket of jaw, C–Canine, D–Molars, E–Incisor
(c) A–Premolars, B–Molars, C–Socket of jaw, D–Incisor, E–Canine
(d) A–Socket of jaw, B–Canine, C–Premolars, D–Molars, E–Incisor

20. Dental formula is given to show
(a) The structure of molars
(b) Number and types of teeth in both jaws
(c) Homodont condition
(d) Diphyodont condition

21. Dental formula of human being is
(a) I_2, C_2, P_1, M_3 (b) I_2, C_1, P_2, M_3 (c) I_3, C_1, P_2, M_2 (d) I_2, C_2, P_3, M_1

22. The hardest substance in vertebrate body is
(a) Keratin (b) Dentine (c) Chondrin (d) Enamel

23. Select the incorrect statement among the following about human tongue.
(a) The human tongue has freely movable muscular organ.
(b) It is attached to the floor of the oral cavity by the frenulum.
(c) The upper surface of the tongue has small projections called papillae.
(d) All papillae of human tongue bear taste buds.

24. The tongue is attached to the floor of oral/buccal cavity by
(a) Epiglottis (b) Frenulum (c) Gubernaculums (d) Mesentery

25. Which of the following acts as a common passage for food and air?
(a) Larynx (b) Pharynx (c) Oesophagus (d) Glottis

26. A cartilaginous flap called _____ prevents the entry of food into the glottis (opening of the wind pipe) during swallowing.
(a) Capsule (b) Epiglottis (c) Glottis (d) Gullet

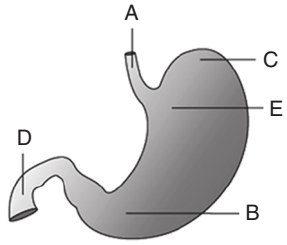
27. Select the total number of correct statement from the following:
A. The esophagus and the trachea (wind pipe) open into the pharynx.
B The hard chewing surface of the teeth, made up of dentine, helps in the mastication of food.
C. The oral cavity leads into a long pharynx which serves as a common passage for food and air.
D. The tongue is a freely movable muscular organ attached to the roof of the oral cavity by the frenulum.
(a) 1 (b) 2 (c) 3 (d) 4

28. Stomach is divided into how many major parts?
(a) 1 (b) 2 (c) 3 (d) 4

29. Which part of stomach opens into the first part of small intestine?
(a) Cardiac (b) Fundic (c) Pyloric (d) Any of these

30. Which of the following is a highly coiled part of small intestine?
(a) Duodenum (b) Jejunum (c) Ileum (d) All of these

31. Identify A to E in the given figure.



(a) A–Oesophagus, B–Pyloric, C–Fundus, D–Superior portion of duodenum, E–Cardiac
(b) A–Pyloric, B–Cardiac, C–Fundus, D–Oesophagus, E–Superior protein of duodenum
(c) A–Superior protein of duodenum, B–Oesophagus, C–Cardiac, D–Fundus, E–Pyloric
(d) A–Oesophagus, B–Fundus, C–Pyloric, D–Superior protein of duodenum, E–Cardiac

32. A muscular sphincter that regulates the opening of oesophagus into stomach is
(a) Pyloric sphincter (b) Gastroesophageal sphincter
(c) Sphincter of Oddi (d) Cervical sphincter

33. Select the incorrect organ and its shape from the following.
(a) J-shape–stomach (b) U-shape–duodenum
(c) Bean-shape–kidney (d) O-shape–vasa recta

34. A muscular sphincter that regulates the opening of stomach into duodenum is
(a) Pyloric sphincter (b) Gastroesophageal sphincter
(c) Sphincter of Oddi (d) Cervical sphincter

35. Large intestine consists of
(a) Caecum (b) Colon (c) Rectum (d) All of these

36. A part of large intestine which is a blind sac and it harbours some symbiotic micro organism is
(a) Colon (b) Caecum (c) Rectum (d) Ileum

37. Colon is divided into
(a) Ascending colon (b) Descending colon
(c) Transverse colon (d) All of these

38. Which of the following is true about appendix?
(a) Narrow finger-like tubular projection (b) Arises from the caecum
(c) Vestigial organ (d) All of these

39. The wall of alimentary canal from oesophagus to rectum possesses how many histological layers?
(a) 1 (b) 2 (c) 3 (d) 4

40. Identify the order of the following histological layers which are present in the wall of human alimentary canal from esophagus to rectum.
A. Serosa
B. Bowman's layer
C. Muscularis
D. Sub-mucosa
E. Mucosa
F. Ganglion layer
(a) A,B,C,D (b) B,C,D,E (c) A,B,D,F (d) A,C,D,E

41. Which of the following is the outermost histological layer of alimentary canal?
(a) Serosa (thin mesothelium) (b) Mucosa
(c) Sub mucosa (d) Muscularis

42. Where does the oblique muscle layer situated in human alimentary canal?
(a) Oesophagus (b) Stomach
(c) Large intestine (d) Small intestine

43. Select the total number of false statements from the following.
A. Muscularis is formed by smooth muscles usually arranged into an inner circular and an outer longitudinal layer.
B. Submucosal layer is formed of loose connective tissues containing nerves, blood and lymph vessels
C. Serosa is the outermost layer and is made up of a thin mesothelium (epithelium of visceral organs) with some connective tissues.
D. The innermost layer lining the lumen of the alimentary canal is the mucosa.
E. Mucosal epithelium has goblet cells which secrete mucus that helps in lubrication.
(a) 3 (b) 4 (c) 5 (d) All are true

44. Mucosal layer that forms irregular folds in the stomach is called
(a) Rugae (b) Villi (c) Microvilli (d) Papilla

45. Mucosal layer that forms small finger like projections in intestine is called
(a) Villi (b) Microvilli (c) Crypts (d) Papilla

46. Mucosal layer that forms depressions in between villi in intestine is called
(a) Villi (b) Microvilli (c) Crypts (d) Papilla

47. In the wall of alimentary canal which are/is true sequence from outer to inner?
(a) Serosa, longitudinal muscle, mucosa, sub mucosa
(b) Mucosa, serosa, long muscle
(c) Serosa, long muscle, circular, sub-mucosa, mucosa
(d) Serosa, long muscle, sub-mucosa, mucosa

48. The narrow distal end of stomach is called
(a) Cardiac (b) Duodenum (c) Pharynx (d) Pylorus

Absorption of Digested Products

49. Intestinal villi are mainly concerned with
(a) Assimilation (b) Secretion (c) Ultrafilteration (d) Absorption

50. Pylorus is situated at the junction of
(a) Oesophagus and stomach (b) Stomach and duodenum
(c) Duodenum and ileum (d) Ileum and rectum

51. Brush bordered epithelium is found in
(a) Trachea (b) Stomach (c) Small intestine (d) Fallopian tube

52. Vermiform appendix is a part of
(a) Alimentary canal (b) Nervous system
(c) Vascular system (d) Reproductive system

53. Crypt of Lieberkuhn is an example for
(a) Simple tubular gland (b) Coiled tubular gland
(c) Compound alveolar gland (d) Compound tubular gland

54. Serosa is made up of
(a) Mesothelium (b) Some connective tissue
(c) Both (a) and (b) (d) None of these

55. In duodenum, glands are present in
(a) Mucosa (b) Sub-mucosa (c) Muscular layer (d) Both (a) and (b)

56. Which is responsible for the increase in surface area of small intestine?
(a) Villi (b) Microvilli (c) Both (a) and (b) (d) Bigger lumen

57. Which of the following is true about villi?
(a) They are small finger like folding in small intestine.
(b) They are supplied with network of capillaries.
(c) They are supplied with large lymph vessel called lacteals.
(d) All the above

58. Goblet cells are an example of
(a) Multicellular gland (b) Unicellular gland
(c) Alveolar gland (d) Tubular gland

59. Select the incorrect statement from the following.
(a) Mucosal epithelium has goblet cells which secrete mucous that helps in lubrication.
(b) Mucosa form gastric gland in stomach and crypts of Lieberkuhn in Intestine.
(c) All the four histological layers shows modification in different parts of alimentary canal.
(d) Muscularis layer is formed by outer circular and inner longitudinal muscle layer.

60. Which of the following are digestive glands associated with alimentary canal?
(a) Salivary gland (b) Liver
(c) Pancreas (d) All of these

61. How many salivary glands are present in the human body?
(a) 3 (b) 4 (c) 5 (d) 6

62. The following are salivary glands, except
(a) Parotid (b) Sub-maxillary/sub-mandibular
(c) Sub-lingual (d) Brunner gland

63. The gland which is situated below the tongue is
(a) Parotid (b) Sub-maxillary (c) Sub-lingual (d) Sub-mandibular

64. Select the incorrect match:

Position		**Gland**
(a) Cheeks	–	Parotid
(b) Lower jaw	–	Sub-maxillary/sub-mandibular
(c) Below tongue	–	Sub-lingual
(d) Pineal gland	–	Dorsal side of mid brain

65. Which is the largest gland of our body?
(a) Parotid (b) Pancreas (c) Liver (d) Adrenal

66. What is the approximate weight of an adult human liver?
(a) 1.2–1.5 kg (b) 2.5–3.5 kg
(c) 0.5–1.0 kg (d) 200 grams

67. Liver is situated in
(a) Thoracic cavity (b) Abdominal Cavity
(c) Pelvic cavity (d) Cranial cavity

68. Liver is majorly divided into how many lobes?
(a) 1 (b) 2 (c) 3 (d) 4

69. Each lobule in liver is covered by a thin connective tissue sheath called
(a) Hepatic Fascia (b) Glisson's Capsule
(c) Falciform ligament (d) Coronary ligament

70. Structural and functional unit of liver is
(a) Cystic duct (b) Hepatocyte (c) Hepatic lobules (d) Kupffer cells

71. The function of gall bladder is
(a) Storage of bile (b) Concentration of bile
(c) Both (a) and (b) (d) Formation of bile

72. Common bile duct is formed by the joining of
(a) Hepatic ducts (b) Cystic duct (c) Duct of Wirsung (d) Both (a) and (b)

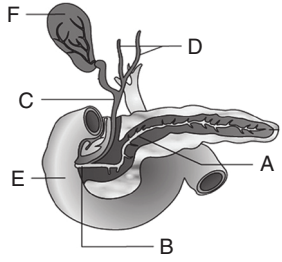
73. Cystic duct is located in
(a) Urinary bladder (b) Gall Bladder (c) Liver (d) Pancreas

74. Bile is secreted by
(a) Glisson's Capsule (b) Gall bladder
(c) Hepatic Cells (d) Kupffer cells

75. The bile duct and pancreatic duct opens together into the duodenum as hepato-pancreatic duct which is guarded by sphincter called
(a) Sphincter of Boyden (b) Hepato pancreatic ampulla
(c) Sphincter of Oddi (d) Cardiac Sphincter

76. Pancreas secretes
(a) Insulin (b) Glucagon (c) Enzymes (d) All of these

77. Identify A to F in the given figure.



(a) A–Common bile duct, B–Gall bladder, C–Pancreatic duct, D–Duodenum, E–Hepato-pancreatic duct, F–Ducts from liver
(b) A–Pancreatic duct, B–Hepato-pancreatic duct, C–Common bile duct, D–Ducts from liver, E–Duodenum, F–Gall bladder
(c) A–Hepato-pancreatic duct, B–Ducts from liver, C–Pancreatic duct, D–Gall bladder, E–Duodenum, F–Common bile duct
(d) A–Gall bladder, B–Common bile duct, C–Duodenum, D–Pancreatic duct, E–Hepato-pancreatic duct, F–Ducts from liver

78. All are secretion of pancreas, except
(a) Insulin (b) Glucagon
(c) Chymotrypsinogen (d) Enterokinase

79. Mixed Gland (endocrine + exocrine) is obtained from
(a) Liver (b) Parotid
(c) Pancreas (d) Adrenal

80. The major function performed by buccal cavity is
(a) Mastication of food (b) Facilitation of swallowing
(c) Both (a) and (b) (d) None of these

81. The bolus formed in buccal cavity conveyed into pharynx and then esophagus by the process is called
(a) Peristalsis (b) Emesis
(c) Deglutition/swallowing (d) Dysagglutination

82. Mucus in saliva helps in lubricating and adhering the masticate food particle into a _____ in buccal cavity
(a) Chyme (b) Chyle (c) Bolus (d) Any of these

83. Saliva contains
(a) Salivary amylase / Ptyalin (b) Electrolyte (Na^+, K^+ ,Cl^-, HCO^{3-} etc.)
(c) Lysozyme (d) All of these

84. Lysozyme
(a) Anti-viral agent (b) Anti-bacterial agent
(c) Acts on lipid (d) Acts on carbohydrates

85. Lysozyme
(a) Cellular barrier (b) Cytokine barrier
(c) Physiological barrier (d) Physical barrier

86. How much percentage of starch is hydrolyzed in mouth?
(a) 30 (b) 50 (c) 70 (d) 90

87. The optimum pH for salivary enzyme is
(a) 6.2 (b) 5.8 (c) 6.8 (d) 8.8

88. Salivary amylase acts on
(a) Slightly basic pH (b) Highly acidic pH
(c) Slightly acidic pH (d) Highly basic pH

89. Starch $\xrightarrow[\text{pH 6.8}]{\text{Salivery amylase}}$ Ⓐ. A is
(a) Sucrose (b) Galactose (c) Maltose (d) Glucose

90. Starch $\xrightarrow[\text{pH 6.8}]{\text{Salivery amylase}}$ Ⓐ. A is
(a) Monosaccharide (b) Polysaccharides
(c) Disaccharide (d) Amylopectin

91. Gastric glands are situated in
(a) Sub-mucosa (b) Mucosa
(c) Muscularis (d) Serosa

92. Match the column:

A		B
A. Mucus neck cells	–	1. HCI
B. Peptic or Chief cells	–	2. Intrinsic factor
C. Parietal/Oxyntic cells	–	3. Pepsinogen
		4. Mucus

(a) A → 4, B → 3, C → 1, 2 (b) A → 1, 4, B → 2, C → 3
(c) A → 4, B → 1, 3, C → 2 (d) A → 4, B → 2, 3, C → 1

93. Which is required for the absorption of Vitamin B_{12}?
(a) HCl (b) Pepsin (c) Intrinsic factor (d) Amylase

94. The stomach stores food for
(a) 1 hr (b) 2–3hr (c) 4–5 hrs (d) 30 min

95. Digestion of carbohydrates starts from
(a) Buccal cavity (b) Stomach (c) Small intestine (d) Large intestine

96. Select the total number of true statement from the following.
A. In stomach the bolus is converted to chyme.
B. Chief cells secrets intrinsic factor required for absorption of Vit B_{12}
C. Pepsinogen $\xrightarrow{HCl}$ pepsin
D. Pepsin converts protein into amino acids.
(a) 1 (b) 2 (c) 3 (d) 4

97. Protection of mucosal epithelium from highly concentrated HCl in stomach is performed by
A. HCO_3- Ion
B. Mucus
C. Pepsin
D. Intrinsic factor
(a) A and C only (b) B only
(c) A and B only (d) A, B and C only

98. Optimal pH for pepsin is
(a) 6.8 (b) 1.8 (c) 3.8 (d) 6.0

99. Which of the following is incorrect about gastric juice?
(a) Gastric juice of an infant contain Rennin.
(b) Small amount of lipase is present.
(c) Gastric juice is secreted by gastric glands.
(d) Rennin doesn't help in digestion of milk protein present in gastric juice of infant.

100. Which of the following is released in small intestine?
(a) Bile juice (b) Pancreatic juice
(c) Intestinal juice (d) All of these

101. Bile and pancreatic juice is released in small intestine by
(a) Cystic duct (b) Bile duct
(c) Pancreatic duct (d) Hepatic–pancreatic duct

102. Select from the following the total number of enzyme secreted by the pancrease.
Trypsinogen, Amylase, Lipase, Pepsinogen, Prorennin, Maltase, Sucrase, Chymotrypsinogen, Procarboxypeptidase, Nucleases
(a) 4 (b) 5 (c) 6 (d) 7

103. Trypsinogen is activated by
(a) Enterokinase (b) Chymotrypsin (c) Rennin (d) Acidic pH

104. Which enzyme activates other enzymes in pancreatic juice?
(a) Enterokinase (b) Chymotrypsin (c) Trypsin (d) Lipase

105. Enterokinase is secreted by
(a) Mouth (b) Stomach (c) Small intestine (d) Large intestine

106. Bile juice contains all except
(a) Bilirubin and bili-verdin (b) Bile salts and cholesterol
(c) Phospholipids (d) Enzymes

107. Which of the following is incorrect about bile?
(a) It contains bilirubin and biliverdin which are waste products.
(b) Bile salts in it helps in the emulsification of fats.
(c) Bile also activates lipases.
(d) Bile contain digestive enzymes.

108. Intestinal juice or succus entericus is formed by the secretion of
(a) Goblet cells
(b) Brush border cells lining mucosa
(c) Both (a) and (b)
(d) None

109. Enzymes like dipeptidases, lipases, nucleosidases, nucleotidases, maltase and sucrase are present in
(a) Bile juice (b) Gastric juice
(c) Pancreatic juice (d) Succus entericus

110. Brunner's gland
(a) Is situated in mucosal layer (b) Is present in sub-mucosal layer
(c) Secretes HCI (d) Helps in the activation of gastric enzyme

111. Select the incorrect from the following:

(a) $\left.\begin{matrix}\text{Proteins}\\ \text{Peptones}\\ \text{Proteoses}\end{matrix}\right\} \xrightarrow[\text{Carboxypeptidase}]{\text{Trypsin/Chymotrypsin}} \text{Dipeptides}$

(b) $\text{Starch} \xrightarrow{\text{Amylase}} \text{Disaccharides}$

(c) $\text{Fats} \xrightarrow{\text{Iipases}} \text{Diglycerides} \rightarrow \text{Monoglycerides}$

(d) $\text{Nucleotides} \xrightarrow{\text{Nuclease}} \text{Nucleosides}$

112. Select the incorrect statement from the following:
(a) Succus entericus act on end products produced by pancreatic enzyme.
(b) Final steps of digestion occur far away from the mucosal epithelial cells of the intestine.
(c) The breakdown of biomacromolecule generally occurs in the duodenum region of small intestine.
(d) Simple substance forms after digestion is absorbed mainly by jejunum and ileum.

113. Action of which enzyme produces glucose?
(a) Maltase (b) Lactase (c) Sucrase (d) All of these

114. Action of which enzyme produces only glucose?
(a) Maltase (b) Lactase (c) Sucrase (d) All of these

115. Where we use term feaces for undigested and unabsorbed food particle in alimentary canal.
(a) Jejunum (b) Colon (c) Rectum (d) End of ileum

116. Where faecal matters are temporarily stored till defecation?
(a) Colon (b) Caecum (c) Ileum (d) Rectum

117. The activities of gastrointestinal are under
(a) Neural control only
(b) Hormonal control only
(c) Neither hormonal nor neural control
(d) Neural and hormonal control

118. The muscular activities of different parts of alimentary canal also be regulated by
(a) Local neural control (b) CNS neural control
(c) Both (a) and (b) (d) None of these

119. Absorption is a process by which the end product of digestion pass through the intestinal mucosa into _____
(a) Blood/lymph (b) Liver (c) CSF (d) Heart

120. Secretion of saliva can be stimulated by
(a) Sight of food (b) Smell of food
(c) Presence of food in oral cavity (d) All of these

121. In addition to controlling the neurons, hormones also influence the
(a) Gastric secretions
(b) Intestinal secretions
(c) Muscular activities of different parts of alimentary canal
(d) All of these

122. Hormonal control of the secretion of digestive juice is carried out by local _____, produced by _____ and _____ mucosa.
(a) Neurotransmitters, liver, pancreas
(b) Hormones, Liver, pancreas
(c) hormones, Gastric, intestinal
(d) Neurotransmitters, gastric, intestinal

123. Absorption of digested food is carried out by
(a) Passive method (b) Active transport
(c) Facilitated transport (d) All of these

124. Glucose and amino acids are absorbed in the intestine by
(a) Active transport (b) Passive transport
(c) Selective absorption (d) Osmosis

125. Which of the following statements is incorrect?
A. Absorption of simple sugar, alcohol, some water and medicines take place in stomach.
B. Maximum water absorption occurs in small intestine.
C. Small intestine is the major site of digestion and absorption of food.
D. Fatty acid and glycerol are absorbed by lacteals.
E. Nothing is absorbed in mouth and large intestine.
(a) A, D and E only (b) D and E only (c) D only (d) B and C only

126. Fructose and some amino acids are absorbed by
(a) Active transport (b) Diffusion
(c) Facilitated transport (d) Osmosis

127. A small amount of monosaccharide like glucose, amino acids and some electrolytes like chloride ions are generally absorbed by
(a) Active transport (b) Simple diffusion
(c) Facilitated transport (d) Osmosis

128. Carrier ions is generally used for facilitated transport of fructose and some amino acids
(a) Ca^{2+} (b) Cl^{-} (c) K^{+} (d) Na^{+}

129. Amino acids, monosaccharide, electrolytes like Na^{+} are mainly absorbed by
(a) Osmosis (b) Passive transport
(c) Facilitated transport (d) Active transport

130. Which of the following statement is wrong about Chylomicrons?
A. Chylomicrons are produced in the epithelial cells of small intestine.
B. It contain triglycerides, cholesterol and phospholipids.
C. It is protein coated small vesicles.
D. Chylomicrons released from the epithelial cell into lacteals.
(a) A and D only (b) B and C only (c) All of these (d) None of these

131. Chylomicrons are concerned with the
(a) Digestion of fats (b) Absorption of proteins
(c) Digestion of protein (d) Absorption of fats

132. The absorbed substances finally reach the tissues which utilize them for their activities.

This process is called
(a) Assimilation (b) Emulsification (c) Catabolism (d) Digestion

Disorder of Digestive System

133. Vomit center is situated at
(a) Pons (b) Mid-brain (c) Cerebellum (d) Medulla

134. Defecation
(a) Is a voluntary process
(b) Is carried out by a mass peristaltic movement
(c) Both (a) and (b)
(d) Is otherwise known as ingestion

135. Which of the following statements is incorrect?
(a) Faecal accumulation in the rectum initiates a neural reflex causing an urge for its removal.
(b) Reflex of vomiting is controlled by medulla.
(c) Irregular bowel movements cause constipation.
(d) In diarrhea the absorption of food is increased.

136. Marasmus is characterized by
(a) Thinning of limbs (b) Skin becomes dry, thin and wrinkled
(c) Decreases growth rate (d) All the above

137. Maximum absorption of digested food takes place in
(a) Mouth (b) Stomach
(c) Small intestine (d) Large intestine

138. Absorption of simple sugar, water and alcohol takes place in
(a) Mouth (b) Stomach
(c) Small intestine (d) Large intestine

139. Mouth can absorb
(a) Fatty acid (b) Certain drugs (c) Alcohol (d) All of these

140. Jaundice occurs due to the increasing level of
(a) $CaCO_3$ (b) HCO_3 (c) Bile pigments (d) CO_2

141. Which of the following are parasites of intestine?
(a) Tapeworm and Roundworm (b) Threadworm and Hookworm
(c) Pinworm (d) All of these

142. Jaundice is a disorder of
(a) Excretory system (b) Skin and eyes
(c) Digestive system (d) Circulatory system

143. The cause(s) of indigestion is/are
(a) Inadequate enzyme secretion
(b) Anxiety
(c) Food poisoning, over eating and spicy food
(d) All the above

144. The abnormal frequent bowel movement and increased liquidity of faecal discharge is known as
(a) Constipation (b) Vomiting (c) Diarrhoea (d) Indigestion

145. Swelling of gut is the most common ailment due to
(a) Bacterial infections
(b) Viral infections
(c) Infection of intestinal parasites (e.g., different types of worms)
(d) All the above

146. Which of the following is correct about vomiting?
(a) Ejection of stomach content through mouth.
(b) It is a reflex action.
(c) A feeling of nausea precedes vomiting.
(d) All of the above

147. One gram of fat produces
(a) 4.1 kcal of chemical energy
(b) 9.45 kcal of chemical energy
(c) 7.0 kcal of chemical energy
(d) 5.0 kcal of chemical energy

148. The amount of heat liberated from the complete combustion of 1 gm of food in a bomb calorimeter is known as its_____
(a) gross caloric value
(b) gross energy value
(c) physiological value
(d) both (a) and (b)

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

149. **Assertion:** Process of conversion of complex food substances to simple absorbable forms is called digestion.
Reason: Biomacromolecules in food cannot be utilized by our body in their original form.

150. **Assertion:** Tounge contains receptor for taste.
Reason: The upper surface of the tounge has small projections called papillae, all of which bear taste buds which act as receptor for taste.

151. **Assertion:** Large intestine also shows the presence of villi like small intestine.
Reason: Absorption of most substance takes place in large intestine.

152. **Assertion:** Lipases of bile helps in the emulsification of fats.
Reason: Lipases can break large fat droplets into smaller ones.

153. **Assertion:** Presence of HCl in stomach is necessary for the process of digestion.
Reason: HCl kills and inhibits the growth of bacteria in the stomach.

154. **Assertion:** Facilitated diffusion is more rapid than simple diffusion.
Reason: Facilitated diffusion involves the expenditure of energy unlike simple diffusion.

155. **Assertion:** Mucosal epithelium secretion helps in lubrication.
Reason: Mucosal epithelium has goblet cells which secretes mucus.

156. **Assertion:** The vermiform appendix which is a vestigeal organ arises from ileum.
Reason: Appendix is a small blind sac which hosts some non symbiotic bacteria.

157. **Assertion:** Pancreas is a compound organ.
Reason: Pancreas contains both exocrine and endocrine tissues.

158. **Assertion:** The chemical process of digestion is initiated in the oral cavity.
Reason: Saliva contains the hydrolytic enzyme salivary amylase.

159. **Assertion:** Jaundice is the yellowish discolouration of eye and skin.
Reason: It occurs due to the deposition of bile pigments.

160. **Assertion:** Faeces are retained with in rectum in constipation.
Reason: Bowel movement are regular in constipation.

161. **Assertion:** In human teeth is thecodont type.
Reason: Tooth in human embedded in a socket of jaw bone

161. **Assertion:** Pharynx serves as common passage for air and food
Reason: Trachea and oesophagus open into pharynx

163. **Assertion:** Saliva is antibacterial in nature
Reason: Saliva contain lysozyme

164. **Assertion:** Chemical process of digestion is initiated in oral cavity
Reason: Protein digestion starts in mouth

165. **Assertion:** Absorption of vitamin B_{12} is affected by gastric secretion
Reason: Gastric secretion contain intrinsic factor which is essential for B_{12} absorption

166. **Assertion:** Large amount of lipases are secreted in gastric juice
Reason: Lipid digestion mainly occur in stomach

167. **Assertion:** Pepsin converts proteins into dipeptide and amino acid
Reason: Pepsin is exopeptidase

168. **Assertion:** Brunner's gland helps in protection of intestinal mucosa from acid
Reason: Brunner's gland also secretes mucus

169. **Assertion:** No significant digestive activity occur in large intestine
Reason: Function of large intestine is absorption of some water, minerals and certain drugs.

170. **Assertion:** Various type of movements are generated by muscularis layer of the small intestine
Reason: These movements help in a through mixing up of the food with various secretions in intestine

171. **Assertion:** Villi is supplied with a large lymph vessels called the lacteals.
Reason: Chylomicrons transported via lacteals

172. **Assertion:** Bile is required for effective digestion of fat.
Reason: Bile helps in emulsification of fats.

173. **Assertion:** Diarrhoea reduces the absorption of food.
Reason: During diarrhoea frequency of bowel movement decreases.

174. **Assertion:** Vomit is a cranial reflex action
Reason: It is controlled by vomit centre in the medulla of brain.

175. **Assertion:** Defecation is a voluntary process.
Reason: External anal sphincter is under voluntary control.

176. **Assertion:** Bile helps in emulsification of fats.
Reason: Bile juice contains bile salts require for emulsification process.

PREVIOUS YEAR QUESTIONS

1. If for some reason the parietal cells of the gut epithelium become partially non-functional, what is likely to happen?

[AIPMT MAINS 2010]

(a) The pancreatic enzymes and specially the trypsin and lipase will not work efficiently.
(b) The pH of stomach will fall abruptly.
(c) Steapsin will be more effective.
(d) Proteins will not be adequately hydrolyzed by pepsin into proteoses and peptones.

2. Jaundice is a disorder of

[AIPMT MAINS 2010]

(a) Excretory system (b) Skin and eyes
(c) Digestive system (d) Circulatory system

3. Carrier ions like Na^+ facilitates the absorption of substance like

[AIPMT PRE 2010]

(a) Amino acids and glucose (b) Glucose and fatty acids
(c) Fatty acids and glycerol (d) Fructose and some amino acids

4. Which of the following enzymes carries out the initial step in the digestion of milk in humans?

[AIPMT PRE 2011]

(a) Rennin (b) Lipase
(c) Trypsin (d) Pepsin

5. One of the constituents of the pancreatic juice which is poured into the duodenum in humans is

[AIPMT MAINS 2011]

(a) Trypsinogen (b) Chymotrypsin
(c) Trypsin (d) Enterokinase

6. Which one of the following correctly represents the normal adult human dental formula?

[AIPMT MAINS 2011]

(a) $\frac{3}{3},\frac{1}{1},\frac{3}{2},\frac{1}{1}$ (b) $\frac{2}{2},\frac{1}{1},\frac{3}{2},\frac{3}{3}$
(c) $\frac{2}{2},\frac{1}{1},\frac{2}{2},\frac{3}{3}$ (d) $\frac{3}{3},\frac{1}{1},\frac{3}{3},\frac{3}{3}$

7. Where do certain symbiotic microorganisms normally occur in human body?

[AIPMT MAINS 2012]

(a) Oral lining and tongue surface (b) Vermiform appendix and rectum
(c) Duodenum (d) Caecum

8. Anxiety and eating spicy food together otherwise normal human, may lead to

[AIPMT PRE 2012]

(a) Indigestion (b) Jaundice
(c) Diarrhoea (d) Vomiting

9. Select the correct match of the digested products in humans given in column I with their absorption site and mechanism in column II.

[AIPMT 2013]

Column-I	**Column-II**
(a) Glycine, glucose	Small intestine and active absorption
(b) Fructose, Na^+	Small intestine and passive absorption
(c) Glycerol and fatty acids	Duodenum, move as chilomicrons
(d) Cholesterol and maltose	Large intestine and active absorption

10. The initial step in the digestion of milk in humans is carried out by

[AIPMT 2014]

(a) Lipase (b) Trypsin
(c) Rennin (d) Pepsin

11. Fructose is absorbed into the blood through mucosa cells of intestine by the process called

[AIPMT 2014]

(a) Active transport (b) Facilitated transport
(c) Simple diffusion (d) Co transport mechanism

12. The primary dentition in human differs from permanent dentition in not having one of the following type of teeth

[AIPMT 2015]

(a) Premolars (b) Molars (c) Incisors (d) Canine

13. The enzyme that is not present in succus entericus is

[AIPMT 2015]

(a) Nucleases (b) Nucleosidase
(c) Lipase (d) Maltase

14. Which of the following statement is not incorrect?

[AIPMT 2015]

(a) Brunner's glands are present in the submucosa of stomach and secrete pepsinogen.
(b) Goblet cells are present in the mucosa of intestine and secrete mucus.
(c) Oxyntic cells are present in the mucosa of stomach and secrete HCI.
(d) Acini are present in the pancreas and secrete Carboxypeptidase.

15. Gastric juice of infants contains

[AIPMT 2015]

(a) Maltase, pepsinogen, rennin (b) Nuclease, pepsinogen, lipase
(c) Pepsinogen, lipase, rennin (d) Amylase, rennin, pepsinogen

16. The primary dentition in human differs from permanent dentition in not having one of the following type of teeth

[RE-AIPMT 2015]

(a) Premolars (b) Molars
(c) Incisors (d) Canine

17. The enzyme that is not present in succus entericus is

[RE-AIPMT 2015]

(a) Nucleases (b) Nucleosidase
(c) Lipase (d) Maltase

18. In the stomach, gastric acid is secreted by the: [NEET - I, 2016]

(a) gastrin secreting cells (b) parietal cells
(c) peptic cells (d) acidic cells

19. Which of the following guards the opening of hepatopancreatic duct into the duodenum? [NEET - I, 2016]

(a) Semilunar valve (b) Ileocaecal valve
(c) Pyloric sphincter (d) Sphincter of Oddi

20. Which hormones do stimulate the production of pancreatic juice and bicarbonate? [NEET - II, 2016]

(a) Gastrin and insulin (b) Cholecystokinin and secretin
(c) Insulin and glucagon (d) Angiotensin and epinephrine

NCERT EXEMPLAR QUESTIONS

1. Select what is not true about intestinal villi among the following:
(a) They possess microvilli.
(b) They increase the surface area.
(c) They are supplied with capillaries and the lacteal vessels.
(d) They only participate in digestion of fats.

2. Hepato–pancreatic duct opens into the duodenum and carries
(a) Bile (b) Pancreatic juice
(c) Both bile and pancreatic juice (d) Saliva

3. Which of the following is not a common disorder associated with digestive system?
(a) Tetanus (b) Diarrhoea
(b) Jaundice (d) Dysentery

4. A gland not associated with the alimentary canal is
(a) Pancreas (b) Adrenal
(c) Liver (d) Salivary glands

5. Match the two columns and select the correct among the options given:

Column I	Column II
(A) Biomacromolecules of food	(i) Alimentary canal and associated gland
(B) Human digestive system	(ii) Embedded in jaw bones
(C) Stomach	(iii) Outer wall of visceral organs
(D) Thecodont	(iv) Converted into simple substances
(E) Serosa	(v) J-shaped bag like structure

(a) (A) – (ii), (B) – (i), (C) – (v), (D) – (iii), (E) – (iv)
(b) (A) – (iv), (B) – (i), (C) – (v), (D) – (ii), (E) – (iii)
(c) (A) – (i), (B) – (ii), (C) – (iii), (D) – (iv), (E) – (v)
(d) (A) – (i), (B) – (iii), (C) – (ii), (D) – (iv), (E) – (v)

6. Match the two columns and select the right one among the options given:

	Column I		Column II
(A)	Duodenum	(i)	A cartilaginous flap
(B)	Epiglottis	(ii)	Small blind sac
(C)	Glottis	(iii)	'U' shaped structure emerging from the stomach
(d)	Caecum	(iv)	Opening of wind pipe

Options:

(a) (A) – (i), (B) – (ii), (C) – (iii), (D) – (iv)
(b) (A) – (iv), (B) – (iii), (C) – (ii), (D) – (i)
(c) (A) – (iii), (B) – (i), (C) – (iv), (D) – (ii)
(d) (A) – (ii), (B) – (iv), (C) – (i), (D) – (iii)

7. Match the enzymes with their respective substrate and choose the right one among options given:

	Column I		Column II
(A)	Lipase	(i)	Dipeptides
(B)	Nuclease	(ii)	Fats
(C)	Carboxypeptidase	(iii)	Nucleic acids
(D)	Dipeptidases	(iv)	Proteins, peptones and proteoses.

Options:

(a) (A) – (ii), (B) – (iii), (C) – (i), (D) – (iv)
(b) (A) – (iii), (B) – (iv), (C) – (ii), (D) – (i)
(c) (A) – (iii), (B) – (i), (C) – (iv), (D) – (ii)
(d) (A) – (ii), (B) – (iii), (C) – (iv), (D) – (i)

8. Dental formula in human beings is

(a) $\frac{3223}{3223}$ (b) $\frac{2123}{2123}$

(c) $\frac{1232}{1232}$ (d) $\frac{2233}{2233}$

9. Liver is the largest gland and is associated with various functions. Choose one of the options below which is not correct.

(a) Metabolism of carbohydrate (b) Digestion of fat
(c) Formation of bile (d) Secretion of hormone called gastrin

10. Mark the right statement among the following.

(a) Trypsinogen is an inactive enzyme.
(b) Trypsinogen is secreted by intestinal mucosa.
(c) Enterokinase is secreted by pancreas.
(d) Bile contains trypsin.

Answer Keys

Practice Questions

1. (b)	2. (d)	3. (c)	4. (a)	5. (d)	6. (c)	7. (a)	8. (c)	9. (d)	10. (b)
11. (a)	12. (d)	13. (a)	14. (a)	15. (c)	16. (b)	17. (a)	18. (c)	19. (c)	20. (b)
21. (b)	22. (d)	23. (d)	24. (b)	25. (b)	26. (b)	27. (a)	28. (c)	29. (c)	30. (c)
31. (a)	32. (b)	33. (d)	34. (a)	35. (d)	36. (b)	37. (d)	38. (d)	39. (d)	40. (d)
41. (a)	42. (b)	43. (d)	44. (a)	45. (a)	46. (c)	47. (c)	48. (d)	49. (d)	50. (b)
51. (c)	52. (a)	53. (a)	54. (c)	55. (d)	56. (c)	57. (d)	58. (b)	59. (d)	60. (d)
61. (d)	62. (d)	63. (c)	64. (d)	65. (c)	66. (a)	67. (b)	68. (b)	69. (b)	70. (c)
71. (c)	72. (d)	73. (b)	74. (c)	75. (c)	76. (d)	77. (b)	78. (d)	79. (c)	80. (c)
81. (c)	82. (c)	83. (d)	84. (b)	85. (c)	86. (a)	87. (c)	88. (c)	89. (c)	90. (c)
91. (b)	92. (a)	93. (c)	94. (c)	95. (a)	96. (b)	97. (c)	98. (b)	99. (d)	100. (d)
101. (d)	102. (c)	103. (a)	104. (c)	105. (c)	106. (d)	107. (d)	108. (c)	109. (d)	110. (b)
111. (d)	112. (b)	113. (d)	114. (a)	115. (d)	116. (d)	117. (d)	118. (c)	119. (a)	120. (d)
121. (d)	122. (c)	123. (d)	124. (a)	125. (b)	126. (c)	127. (b)	128. (d)	129. (d)	130. (d)
131. (d)	132. (a)	133. (d)	134. (c)	135. (d)	136. (d)	137. (c)	138. (b)	139. (b)	140. (c)
141. (d)	132. (c)	143. (d)	144. (c)	145. (d)	146. (d)	147. (b)	148. (d)		

Assertion and Reason Questions

149. (b)	150. (c)	151. (d)	152. (d)	153. (b)	154. (c)	155. (a)	156. (d)	157. (a)	158. (a)
159. (a)	160. (c)	161. (a)	162. (a)	163. (a)	164. (c)	165. (a)	166. (d)	167. (d)	168. (a)
169. (b)	170. (a)	171. (a)	172. (a)	173. (c)	174. (a)	175. (a)	176. (a)		

Previous Year Questions

1. (d)	2. (c)	3. (d)	4. (a)	5. (a)	6. (c)	7. (d)	8. (a)	9. (a)	10. (c)
11. (b)	12. (a)	13. (a)	14. (c)	15. (c)	16. (a)	17. (a)	18. (b)	19. (d)	20. (b)

NCERT Exemplar Questions

1. (d)	2. (c)	3. (a)	4. (b)	5. (b)	6. (c)	7. (d)	8. (b)	9. (d)	10. (a)

CHAPTER

17

Breathing and Exchange of Gases

PRACTICE QUESTIONS

Respiratory Organs

1. The process of exchange of O_2 from the atmosphere with CO_2 produced by the cell is called
(a) Cellular respiration (b) Breathing
(c) Ventilation (d) Perfusion

2. The harmful gas produced by catabolic reaction in our body is
(a) Oxygen (b) Carbon dioxide
(c) Phosphine (d) Ozone

3. Oxygen (O_2) is utilized by the organisms to _____ break down nutrient molecules like glucose and to derive energy for performing various activities.
(a) Directly (b) Indirectly (c) Incompletely (d) Any of these

4. Mechanisms of breathing vary among different groups of animals depending mainly on their _____ and _____.
(a) Habitats (b) Levels of organization
(c) Both (a) and (b) (d) None of these

Exchange of Gases

5. In which of the following, gaseous exchange between O_2 and CO_2 occurs through the entire body surface?
(a) Sponges (b) Flatworms (c) Coelenterates (d) All of these

6. Select the total number of organism from the following which respire through their body surface.

Sycon, Spongilla, Admsia, Taenia, Laccifer, Pila, Antedon, Gorgonia, Jelly fish
(a) 4 (b) 5 (c) 6 (d) 8

7. In which of the following skin serves as an accessory organ of respiration?
(a) Rabbit (b) Frog (c) Lizards (d) Birds

8. Match the following:

Animals		**Respiratory Organs**
A. Earthworms	–	1. Lungs
B. Aquatic arthropods/Molluscs	–	2. Tracheal tubes
C. Insects	–	3. Gills
D. Birds/ Reptiles/Mammals	–	4. Moist cuticle
E. Fishes		

(a) A–2, B and C–3, D–2, E–1 (b) A–4, B and E–3, C–2, D–1
(c) A–4, B and D–3, D–1, E–2 (d) A–3, B and D–1, C–2, E–4

9. Amphibians, e.g., frogs respire through
(a) Moist skin (b) Lungs
(c) Buccopharyngeal cavity (d) All of these

10. The adult frog does not respire through
(a) Buccopharyngeal cavity (b) Gills
(c) Skin (d) Lungs

11. Which is the correct sequence of the air passage in man?
(a) Nasal cavity → pharynx → trachea → larynx → bronchi → bronchioles → alveoli
(b) Nasal cavity → pharynx → larynx → trachea → bronchi → bronchioles → alveoli
(c) Nasal cavity → larynx → pharynx → trachea → bronchi → bronchioles → alveoli
(d) Nasal cavity → larynx → bronchi → pharynx → trachea → bronchioles → alveoli

12. In mammals, voice is produced by
(a) Bronchus (b) Syrinx
(c) Larynx (d) Inhalation and exhalation

13. Vocal cords occur in
(a) Pharynx (b) Larynx
(c) Glottis (d) Bronchial tube

14. Trachea divides into right and left primary bronchi at _____ the thoracic vertebra.
(a) 4 (b) 5 (c) 6 (d) 9

15. Opening of larynx into pharynx is guarded by
(a) Syrinx (b) Epiglottis (c) Tracheal valves (d) All of these

16. Glottis is a passage for
(a) Food (b) air
(c) Both (a) and (b) (d) None of these

17. Glottis is an opening in the floor of
(a) Mouth (b) Trachea (c) Pharynx (d) Diaphragm

18. The Lungs are protected with the help of?
(a) Ribs (b) Vertebral column
(c) Sternum (d) All of these

19. Which one has the smallest diameter?
(a) Right bronchus (b) Left bronchus
(c) Secondary bronchiole (d) Respiratory bronchiole

20. Lining of trachea is made of
(a) Simple squamous epithelium (b) Simple cuboidal epithelium
(c) Pseudostratified epithelium (d) Stratified cuboidal epithelium

21. Each terminal bronchiole gives rise to a number of very thin, irregular walled and vascularized bag like structures called
(a) Alveoli (b) Respiratory bronchioles
(c) Pleura (d) Follicles

22. Epiglottis is made up of
(a) Fibrous cartilage (b) Hyaline cartilage
(c) Elastic cartilage (d) Calcified cartilage

23. Covering of the lungs is called
(a) Perichondrium (b) Pleural membrane
(c) Pericardium (d) Peritoneum

24. Read the following statements:
A. It is double layered and covers the lungs.
B. Outer layer is in contact with thoracic wall.
C. Fluid is present between these layers.
D. Inner layer is in contact with the lungs.

The above features refer to
(a) Pericardium (b) Peritoneum
(c) Perichondrium (d) Pleura

25. The part starting with the external nostrils up to the terminal bronchioles constitute the
(a) Respiratory part of respiratory system (b) Exchange part of respiratory system
(c) Expiratory part (d) Conducting part of respiratory system

26. Respiratory or exchange part of the respiratory system consists of
(a) All bronchi
(b) All bronchioles
(c) All bronchi and terminal bronchioles
(d) Alveoli and their ducts

27. Sites of gaseous exchange in lungs are
(a) Alveoli (b) Bronchi (c) Bronchioles (d) Pleura

28. Pleura is a double membrane sac which envelops
(a) Kidneys (b) Brain (c) Lungs (d) Nasal passage

29. Which of the following are functions of conducting part of the respiratory system?
(a) Removal of foreign particles from incoming air.
(b) Humidifies incoming air
(c) Bring the temperature of incoming air to body temperature.
(d) All the above

30. _____ is the site of actual diffusion of O_2 and CO_2 between blood and atmospheric air.
(a) All bronchi
(b) All bronchioles
(c) All bronchi and terminal bronchioles
(d) Alveoli and their ducts

31. Even when air being absent, the human trachea does not collapse due to the presence of
(a) Bony rings (b) Turgid pressure
(c) Chitinous rings (d) Cartilaginous rings

32. The chambers formed dorsally by the vertebral column, ventrally by sternum, laterally by ribs and on the lower side by dome-shaped diaphragm is

(a) Abdominal chamber (b) Cranial chamber
(c) Pelvic chamber (d) Thoracic chamber

33. Select the incorrect statement from the following:
(a) Pleural fluid reduces friction on the lung surface.
(b) The anatomical setup of lungs in thorax is such that any change in the volume of the thoracic cavity will be reflected in the lung (pulmonary) cavity. Such an arrangement is essential for breathing, as we cannot directly alter the pulmonary volume.
(c) The tracheae, primary, secondary and tertiary bronchi and initial bronchioles are supported by complete cartilaginous rings.
(d) During swallowing, the glottis can be covered by a thin elastic cartilaginous flap called epiglottis to prevent the entry of food into the larynx.

34. During inspiration
(a) Diaphragm and external intercostals muscle relax.
(b) Diaphragm and internal intercostals muscles relax.
(c) Diaphragm and external intercostals muscles contract.
(d) Diaphragm and internal intercostals muscles contract .

35. During inspiration, the diaphragm
(a) Relaxes to become dome-shaped (b) Contracts and flattens
(c) Expands (d) Shows no change

36. Expiration involves
(a) Relaxation of diaphragm and intercostals muscles
(b) Contraction of diaphragm and intercostals muscles
(c) Contraction of diaphragm muscles
(d) Contraction of intercostals muscles

37. Which two of the following changes (a to d) usually tend to occur in plain dwellers when they move to higher altitudes (3500 m or more)
(i) Increase in red blood cell size (ii) Increase in red blood cell production
(iii) Increase in breathing rate (iv) Increase in thrombocyte count
(a) Both (iii) and (iv) (b) Both (i) and (iv)
(c) Both (iii) and (i) (d) Both (ii) and (iii)

38. In alveolar air, the partial pressure of CO_2 is
(a) 40 mm Hg (b) 44 mm Hg
(c) 46 mm Hg (d) 42 mm Hg

39. Arrange the following steps of respiration properly:
1. Breathing or pulmonary ventilation by which atmospheric air is drawn in and CO_2 rich alveolar air is released out.
2. Diffusion of gases (O_2 and CO_2) across alveolar membrane.
3. Transport of gases by the blood.
4. Diffusion of O_2 and CO_2 between blood and tissues.
5. Utilization of O_2, by the cells for catabolic reactions and resultant release of CO_2.

(a) 1,2,3,4,5 (b) 1,3,2,5,4
(c) 5,4,3,1,2 (d) 3,4,5,2,1

40. Expiratory muscles contract at the time of
(a) Deep inspiration (b) Normal inspiration and expiration
(c) Forceful expiration (d) Muscular expansion of lungs

41. Which of the following statements is correct?
(a) Inspiration is an active process
(b) Inspiration is a passive process
(c) Expiration is an active process
(d) Both expiration and inspiration are passive processes

42. Gaseous exchange between blood and alveolar air across respiratory membrane occurs by
(a) Osmosis (b) Diffusion
(c) Active transport (d) Phagocytosis

43. On an average, a healthy human breathes how many times/minute
(a) 20 to 40 (b) 72 to 75 (c) 3 to 5 (d) 12 to 16

44. We can increase the strength of inspiration and expiration by the help of additional muscle in
(a) Abdomen (b) Neck (c) Pelvis (d) Head

45. Match the following:

1. Tidal volume	–	A. Tidal volume and inspiratory reserve volume and expiratory reserve volume.
2. Inspiratory reserve volume	–	B. Additional volume of air a person can inspire by a forcible inspiration.
3. Expiratory reserve volume	–	C. Volume of air remaining in the lungs even after a forcible expiration.
4. Residual volume	–	D. Tidal volume and inspiratory reserve volume.
5. Inspiratory reserve capacity	–	E. Volume of air inspirited or expired during a normal respiration.
6. Vital capacity	–	F. Vital capacity + residual volume
7. Total lung capacity	–	G. Additional volume of air a person can expire by a forcible expiration.

(a) 1–E, 2–C, 3–B, 4–G, 5–D, 6–A, 7–F
(b) 1–E, 2–G, 3–B, 4–C, 5–A, 6–D, 7–F
(c) 1–E, 2–C, 3–G, 4–B, 5–D, 6–A, 7–F
(d) 1–E, 2–B, 3–G, 4–C, 5–D, 6–A, 7–F

46. Match the following:

1. Tidal Volume	–	A. 2500–3000 ml of air
2. Inspiratory reserve volume	–	B. 1000–1100 ml of air
3. Expiratory reserve volume	–	C. 500 ml of air
4. Residual volume	–	D. 3500–4600 ml of air
5. Vital capacity	–	E. 1100–1200 ml of air

(a) 1–C, 2–D, 3–B, 4–A, 5–E (b) 1–C, 2–A, 3–B, 4–E, 5–D
(c) 1–C, 2–A, 3–D, 4–E, 5–B (d) 1–E, 2–A, 3–B, 4–E, 5–D

47. Total lung capacity is equal to
(a) ERV + TV (b) IRV+ TV
(c) VC + RV (d) ERV + TV + IRV

48. Vital capacity is equal to
(a) ERV + TV (b) IRV+ TV
(c) VC + RV (d) ERV + TV + IRV

49. EC (expiratory capacity) is equal to
(a) ERV + TV (b) IRV+ TV
(c) VC + RV (d) ERV + TV + IRV

50. IC (Inspiratory capacity) is equal to
(a) ERV + TV (b) IRV+ TV
(c) VC + RV (d) ERV + TV + IRV

51. Arrange the following in the order of increasing volume
1. Tidal volume 2. Residual volume
3. Expiratory reserve volume 4. Inspiratory reserve volume
(a) 1 < 2 < 3 < 4 (b) 1 < 4 < 3 < 2
(c) 1 < 3 < 2 < 4 (d) 1 < 4 < 2 < 3

52. The largest quantity of air that can be expired after a maximum inspiratory effort is
(a) Residual volume (b) Tidal volume
(c) Vital capacity (d) Total lung volume

53. The vital capacity of adult human lungs is equal to
(a) The maximum volume of air a person can breathe out after a forced inspiration.
(b) The maximum volume of air a person can breathe in after a forced expiration.
(c) ERV + TV + IRV
(d) All of these

54. Functional residual capacity can be represented as
(a) TV + ERV (b) ERV + RV
(c) RV + IRV (d) ERV + TV + IRV

55. The volume of air involved in breathing movements can be estimated by using a _____ which helps in clinical assessment of pulmonary functions
(a) Osmometer (b) Potometer
(c) Spirometer (d) Sphygmomanometer

56. A spirometer cannot be used to measure
(a) IC (b) RV (c) ERV (d) IRV

57. Inspiratory air in lungs ultimately reaches
(a) Trachea (b) Alveoli
(c) Bronchi (d) Bronchioles

58. Which is not true?
(a) pCO_2 of deoxygenated blood is 95 mm Hg.
(b) pCO_2 of alveolar air is 40 mm Hg.
(c) pO_2 alveolar air is 104 mm Hg.
(d) pO_2 of oxygenated blood is 95 mm Hg.
(e) pO_2 of deoxygenated blood is 40 mm Hg.

59. Which of the following factors affect the rate of diffusion of gases?
(a) Partial pressure/concentration gradient of diffusing gases
(b) Solubility of gases
(c) Thickness of diffusion membrane
(d) All the above

60. Lung alveoli of mammals have a thin wall composed of
(a) Simple cuboidal epithelium (b) Simple squamous epithelium
(c) Stratified cuboidal epithelium (d) Stratified squamous epithelium

61. The mode of respiration in rabbit is
(a) Cutaneous (b) Mucosal (c) Tracheal (d) Pulmonary

62. The respiratory diffusion membrane is majorly made of _____ layers
(a) 2 (b) 3 (c) 4 (d) 5

63. The solubility of CO_2 is _____ times higher than that of O_2.
(a) 10–15 (b) 20–25 (c) 30–35 times (d) 210 times

64. What is the value of [PO_2 (in deoxygenated blood) minus PCO_2 (in deoxygenated blood)]?
(a) 5 (b) –5 (c) 45 (d) 40

65. Select the incorrect statement from the following:
(a) Diffusion of O_2 occurs from alveoli to tissue.
(b) Diffusion of CO_2 occurs from tissue to alveoli.
(c) Amount of CO_2 diffused through membrane is higher than that of O_2.
(d) Partial pressure of O_2 is higher in pulmonary artery than that of pulmonary vein.

66. The total thickness of respiratory diffusion membrane is
(a) Less than fm (b) Less than micrometer
(c) Much less than mm (d) Less than nm

67. Diffusion membrane is made up of
(a) Thin squamous epithelium of alveoli
(b) Endothelium of alveolar capillaries
(c) Basement membrane between the two layers
(d) All the above

68. Partial pressures (in mmHg) of O_2 in atmospheric air, alveoli, deoxygenated blood, oxygenated blood and tissues are
(a) 159,104,40,95,40 (b) 104,40,40,95,159
(c) 0.3,40,45,40,45 (d) 159,104,45,95,40

69. Partial pressure (in mmHg) of CO_2 in atmospheric air, alveoli, deoxygenated blood, oxygenated blood and tissues are
(a) 159,104,40,95,40 (b) 104,40,40,95,159
(c) 0.3,40,45,40,45 (d) 159,104,45,95,40

Transport of Gases

70. The total percentage of O_2 transported by haemoglobin or RBC is
(a) 3% (b) 97% (c) 70% (d) 7%

71. Besides RBC blood plasma also carries O_2 in dissolved state. The percentage is
(a) 3% (b) 97% (c) 70% (d) 7%

72. CO_2 is transported
(a) By RBC (b) As bicarbonates
(c) In dissolved state through plasma (d) All of these

73. Blood entering the lung is rich in
(a) Oxygen (b) Carbon dioxide (c) Urea (d) More RBCs

74. The majority of CO_2 is transported as
(a) Carbonates (b) Bicarbonates
(c) Carbaminohaemoglobin (d) Dissolved state in blood

75. Oxygen is transported in blood mainly by
(a) Blood plasma (b) Leucocytes (c) Thrombocytes (d) Erythrocytes

76. Blood transport of CO_2 occurs in three forms. The correct percentages of CO_2 in these forms are

As Carbaminohaemoglobin in RBC	As bicarbonates	Dissolved form in plasma
(a) 20–25 %	70%	7%
(b) 7%	20–25%	70%
(c) 20–25%	7%	70%
(d) 70%	20–25%	7%

77. Each molecule of haemoglobin can carry at the maximum of _____ molecules of O_2.
(a) 1 (b) 2 (c) 3 (d) 4

78. Under a given oxygen concentration in blood, dissociation of oxyhaemoglobin will increase if
(a) pH of blood falls
(b) pH of blood rises
(c) CO_2 concentration in blood falls
(d) Free fatty acid concentration in blood falls

79. The blood coming out of lungs is richer than that one entering into lungs in
(a) CO_2 (b) O_2 (c) Both (a) and (b) (d) None of these

80. When partial pressure of CO_2 (pCO_2) rises, the oxygen dissociation curve of haemoglobin at 37°C will
(a) Shift towards right (b) Shift towards left
(c) Become irregular (d) Remains unchanged

81. Dissociation curve is connected with
(a) Myoglobin (b) CO
(c) O_2 (d) Oxyhaemoglobin

82. A large proportion of oxygen is left unused in the human blood even after uptake by the body tissue. This oxygen
(a) Is enough to keep oxyhaemoglobin saturation at 96%
(b) Helps in releasing more oxygen to epithelial tissues.
(c) Acts as reserve during muscular exercise.
(d) Raise pCO_2 of blood to 75 mm Hg.

83. Oxygen dissociation curve is
(a) Parabola (b) Sigmoid (c) Hyperbola (d) Straight line

84. Binding of oxygen with haemoglobin can be affected by
(a) pCO_2 (b) H+ conc (c) Temperature (d) All of these

85. The amount of O_2 normally carried by 100 ml of pure blood is
(a) 10 ml (b) 20 ml (c) 5 ml (d) 4 ml

86. How much oxygen is delivered to tissue by 100 ml of oxygenated blood under normal physiological condition?
(a) 10 ml (b) 20 ml (c) 5 ml (d) 4 ml

87. How much carbon dioxide is delivered to alveoli by 100 ml of deoxygenated blood under normal physiological condition?
(a) 10 ml (b) 20 ml (c) 5 ml (d) 4 ml

88. Oxygen binding to haemoglobin is
(a) Directly proportional to CO_2 concentration
(b) Directly proportional to CO concentration
(c) Inversely proportional to CO_2 concentration
(d) Independent of CO concentration

89. The most characteristic feature of haemoglobin is
(a) Its red colour
(b) Presence of iron
(c) Its ability to combine reversibly with oxygen
(d) Presence of basic protein globin

90. Factors at tissue level favours the dissociation of oxygen from oxyhaemoglobin
(a) Low pO_2, low pCO_2, high H^+, low temperature
(b) High pO_2, high pCO_2, low H^+, high temperature
(c) Low pO_2, high pCO_2, high H^+, high temperature
(d) Low pO_2, high pCO_2, high H^+, low temperature

91. CO_2 dissociates from Carbaminohaemoglobin when
(a) Low PO_2, low PCO_2 (b) High PO_2, high PCO_2
(c) Low PO_2, high PCO_2 (d) High PO_2, low PCO_2

92. Dissociation of oxyhaemoglobin can be promoted by
(a) Low pCO_2 (b) High pCO_2
(c) Low body temperature (d) High blood pH

93. The enzyme essential for transport of CO_2 as bicarbonate in blood is
(a) Carboxypeptidase (b) Succinic dehydrogenase
(c) Carbonic anhydrase (d) Thrombokinase
(e) Lactase

94. What is correct about human respiration?
(a) About 90 per cent of CO_2 is carried by haemoglobin as carbaminohaemoglobin.
(b) Neural signals from pneumotaxic centre of pons can increase the duration of inspiration.
(c) Workers in grinding and stone breaking industries may suffer from lung fibrosis.
(d) Cigarette smoking leads to inflammation of bronchi.

95. Choose the right sequential phenomena during the passage of CO_2 from blood to tissues:
(P) Absorption of CO_2 by blood.
(Q) Reaction of CO_2 with water forming H_2CO_3 inside RBCs and then HCO_3^- and H^+ ions.
(R) Reaction of CO_2 with water forming H_2CO_3 inside plasma followed by conversion into H^+ and HCO_3^- ions.
(S) Combination of H^+ with haeme part of HbO_2 to release O_2.
(T) Combination of HCO_3 with haeme part of HbO_2 to form reduced haemoglobin and release of O_2.
(a) P, R, S (b) P, Q, T (c) P, Q, S (d) P, R, T

96. The transport of CO_2 by the blood is primarily dependent on the
(a) Solubility of CO_2 in blood.
(b) Presence of carbonic anhydrase in RBCs.
(c) Ability of haemoglobin to bind and transport CO_2.
(d) Ability of other blood proteins.

97. Pick the correct statement:
(a) Contraction of internal intercostals muscles lifts up the ribs and sternum.
(b) RBCs transport oxygen only.
(c) Thoracic cavity is anatomically an air tight chamber.
(d) Healthy man can inspire approximately 500 mL of air per minute.
(e) During expiration the interpleural pressure is slightly below the surrounding atmospheric pressure.

98. Respiratory rhythm centre is present in which part of brain?
(a) Pons (b) Medulla oblongata
(c) Cerebrum (d) Cerebellum

99. Pneumotaxic centre is present in
(a) Pons (b) Medulla oblongata
(c) Cerebrum (d) Cerebellum

100. Human beings have a significant ability to maintain and moderate the respiratory rhythm to suit the demands of the body tissues. This is done by
(a) Endocrine system (b) Neural system
(c) Excretory system (d) All of these

101. A (1) _____ sensitive area is situated adjacent to the rhythm centre which is highly sensitive to _____ (2) _and _ (3) _____ ions.
(a) (1)–thermo, (2)–CO_2, (3)–hydroxide (b) (1)–chemo, (2)–O_2, (3)–hydroxide
(c) (1)–thigmo, (2)–O_2, (3)–hydrogen (d) (1)–chemo, (2)–CO_2, (3)–hydrogen

102. All of the following factors play an important role in the regulation of respiratory rhythm except
(a) CO_2 (b) H^+ conc (c) O_2 (d) None of these

103. Select the incorrect statement from the following:
(a) Neural signal from pneumotaxic centre can reduce the duration of inspiration.
(b) The role of oxygen in the regulation of respiratory rhythm is quite significant.
(c) RBCs contain a very high concentration of the enzyme, carbonic anhydrase and minute quantities of the same is present in the plasma too.
(d) CO_2 is carried by haemoglobin as carbamino-haemoglobin (about 20–25 per cent).

104. Receptors associated with aortic and carotid artery can recognize changes in _____ and _____ concentration and send necessary signal to _____ for remedial action.
(a) O_2, CO_2, pneumotaxic (b) CO_2, H^+, rhythm centre
(c) CO_2,H^+, apneustic centre (d) O_2, H^+, pneumotaxic

105. Carbonic anhydrase is found in high concentration in
(a) Leucocytes (b) Blood plasma (c) Erythrocytes (d) Lymphocytes

106. The controlling centre of normal breathing in mammals lies in
(a) Cerebrum (b) Cerebellum
(c) Midbrain (d) Medulla oblongata

107. Number of RBCs per unit volume of blood is likely to be higher in a person living at high altitudes, because
(a) Air is clean and unpolluted (b) More sunshine is available
(c) Air is less dense (d) Vegetation gives out more O_2

Disorder of Respiratory System

108. Wheezing sound is produced in
(a) Asthma (b) Emphysema (c) Silicosis (d) Pneumonia

109. Major cause of emphysema is
(a) Cigarette smoking (b) Allergy
(c) Wine consumption (d) Viral infection

110. Match the column:

Column A		**Column B**
1. Asthma	–	A. Inflammation of bronchi and bronchioles.
2. Emphysema	–	B. Chronic disorder in which alveolar walls are damaged due to which respiratory surface is decreased.
3. Occupational Respiratory Disorders	–	C. Long exposure of chemicals can give rise to inflammation leading to fibrosis (proliferation of fibrous tissues).

(a) 1–A, 2–B, 3–C (b) 1–B, 2–A, 3–C
(c) 1–C, 2–A, 3–B (d) 1–C, 2–B, 3–A

111. Emphysema is a
(a) Cardiovascular disease (b) Pulmonary disease
(c) Renal disease (d) Pain in lungs

112. Which of the following is incorrect about occupational respiratory disorder?
(a) It occur in some industries, especially those involving grinding or stone-breaking.
(b) Long exposure in such industries leading to fibrosis (proliferation of fibrous tissues).
(c) Workers in such industries can be protected from these disorders by wearing protective masks.
(d) It is an allergic disease always.

113. Respiratory control centre lies in
(a) Pons (b) Medulla oblongata
(c) Both (a) and (b) (d) Cerebellum

114. Two friends are eating together in a dining table. One of them suddenly starts coughing while swallowing some food. This coughing would have been due to the improper movement of
(a) Tongue (b) Epiglottis (c) Diaphragm (d) Neck

115. Which one of the following is a possibility for most of us in regard to breathing, by making a conscious effort?
(a) One can breathe out air totally without oxygen.
(b) One can breathe out air through Eustachian tubes by closing both the nose and the mouth.
(c) One can consciously breathe out by moving the diaphragm alone without moving the ribs at all.
(d) The lungs can be made fully empty by forcefully breathing out all air from them.

116. Cartilaginous rings in respiratory passage are present in
(a) Trachea only
(b) Trachea and initial bronchioles only
(c) Trachea, bronchi and initial bronchioles
(d) None of these

117. Which of the following represents a larger volume of air than that is normally found in the resting tidal volume or a human lung?
(a) Residual volume (b) Inspiratory reserve volume
(c) Expiratory reserve volume (d) All the above

118. Mark the correct statement from the following:
(a) Tracheal rings are of hyaline cartilage.
(b) Dorsal side of thoracic chamber is formed by sternum.
(c) Expiration occurs when there is negative pressure in lungs.
(d) All the above

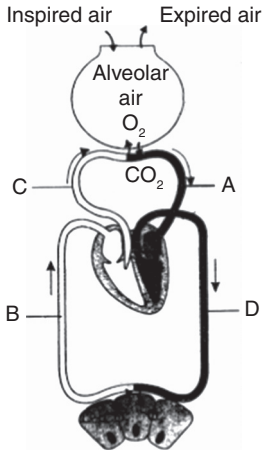
119. 6000–8000 ml of air is the
(a) Vital capacity of lungs
(b) Volume of normal expiration per minute
(c) Sum of IRV + ERV
(d) Inspiratory capacity of lungs

120. The volume of air that remains in the lungs after normal expiration is
(a) Residual volume (b) Vital capacity
(c) Expiratory capacity (d) Functional residual capacity

121. A large proportion of oxygen is left unused in the human blood even after its uptake by the body tissues. This O_2
(a) Helps in releasing more O_2 to the epithelium tissues.
(b) Acts as a reserve during muscular exercise.
(c) Raises the pCO_2 of blood to 75 mm of Hg.
(d) Is enough to keep oxyhaemoglobin saturation at 96%.

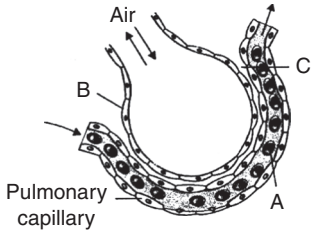
122. Bulk of carbon dioxide (CO_2) released from body tissues into blood is present as
(a) Bicarbonate in blood plasma and RBCs
(b) Free CO_2 in blood plasma.
(c) 70 per cent carbaminohaemoglobin and 30 per cent as bicarbonate.
(d) Carbaminohaemoglobin in RBCs.

123. Name the blood vessel A to D.



(a) A–Pulmonary vein, B–Systemic vein, C–Pulmonary artery, D–Systemic artery
(b) A–Systemic vein, B–Systemic artery, C–Pulmonary vein, D–Pulmonary artery
(c) A–Systemic artery, B–Pulmonary artery, C–Systemic vein, D–Systemic artery
(d) A–Pulmonary artery, B–Systemic vein, C–Systemic artery, D–Pulmonary vein

124. Study the accompanying figure.



Identify A to C from the above figure.
(a) A–Basement substance, B–RBC, C–Alveolar wall
(b) A–Alveolar wall, B–Basement substance, C–RBC
(c) A–RBC, B–Basement substance, C–Alveolar wall
(d) A–RBC, B–Alveolar wall, C–Basement substance

125. How O_2 and CO_2 gets transported through blood?
(a) With the help of RBCs and blood plasma
(b) With the help of RBCs and WBCs
(c) With the help of WBCs and blood serum
(d) With the help of platelets and corpuscles

126. During oxygen transport the oxyhaemoglobin at the tissue level liberates oxygen to the cells because in tissue
(a) O_2 concentration is high and CO_2 is low.
(b) O_2 concentration is low and CO_2 is also low.
(c) O_2 tension is high and CO_2 tension is low.
(d) O_2 tension is low and CO_2 tension is high.

127. The blood leaving the lungs has all its haemoglobin oxygenated and gives up oxygen to the tissues because
(a) The tissue can absorb O_2 from oxyhaemoglobin.
(b) O_2 concentration in tissues is lower and CO_2 concentration is higher as compared to lungs.
(c) O_2 concentration in tissues is higher and CO_2 concentration is lower as compared to lungs.
(d) Oxyhaemoglobin undergoes reduction.

128. During one circuit of blood from lungs to the tissues and back through circulatory system, the percentage of haemoglobin giving up its oxygen to tissues is
(a) 25% (b) 50% (c) 75% (d) 100%

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

129. **Assertion:** Fishes use tracheal tubes for respiration.
Reason: Fishes are amphibian.

130. **Assertion:** Humans can directly alter the pulmonary volume without change in the volume of thoracic cavity.
Reason: Our lungs are inelastic.

131. **Assertion:** We have the ability to increase the strength of inspiration and expiration.
Reason: We have some vestigeal abdominal muscles.

132. **Assertion:** During inspiration, pressure of air falls in the thorax.
Reason: There is a rise in volume of thorax during inspiration.

133. **Assertion:** During inspiration, the volume of thorax increases.
Reason: This happens due to the relaxation of diaphragm and inspiratory muscles.

134. **Assertion:** Forceful expiration occurs through expiratory muscles.
Reason: Expiratory muscles expires quickly.

135. **Assertion:** Vital capacity is higher in athletes than non-athletes.
Reason: Vital capacity is about 3.5–4.5 litres in a normal adult person.

136. **Assertion:** 70 per cent of CO_2 is carried as bicarbonate ion in plasma.
Reason: If it is transported directly then pH of blood becomes acidic.

137. **Assertion:** In mammals, complex respiratory system has developed.
Reason: Mammalian skin is impermeable to gases.

138. **Assertion:** Emphysema is a chronic disorder.
Reason: One of the major cause of emphysema is cigarette smoking.

139. Assertion: Respiratory rhythm is maintained by the respiratory centre in medulla region of brain.
Reason: A chemosensitive area in the medulla can alter the respiratory mechanism.

140. Assertion: The maximum amount of CO_2 is converted into bicarbonate ion in RBCs.
Reason: RBCs contain a very high concentration of the enzyme, carbonic anhydrase.

141. Assertion: Blood of insects is colourless.
Reason: The blood of insect does not play any role in transport of oxygen.

142. Assertion: In mollusca, the circulatory system is of closed type.
Reason: The blood of mollusca contains haemoglobin.

143. Assertion: The amount of CO_2 that can diffuse through the diffusion membrane per unit difference in partial pressure is much higher when compared to that of O_2.
Reason: The solubility of CO_2 is 20 to 25 times higher than that of O_2.

144. Assertion: Trachea, primary, secondary and tertiary bronchi and terminal bronchioles are non-collapsible.
Reason: They all are supported by incomplete cartilaginous ring

145. Assertion: Human breathing is negative pressure breathing.
Reason: Air drawn in lungs because of pressure less than atmospheric pressure in lungs during inspiration

146. Assertion: Functional residual capacity is equal to ERV+RV
Reason: Expiratory capacity is equal to TV+IRV

147. Assertion: Oxygen dissociation curve is sigmoid.
Reason: Affinity of oxygen for Hb increases with addition of each molecule of oxygen one after another.

148. Assertion: Pneumotaxic centre can alter the respiratory rate.
Reason: Neural signal from pneumotaxic centre can reduce the duration of inspiration.

149. Assertion: Every 100 ml of oxygenated blood can deliver around 5 ml of O_2 to the tissues.
Reason: Every 100 ml of deoxygenated blood delivers approx 4 ml of CO_2 to the alveoli.

150. Assertion: Oxygen is transported mainly as oxyhaemoglobin in human.
Reason: CO_2 is transported mainly as carbamino - haemoglobin in human.

151. Assertion: CO_2 produced by cells have to be released out of animal body.
Reason: CO_2 is harmful gas.

152. Assertion: Gills are highly vascularised
Reason: Gills are used for respiration

153. Assertion: Fishes respire through lungs
Reason: Amphibians respire through gills

154. Assertion: During swallowing food can't enter in larynx.
Reason: During swallowing open of larynx glottis is covered by epiglottis

155. **Assertion:** Larynx is called sound box.
Reason: Larynx helps in production of sound.

156. **Assertion:** Alveoli and their duct form respiratory part of respiratory tract.
Reason: This part is actual site of exchange of O_2 and CO_2 between blood and atmospheric air.

157. **Assertion:** External nostril to terminal bronchioles constitutes conducting as well as respiratory part of respiratory tract.
Reason: It help in conduction of atmospheric air to the alveoli as well as diffusion of O_2 and CO_2 between blood and atmospheric air.

158. **Assertion:** Inspiration during which alveolar air is released out.
Reason: Expiration by which atmospheric air is drawn in.

159. **Assertion:** We can increase strength of inspiration and expiration.
Reason: We can use additional muscle of thoracic and abdominal region

160. **Assertion:** About 97% of O_2 is transported by RBCs
Reason: RBCs has haemoglobin.

PREVIOUS YEAR QUESTIONS

1. Listed below are the four respiratory capacities (1 to 4) and four jumbled respiratory volumes of a normal human adult

Respiratory capacities	**Respiratory volumes**
(i) Residual volume	2500 mL
(ii) Vital capacity	3500 mL
(iii) Inspiratory reserve volume	1200 mL
(iv) Inspiratory capacity	4500 mL

Which one of the following is the correct matching of two capacities and volumes?

[AIPMT PRE 2010]

(a) (ii) 2500 mL (iii) 4500 mL
(b) (iii) 1200 mL (iv) 2500 mL
(c) (iv) 3500 mL (i) 1200 mL
(d) (i) 4500 mL (ii) 3500 mL

2. What is true about RBCs in humans?

[AIPMT PRE 2010]

(a) They carry about 20 to 25 per cent of CO_2.
(b) They transport 99.5 per cent of O_2.
(c) They transport about 80 per cent oxygen only and the rest 20 per cent of it is transported in dissolved state in blood plasma.
(d) They do not carry O_2 at all.

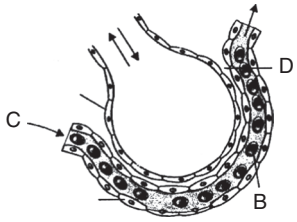
3. Two friends are eating together on a dining table. One of them suddenly starts coughing while swallowing some food. This coughing would have been due to improper movement of

[AIPMT PRE 2011]

(a) Diaphragm (b) Neck
(c) Tongue (d) Epiglottis

4. The figure given below shows a small part of human lung where exchange of gas takes place. In which one of the options given below, the one part A, B C or D is correctly identified along with its function.

[AIPMT PRE 2011]



(a) B: Red blood cell — Transport of CO_2 mainly
(b) C: Arterial capillary — Passes oxygen to tissues
(c) A: Alveolar cavity — Main site of exchange of respiratory gases.
(d) D: Capillary wall — Exchange of Q_2 and CO_2 takes place here

5. Which one of the following is a possibility for most of us with regard to breathing by making a conscious effort?

[AIPMT MAINS 2011]

(a) One can breathe out air totally without oxygen.
(b) One can breathe out air through Eustachian tube by closing both nose and mouth.
(c) One can consciously breathe in and breathe out by moving the diaphragm alone, without moving the ribs at all.
(d) The lungs can be made fully empty by forcefully breathing out all air from them.

6. The bulk of carbon dioxide CO_2 released from body tissues into the blood is present as

[AIPMT MAINS 2011]

(a) Bicarbonate in blood plasma and RBCs.
(b) Free CO_2 in blood plasma.
(c) 70 per cent carbaminohaemogloin and 30 per cent as bicarbonate.
(d) Carbaminohaemoglobin in RBCs.

7. A large proportion of oxygen is left unused in the human blood even after its uptake by the body tissues. This O_2

[AIPMT PRE 2011]

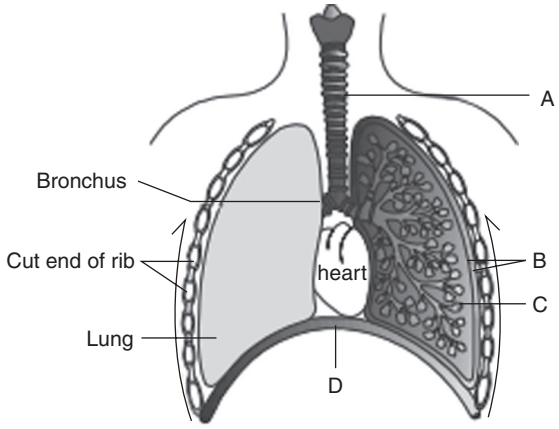
(a) Raises the p_{CO_2} of blood to 75 mm of Hg.
(b) Is enough to keep oxyhaemoglobin.
(c) Helps in releasing more O_2 to the epithelial tissues.
(d) Acts as a reserve during muscular exercise.

8. Which one of the following is the correct statement for respiration in humans?

[AIPMT PRE 2012]

(a) Cigarette smoking may lead to inflammation of bronchi.
(b) Neural signals form pneumotoxic centre in pons region of brain can increase the duration of inspiration.
(c) Workers in grinding and stone-breaking industries may suffer from lung fibrosis.
(d) About 90 per cent of carbon dioxide CO_2 is carried out by haemoglobin as carbamino haemoglobin.

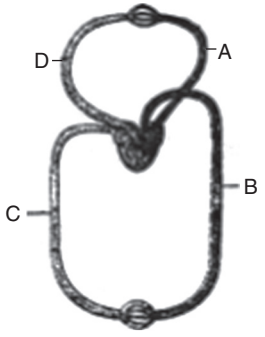
9. The figure shows a diagrammatic view of human respiratory system with labels A, B, C and D. Select the option which gives the correct identification and main function and/or characteristics.



[AIPMT 2013]

(a) A – Trachea – long tube supported by complete cartilaginous rings for conducting inspired air
(b) B – Pleural membrane – surround ribs on both sides to provide cushion against robbing
(c) C – Alveoli – thin walled vascular bag like structures for exchange of gases
(d) D – Lower end of lungs – diaphragm pulls it down during inspiration

10. Figure shows the schematic plant of blood circulation in humans with labels A to D. Identify the label a give its function/s.



[AIPMT 2013]

(a) A – Pulmonary vein – takes impure blood from body parts, pO_2 = 60 mm Hg.
(b) B – Pulmonary artery – takes blood from heart to lungs pO_2 = 90 mm Hg.
(c) C – Vena Cava – takes blood from body parts to right auricle, pCO_2 = 45 mm Hg.
(d) D – Dorsal aorta – takes blood from heart body parts, pO_2= 95 mm Hg.

11. Approximately seventy percent of carbon dioxide absorbed by the blood will be transported to the lungs

[AIPMT 2014]

(a) As bicarbonate ions
(b) In the form of dissolved gas molecules
(c) By binding to R.B.C.
(d) As carbamino – haemoglobin

12. When you hold your breath, which of the following gas changes in blood would first lead to the urge in breathe? [AIPMT 2015]
(a) Falling O_2 concentration
(b) Rising CO_2 concentration
(c) Falling CO_2 concentration
(d) Rising CO_2 and falling O_2 concentration

13. Name the pulmonary disease in which alveolar surface area involved in gas exchange is drastically reduced due to damage in the alveolar walls [RE-AIPMT 2015]
(a) Emphysema
(b) Pneumonia
(c) Asthma
(d) Pleurisy

14. Name the chronic respiratory disorder caused mainly by cigarette smoking: [NEET - I, 2016]
(a) Emphysema
(b) Asthma
(c) Respiratory acidosis
(d) Respiratory alkalosis

15. Reduction in pH of blood will: [NEET - I, 2016]
(a) Reduce the rate of heart beat
(b) Reduce the blood supply to the brain
(c) Decrease the affinity of hemoglobin with oxygen
(d) None of these

16. The partial pressure of oxygen in the alveoli of the lungs is [NEET - II, 2016]
(a) More than that in the blood
(b) Less than that in the blood
(c) Les than that of carbon dioxide
(d) Equal to that in the blood

17. Lungs do not collapse between breaths and some air always remains in the lungs which can never be expelled because [NEET - II, 2016]
(a) There is a negative intrapleural pressure pulling a the lung walls
(b) There is a positive intrapleural pressure
(c) Pressure in the lungs is higher than the atmospheric pressure
(d) There is a negative pressure in the lungs

NCERT EXEMPLAR QUESTIONS

1. Respiration in insects is called direct because
(a) The tissues exchanges O_2/CO_2 directly with the air in the tubes.
(b) The tissues exchange O_2/CO_2 directly with coelomic fluid.
(c) The tissues exchange O_2/CO_2 directly with the air outside through body surface.
(d) Tracheal tubes exchange O_2/CO_2 directly with the haemocoel which then exchanges with tissues.

2. Regarding the functions of our respiratory system, mark the wrong entry.
(a) Humidifies the air
(b) Warms up the air
(c) Diffusion of gases
(d) Cleans up the air

3. A person suffers punctures in his chest cavity in an accident, without any damage to the lungs. Its effect could be
(a) Reduced breathing rate
(b) Rapid increase in breathing rate
(c) No change in respiration
(d) Cessation of breathing

4. It is known that exposure to carbon monoxide is harmful to animals because
(a) It reduces CO_2 transport
(b) It reduces O_2 transport
(c) It increases CO_2 transport
(d) It destroys haemoglobin

5. Mark the true statement among the following with reference to normal breathing
(a) Inspiration is a passive process whereas expiration is active
(b) Inspiration is an active process where as expiration is passive
(c) Inspiration and expiration are active processes
(d) Inspiration and expiration are passive processes.

6. A person breathes in some volume of air by forced inspiration after having a forced expiration. This quantity of air taken in is
(a) Total lung capacity
(b) Tidal volume
(c) Vital capacity
(d) Inspiratory capacity

7. Mark the incorrect statement in context to O_2 binding to Hb
(a) Higher pH
(b) Higher temperature
(c) Lower pCO_2
(d) Higher pO_2.

8. Mark the correct pair of muscles involved in the normal breathing in humans
(a) External and internal intercostal muscles
(b) Diaphragm and abdominal muscles
(c) Diaphragm and external intercostal muscles
(d) Diaphragm and internal intercostal muscles.

9. Incidence of Emphysema, a respiratory disorder is high in cigarette smokers. In such cases
(a) The bronchioles are found damaged.
(b) The alveolar walls are found damaged.
(c) The plasma membrane is found damaged.
(d) The respiratory muscles are found damaged.

10. Respiratory process is regulated by certain specialized centres in the brain. Which of the following listed centres can reduce the inspiratory duration upon stimulation?
(a) Medullary inspiratory centre
(b) Pneumotaxic centre
(c) Apneustic centre
(d) Chemosensitive centre

11. CO_2 dissociates from carbaminohemoglobin when
(a) pCO_2 is high and pO_2 is low
(b) pO_2 is high and pCO_2 is low
(c) pCO_2 and pO_2 are equal
(d) None of these

12. In breathing movements, air volume can be estimated by
(a) Stethoscope
(b) Hygrometer
(c) Sphygmomanometer
(d) Spirometer.

13. From the following relationships, between respiratory volumes and capacities, mark the correct option.

(i) Inspiratory capacity (IC) = Tidal Volume + Residual Volume
(ii) Vital Capacity (VC) = Tidal Volume (TV) + Inspiratory Reserve Volume (IRV) + Expiratory Reserve Volume (ERV)
(iii) Residual Volume (RV) = Vital Capacity (VC) – Inspiratory Reserve Volume (IRV)
(iv) Tidal Volume (TV) = Inspiratory Capacity (IC) – Inspiratory Reserve Volume (IRV)

(a) (i) Incorrect, (ii) Incorrect, (iii) Incorrect (iv) Correct
(b) (i) Incorrect, (ii) Correct, (iii) Incorrect, (iv) Correct
(c) (i) Correct, (ii) Correct, (iii) Incorrect, (iv) Correct
(d) (i) Correct, (ii) Incorrect, (iii) Correct, (iv) Incorrect

14. The oxygen–haemoglobin dissociation curve will, show a right shift in case of
(a) High pCO_2 (b) High pO_2
(c) Low pCO_2 (d) Less H^+ concentration

15. Match the following and mark the correct options.

	Animal		**Respiratory Organ**
(A)	Earthworm	(i)	Moist cuticle
(B)	Aquatic Arthropods	(ii)	Gills
(C)	Fishes	(iii)	Lungs
(D)	Birds/Reptiles	(iv)	Trachea

Options:
(a) (A)–(ii), (B)–(i), (C)–(iv), (D)–(iii)
(b) (A)–(ii), (B)–(iv), (C)–(i), (D)–(iii)
(c) (A)–(i), (B)–(iii), (C)–(ii), (D)–(iv)
(d) (A)–(i), (B)–(ii), (C)–(iv), (D)–(iii)

Answer Keys

Practice Questions

1. (b)	2. (b)	3. (b)	4. (c)	5. (d)	6. (c)	7. (b)	8. (b)	9. (d)	10. (b)
11. (b)	12. (c)	13. (b)	14. (b)	15. (b)	16. (b)	17. (c)	18. (d)	19. (d)	20. (c)
21. (a)	22. (c)	23. (b)	24. (d)	25. (d)	26. (d)	27. (a)	28. (c)	29. (d)	30. (d)
31. (d)	32. (d)	33. (c)	34. (c)	35. (b)	36. (a)	37. (d)	38. (a)	39. (a)	40. (c)
41. (a)	42. (b)	43. (d)	44. (a)	45. (d)	46. (b)	47. (c)	48. (d)	49. (a)	50. (b)
51. (c)	52. (c)	53. (d)	54. (b)	55. (c)	56. (b)	57. (b)	58. (a)	59. (d)	60. (b)
61. (d)	62. (b)	63. (b)	64. (b)	65. (d)	66. (c)	67. (d)	68. (a)	69. (c)	70. (b)
71. (a)	72. (d)	73. (b)	74. (b)	75. (d)	76. (a)	77. (d)	78. (a)	79. (b)	80. (a)
81. (d)	82. (c)	83. (b)	84. (d)	85. (c)	86. (c)	87. (d)	88. (c)	89. (c)	90. (c)
91. (d)	92. (b)	93. (c)	94. (c)	95. (c)	96. (b)	97. (c)	98. (b)	99. (a)	100. (b)
101. (d)	102. (c)	103. (b)	104. (b)	105. (c)	106. (d)	107. (c)	108. (a)	109. (a)	110. (a)
111. (b)	112. (d)	113. (c)	114. (b)	115. (c)	116. (c)	117. (d)	118. (a)	119. (b)	120. (d)
121. (b)	122. (a)	123. (a)	124. (d)	125. (a)	126. (d)	127. (b)	128. (a)		

Assertion and Reason Questions

129. (d) 130. (d) 131. (b) 132. (a) 133. (c) 134. (c) 135. (c) 136. (a) 137. (b) 138. (b)
139. (b) 140. (a) 141. (c) 142. (d) 143. (a) 144. (a) 145. (a) 146. (c) 147. (a) 148. (a)
149. (b) 150. (c) 151. (a) 152. (a) 153. (d) 154. (a) 155. (a) 156. (a) 157. (d) 158. (d)
159. (a) 160. (a)

Previous Year Questions

1. (c) 2. (a) 3. (d) 4. (a) 5. (c) 6. (a) 7. (d) 8. (c) 9. (c) 10. (c)
11. (a) 12. (b) 13. (a) 14. (a) 15. (c) 16. (a) 17. (a)

NCERT Exemplar Questions

1. (d) 2. (d) 3. (d) 4. (d) 5. (b) 6. (a) 7. (d) 8. (d) 9. (b) 10. (b)
11. (b) 12. (d) 13. (b) 14. (b) 15. (b)

CHAPTER

18

Body Fluids and Circulation

PRACTICE QUESTIONS

Blood

1. Select the incorrect statement from the following:
(a) Simple organisms like sponges and coelenterates circulate water from their surroundings through their body cavities to facilitate the cells to exchange substances.
(b) Different groups of animals have evolved the same method for transport.
(c) Blood is the most commonly used body fluid by most of the higher organisms for transport.
(d) Lymph also helps in the transport of certain substances in human.

2. Blood is a special connective tissue that consists of
(a) Fluid matrix (b) Plasma (c) Formed elements (d) All of these

3. The colour of Plasma is
(a) Straw colour (b) Red colour (c) Colourless (d) Blue colour

4. How much percentage of plasma is water?
(a) 90 to 92 (b) 80 to 90 (c) 60 to 65 (d) 10 to 15

5. How much protein is present in plasma (in %)?
(a) 2 to 4% (b) 6 to 8% (c) 10% (d) 15 to 20%

6. Which protein is required for coagulation?
(a) Fibrinogen (b) Globulin (c) Albumin (d) All of these

7. The formed element constitutes how much per cent of blood?
(a) 55 (b) 45 (c) 35 (d) 65

8. Find out the incorrect statement:
(a) Globulins are primarly involved in the defence mechanism of body.
(b) Albumin is mainly the osmotic protein of blood.
(c) Plasma without clotting factor is called serum.
(d) The factors for coagulation of blood are also present in the plasma in an active form.

9. The most abundant cell in human blood are
(a) Neutrophils (b) Monocytes (c) Lymphocytes (d) None of these

10. Number of erythrocyte in mm^3 of blood are
(a) 4.5 to 5 million (b) 5 to 5.5 million
(c) 5.5 to 6.5 million (d) 3 million

11. Shape of RBC in mammal is
(a) Oval (b) Biconvex (c) Biconcave (d) Flattened

12. The true statement about RBC is
(a) RBCs have an average life span of 120 days.
(b) RBCs are destroyed in the spleen (graveyard of RBCs).
(c) RBCs are devoid of nucleus in most of the mammals.
(d) All the above

13. Leucocytes are known as WBC as they are colourless due to
(a) Presence of nucleus (b) White pigment present in them
(c) Lack of haemoglobin (d) All of these

14. Basophil secrete
(a) Histamine (b) Serotonin (c) Heparin (d) All of these

15. Which of the following is associated with allergic reactions?
(a) Neutrophils (b) Monocytes (c) Eosinophils (d) Lymphocyte

16. Which of the following is an incorrect statement about leucocytes?
(a) They are nucleated.
(b) They are approximately in an average of 6000–8000 mm^{-3} of blood cells in numbers.
(c) Two main types are found they are granulocytes and agranulocytes.
(d) Monocytes are most abundant WBCs.

17. Lymphocyte forms how much per cent of WBCs?
(a) 20 to 25 (b) 2 to 3 (c) 6 to 8 (d) 60 to 65

18. Which of the following cells are responsible for immune responses of the body?
(a) T–lymphocyte (b) B–lymphocyte (c) Both (a) and (b) (d) Astrocyte

19. Platelets are
(a) Cell fragments of megakaryocyte (b) 1.5 to 3.5 lac/mm^3 in blood
(c) Also called thrombocytes (d) All of these

20. ABO grouping is based on how many antigens present or absent on WBCs
(a) 1 (b) 2 (c) 3 (d) None of these

21. Select the correct statement from the following:
(a) Surface antigen on RBC always induce autoimmune response.
(b) Blood grouping (ABO) is an example of multiple allelism.
(c) AB blood group is a universal recipient as well as donor.
(d) 4 phenotype of blood group (ABO) are possible and 5 genotype of blood group (ABO) are possible.

22. A patient with blood group 'A' was injured in an accident and has lost a lot of blood during injury. Which blood group the doctor should effectively use in this case?
(a) AB (b) A/O (c) B/O (d) AB/A/B

23. How many people are Rh +ve in human population?
(a) 80% (b) 20% (c) 60% (d) 40%

24. Rh incompatibility in first pregnancy occurs when
(a) Foetus develop its heart completely (b) During the delivery of first child
(c) When foetal organs completely develop (d) Never occur in the first pregnancy

25. Erythroblastosis fetalis is
(a) HDN (b) Rh incompatibility
(c) Both (a) and (b) (d) None of these

26. There is a vertical transmission of Rh antibody from mother to foetus because they are _____ type of antibody
(a) Ig M (b) IgG (c) Ig A (d) Ig D

27. Select the incorrect statement from the following:
(a) Clot or coagulum is formed mainly by a network of fibrin in which the died and damaged formed element of blood are trapped.
(b) Inactive fibrinogen is converted to fibrin by the hormone thrombin.
(c) Prothrombin is converted into thrombin by the enzyme complex thrombokinase.
(d) Platelet or injured tissue released certain factors which initiate coagulation.

28. Select the incorrect statement from the following:
(a) When platelet releases certain factor which initiate clotting it is known as intrinsic pathway.
(b) When injured tissue releases certain factor which initiate clotting it is known as extrinsic pathway.
(c) Calcium plays a minor role in clotting.
(d) Coagulation prevent excessive loss of blood from the body from injured part.

29. Which enzyme causes conversion of prothrombin into thrombin?
(a) Thrombinase (b) Prothrombinase
(c) Thrombokinase (d) Rennin

30. Blood is a special type of connective tissue which
(a) Consists of a fluid matric (Plasma)
(b) Forms elements
(c) Is the most commonly used body fluid in most of the higher organism
(d) All the above

31. How many mechanism are there for clotting in our body?
(a) 1 (b) 2 (c) 3 (d) 4

32. Lymph is known as
(a) Tissue fluid (b) Interstitial fluid (c) Both (a) and (b) (d) Plasma

33. Lymph
(a) Transports oxygen to brain
(b) Transports CO_2 to lungs
(c) Returns interstitial fluid to blood
(d) Returns RBCs and WBCs to lymph nodes

34. Fill up the gaps given below in the table:

Blood group	Antigens on RBCs	Antibody in Plasma	Donor groups
A	A	Anti-B	A, O
B	B	__II__	B, O
AB	AB	nil	A,B,ABO,O
O	__I__	__III__	__IV__

	I	II	III	IV
(1)	Nil	Nil	Nil	O
(2)	Nil	Nil	Anti-A, B	AB
(3)	Nil	Anti-A, B	Nil	O
(4)	Nil	Anti-A	Anti-A, B	O

35. Find the correct descending order to the percentage proportion of leucocytes in human blood.
(a) Neutrophils → Basophils → Lymphocytes → Acidophils (Eosinophils) → Monocytes
(b) Neutrophils → Monocytes → Lymphocytes → Acidophils → Basophils
(c) Neutrophils → Lymphocytes → Monocytes → Acidophils → Basophils
(d) Neutrophils → Acidophils → Basophils → Lymphocytes → Monocytes

36. In case of emergency, which blood group could be safely transfused?
(a) AB R– (b) AB Rh+ (c) O Rh– (d) O Rh+

37. Which of the following is expected if husband is Rh^+ and wife is Rh^-?
(a) No problem in the first pregnancy (b) Problems in future pregnancies
(c) Both (a) and (b) (d) No problem in any pregnancy

38. What is the correct order of these events?
1. Conversion of fibrinogen to fibrin 2. Clot retraction and leakage of serum
3. Thromoboplastin formation 4. Conversion of prothrombin to thrombin
(a) 3, 2, 1, 4 (b) 3, 4, 1, 2 (c) 3, 4, 2, 1 (d) 4, 1, 3, 2

Circulatory Pathways

39. Open circulatory system is found in
(a) Arthopods and molluscs (b) Annelids and Chordates
(c) Annelids and arthopods (d) Fishes and molluscs

40. Closed circulatory system is found in
(a) Arthropod and chordates (b) Molluscs and chordates
(c) Amphibians and molluscs (d) Annelids and chordates

41. In an open circulatory system,
(a) There is no heart
(b) There is no need of blood vessels
(c) There are open spaces or sinuses in the body
(d) All the above

42. Which of the following has a closed type of circulatory system?
(a) Cockroach (b) Fish (c) Scorpion (d) Mollusc

43. Which of the following has a closed blood vascular system?
(a) Cockroach (b) Hydra (c) Sponge (d) Earthworm

44. Single heart circuit occurs in
(a) Fishes (b) Frogs (c) Reptiles (d) Man

45. Four chambered heart is found in
(a) Cobra (b) Tortoise (c) Salamander (d) Crocodile

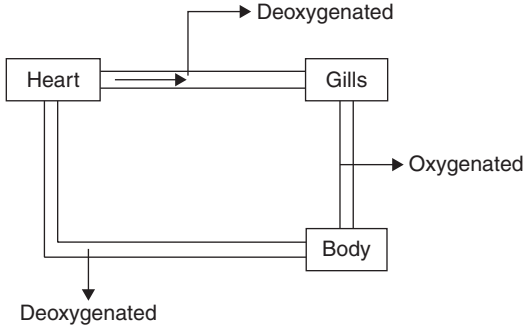
46. Select the correct matching:

Column I	**Column II**
(A) Fishes	(i) 3 chambered
(B) Amphibian	(ii) 4 chambered
(C) Reptiles	(iii) 1 chambered
(D) Birds	(iv) 2 chambered
(E) Mammals	
(F) Crocodile	

(a) (A), (B)–(iii) (b) (B), (C)–(i)
(c) (D), (E), (F)–(iv) (d) (A), (B), (C)–(ii)

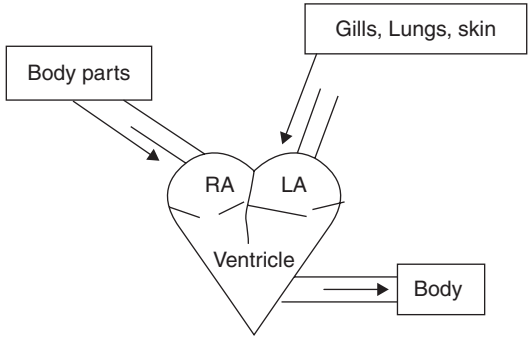
47. Incomplete double circulation is found in
(a) Amphibia (b) Reptiles
(c) Fishes (d) Both (a) and (b)

48.



The given diagram represent circulation in
(a) Fishes (b) Amphibians (c) Birds (d) Reptiles

49.

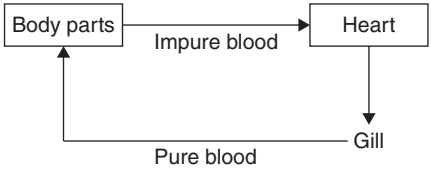


The given diagram shows circulation found in
(a) Amphibian (b) Reptiles
(c) Both (a) and (b) (d) Birds

50. Double circulation is found in
(a) Birds (b) Crocodile
(c) Mammals (d) All of these

51. Heart is derived from
(a) Ectoderm (b) Endoderm
(c) Mesoderm (d) All of these

52. In fishes, the blood circulation is represented as



The given flow of blood indicates that it is a
(a) Double circulation
(b) Single circulation
(c) Incomplete single circulation
(d) Incomplete double circulation

53. Which of the following statements is not true?
(a) Heart is ectodermal in origin.
(b) In human beings the heart is situated in the thoracic cavity, in between the two lungs slightly tilted to the left.
(c) Human heart has the size of a clenched fist.
(d) Heart is protected by a double walled membranous bag (pericardium) with pericardial fluid.

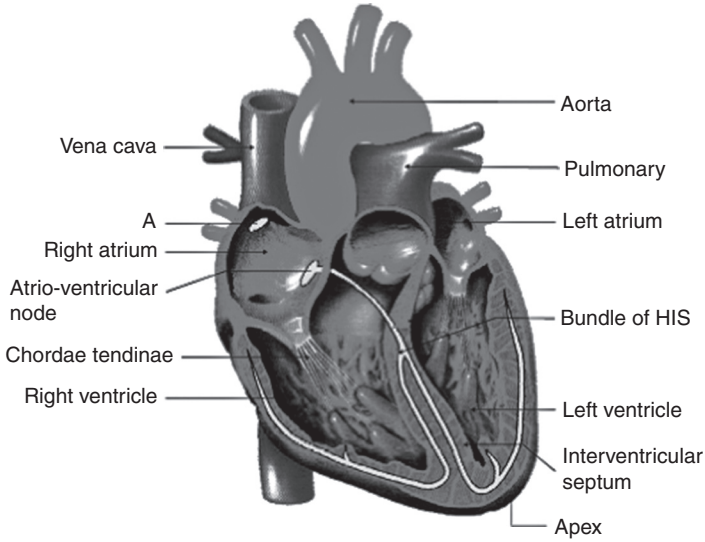
54. Select the total number of thick structure out of the following:
(A) Interatrial septum (muscular wall) (B) Interventricular septum
(C) Atrioventricular septum (fibrous) (D) Walls of ventricles
(a) 1 (b) 2 (c) 3 (d) 4

55. How many papillary muscles are present in right ventricle?
(a) 1 (b) 2 (c) 3 (d) 4

56. Apex of heart is
(a) Upper and tilted toward left
(b) Lower and tilted towards left
(c) Upper and tilted towards right
(d) Lower and tilted towards right

57. Which of the following organs has papillary muscles?
(a) Ciliary body (b) Legs
(c) Wall of heart (d) Mammary glands

58. The full form of label 'A' in the diagram is



(a) Sin–Atrial–Node
(b) Sinu–Atrial–Node
(c) Sino–Atrial–Node
(d) Sinus–Atrial–Node

59. Bundle of HIS consists of
(A) Right bundle branch
(B) Left bundle branch
(C) Purkinje fibres
(D) AV bundle
(a) A, B and C only
(b) A, B, C, D
(c) B, C and D only
(d) C and D only

60. Bicuspid valve/mitral valve is found between
(a) Left atrium and left ventricle
(b) Right atrium and right ventricle
(c) Right atrium and left ventricle
(d) Left atrium and right ventricle

61. Tricuspid valve is present between the
(a) Two atria
(b) Two ventricles
(c) Left atrium and left ventricle
(d) Right atrium and right ventricle

62. Chordae tendinae are found in
(a) Joints
(b) Atria of heart
(c) Ventricles of heart
(d) Ventricles of brain

63. Ventricles are thick-walled as compared to atrium because
(a) It is to receive blood from atria
(b) It is present on the posterior side
(c) It has to pump blood
(d) None of these

64. Papillary muscles are located in
(a) Heart ventricles of human
(b) Dermis of mammalian skin
(c) Orbits of vertebrate eyes
(d) Pylorus of vertebrate stomach

65. Purkinje fibres are found in
(a) Brain (b) Kidneys (c) Skin (d) Heart

66. Which of the following has the thickest wall?
(a) Left auricle (b) Left ventricle
(c) Right auricle (d) Right ventricle

67. 'Heart of heart' is
(a) SA node (b) AV node
(c) Bundle of HIS (d) Purkinje fibres

68. SA node is located in
(a) Upper left corner of right atrium (b) Lower left corner of left atrium
(c) Lower right corner of left atrium (d) Upper right corner of right atrium

69. Human heart is
(a) Neurogenic (b) Myogenic
(c) Cardiogenic (d) Digenic

70. Which of the following term does not apply to human heart?
(a) Pacemaker (b) Four chambered
(c) Mitral valve (d) Neurogenic

71. Rate of heartbeat is determined by
(a) SA node (b) AV node
(c) Purkinje fibres (d) Papillary muscles

72. In amphibia, the heart has
(a) Two auricles and two ventricles
(b) Two auricles and one ventricle
(c) One auricle and two ventricles
(d) One auricle, one ventricle and one sinus venosus

73. SA node is called the pace maker of the heart. Why?
(a) It can change contractile activity generated by AV node.
(b) It delays the transmission of impulse between the atria and ventricles.
(c) It gets stimulated when it receives neural signal.
(d) It initiates and maintains the rhythmic contractile activity of heart.

74. Sino-Atrial node (SAN) can generate impulses
(a) 70–75 min^{-1} (b) 50–55 min^{-1} (c) 35–40min^{-1} (d) 90–100 min^{-1}

75. The impulse of heartbeat originates from
(a) SAN (b) AVN (c) Vagus nerve (d) Cardiac nerve

76. Rate of heart is determined by
(a) SAN (b) AVN
(c) Purkinje fibres (d) Bundle of His

77. Bundle of HIS is a group of
(a) Ganglia (b) Nerve fibres
(c) Muscular fibres (d) Connective tissue

78. Bundle of HIS found in
(a) Right atrium (b) Left atrium
(c) Both (a) and (b) (d) Interventricular septum

79. An atrioventricular valve prevents the back flow or leakage of blood from the
(a) Right ventricle into the right atrium (b) Left atrium into the left ventricle
(c) Aorta into the left ventricle (d) Pulmonary vein into the right atrium

80. How many double circulation are normally completed by the human heart in one minute?
(a) 8 (b) 16 (c) 36 (d) 72

81. The duration of cardiac cycle in a normal man is
(a) 0.8 seconds (b) 80 seconds (c) 60 seconds (d) 72 seconds

82. During systole of heart
(a) Only atria contracts
(b) Only ventricles contract
(c) Atria and ventricles contract separately
(d) Atria and ventricles contract simultaneously

83. During diastole, blood
(a) Enters the heart (b) Leaves the heart
(c) Leaves the ventricle (d) Enters into lungs

84. During ventricular systole the oxygenated blood is pumped into the
(a) Aorta and deoxygenated blood is pumped into the pulmonary artery.
(b) Pulmonary artery and deoxygenated blood is pumped into the artery.
(c) Aorta and deoxygenated blood is pumped into pulmonary vein.
(d) Pulmonary vein and deoxygenated blood is pumped into pulmonary artery.

85. To reach the left side of heart, the blood must pass through
(a) Lungs (b) Liver (c) Kidneys (d) Sinus venosus

86. Mammals are said to have double circulation. It means
(a) Blood vessels are paired.
(b) There are two types of blood vessels attached to every organ.
(c) There are two systems, one from the heart to the lungs and back to the rest of the body.
(d) Blood circulates twice through the heart.

87. In mammals, veins differs from arteries in having
(a) Thicker walls (b) Deeply present
(c) Carry blood away from heart (d) Internal valves

88. An artery is
(a) Thick walled in which blood flows under low pressure.
(b) Thin walled in which blood flows under high pressure.
(c) Thick walled in which blood flows under high pressure.
(d) Thin walled in which blood flows under low pressure.

89. Cells constituting the wall of capillaries are
(a) Parietal (b) Endothelial (c) Oxyntic (d) Haemocytes

90. A muscular wall is absent in
(a) Venule (b) Vein
(c) Capillary (d) Arteriole

91. Contraction of right ventricle pumps blood into
(a) Dorsal aorta (b) Pulmonary vein
(c) Coronary artery (d) Pulmonary artery

92. Arteries carry oxygenated blood except in
(a) Pulmonary (b) Cardiac (c) Hepatic (d) Systemic

93. When ventricular systole occurs
(a) Atrial diastole coincides
(b) Tricuspid and bicuspid valves close
(c) Semilunar valves guarding pulmonary artery and aorta are forced to open
(d) All the above

94. During cardiac cycle, about _____ % of ventricular filling occurs prior to atrial contraction. _____ % ventricular filling occurs due to atrial contraction
(a) 50, 50 (b) 70, 30 (c) 30, 70 (d) 10, 90

95. Which of the following events do not occur during joint diastole?
A. All four chambers of heart are in relaxed state.
B. Tricuspid and bicuspid valves open.
C. Action potential is conducted from SAN to AVN.
D. Blood from the pulmonary veins and vena cava flows into the left and right ventricles respectively through the left and right atria.
E. The semilunar valves are closed.
(a) Only E (b) Only C
(c) Only D (d) Only A and B

96. The amount of blood to be pumped out by each ventricle/minute is
(a) Stroke volume (b) Cardiac output
(c) ERV (d) ZRV

97. During cardiac cycle each ventricle pumps out about 70 mL of blood which is called
(a) Stroke volume (b) Cardiac output
(c) Tidal volume (d) Residual volume

98. Cardiac output is
(a) Stroke volume (SV) × Heart rate (HR) = 5 L/m
(b) SV × HR = 500 ml
(c) SV × HR = 72 ml/m
(d) SV × HR = 70 ml/m

99. Which of the following statement is incorrect?
(a) Cardiac output of an athlete is much higher than that of an ordinary man.
(b) In each minute a single cardiac cycle is performed.
(c) During each cardic cycle two prominent sounds are produced.
(d) Cardiac cycle includes atrial systole, ventricular systole and joint diastole.

100. Identify the correct sequence of events in a cardiac cycle:
(a) Diastole, atrial systole, ventricular diastole
(B) Atrial systole, ventricular diastole, ventricular systole
(c) Atrial systole, ventricular systole, joint diastole
(d) Ventricular diastole, diastole, ventricular systole, atrial systole

101. First cardiac sound (lub) is associated with
(a) Closure of tricuspid and bicuspid valves (b) Opening of tricuspid valves
(c) Closure of semilunar valves (d) Opening of semilunar valves

102. Which of the following statement is wrong for second cardiac sound?
(a) It is heard as dup
(b) It is produced due to the closure of semilunar valves
(c) It is clinically significant
(d) It is clinically nonsignificant

103. Which of the following is correct about human heart?
(a) The volume of both atria > the volume of both ventricles
(b) The volume of both ventricle > the volume of both atria
(c) The volume of both atria = the volume of both ventricles
(d) Ventricles are upper chambers and atria are lower chambers in our heart.

104. Which of the following blood vessels possess semilunar valves?
(a) Vena cava and aorta (b) Aorta and pulmonary artery
(c) Pulmonary artery and pulmonary vein (d) Pulmonary vein and vena cava

105. The heartbeat of a person increases at the time of an interview due to the secretion of
(a) Renin (b) Adrenaline (c) ADH (d) ACTH

106. Which of the following set is correct?
(a) Sebum – Analgesic
(b) Vitamin – Nicotine
(c) Corpus callosum – Graafian follicle
(d) Bundle of His – Purkinje fibres

107. Cardiac centre lies in
(a) Medulla oblongata (b) Pons
(c) Cerebrum (d) Epithalamus

108. Cardiac centre can moderate the cardiac functions through
(a) Somatic neural system
(b) Parasympathetic nervous system only
(c) Autonomic nervous system (ANS)
(d) Sympathetic nervous system only

109. Neural signal through the sympathetic nervous (part of ANS) increases the cardiac output because of
(a) Increasing the rate of heatbeat
(b) Increasing the strength of ventricular contraction
(c) Both (a) and (b)
(d) Increasing the stimulation of vagus nerve

110. Parasympathetic neural signal decreases the cardiac output by
(a) Decreasing the rate of heartbeat
(b) Decreasing the speed conduction of action potential
(c) Both (a) and (b)
(d) Increasing adrenal medulla hormones secretion

111. Heartbeat increases
(a) on stimulation of sympathetic nerves
(b) On stimulation of vagus nerve (parasympathetic nerve)
(c) By adrenalin secreted by adrenal medulla
(d) Both (a) and (c)

112. Select the total number of incorrect matching from the following:
(A) ECG–Electro Cardio Gram
(B) AVN–Atrio Ventricular Node
(C) SAN–Sino Atrial Node
(D) WBC–White Blue Cells
(E) RBC–Red Blood Cells
(a) 1 (b) 2 (c) 3 (d) 4

113. Heartbeat is accelerated by
(a) Sympathetic nerves and acetylcholine
(b) Cranial nerves and adrenaline
(c) Cranial nerves and acetylcholine
(d) Sympathetic nerves and epinephrine

114. Body has the capacity to alter
(a) Stroke volume
(b) Heart rate
(c) Cardiac output
(d) All of these

115. To obtain standard ECG a patient is connected to the machine with three electrical leads attached to the following parts except
(a) Right wrist
(b) Left wrist
(c) Right ankle
(d) Left ankle

116. Find out the incorrect statement from the following:
(a) ECG is a graphical representation of the electrical activity of the heart during cardiac cycle.
(b) For a detailed evaluation of the heart's function, multiple leads are attached to the chest region (chest leads).
(c) P, R, T are +ve wave whereas Q and S are –ve wave in standard ECG.
(d) Starting of T-wave marks the end of systole of ventricles.

117. Select the correct statement from the following:
(a) ECG is of great clinical insignificance.
(b) By counting the number of QRS complexes (in given time period), we can the find pulse rate .
(c) The contraction of atria starts with starting of Q wave.
(d) T-wave represent repolarization of atria.

118. Electrocardiogram is a measure of
(a) Heart rate
(b) Ventricular contraction
(c) Volume of blood pumped
(d) Electrical activity of heart

119. P-wave represents
(a) Depolarization of ventricles (b) Repolarization of ventricle
(c) Repolarization of atria (d) Depolarization of atria

120. QRS complex represents the
(a) Depolarization of ventricles (b) Repolarization of ventricles
(c) Repolarization of atria (d) Depolarization of atria

121. T-wave on an ECG represents
(a) Depolarization of ventricles (b) Repolarization of ventricles
(c) Repolarization of atria (d) Depolrization of atria

Disorder of Circulatory System

122. In an adult, normal blood pressure is
(a) 80/120 mmHg (b) 100/80 mmHg
(c) 120/80 mmHg (d) 100/120 mmHg

123. Normal BP = 120/80 mmHg in an adult. In this measurement 120 mmHg is the _____ pressure and 80 mmHg is _____ pressure.
(a) Diastolic, systolic (b) Systolic, diastolic
(c) Pulse, diastolic (d) Pulse, systolic

124. The difference of blood pressure between systolic and diastolic phase is
(a) 10 mmHg (b) 40 mmHg (c) 120 mmHg (d) 180 mmHg

125. Which one indicates hypertension?
(a) 120/80 mmHg (b) 80/120 mmHg (c) 140/90 mmHg (d) 40/60 mmHg

126. Pulmonary circulation includes
(a) Pulmonary artery (b) Pulmonary vein
(c) Lungs (d) All of these

127. The instrument by which BP of human beings are determined is called
(a) Ultrasound (b) BP meter
(c) Stethoscope (d) Sphygmomanometer

128. The instrument used to hear heartbeats is called
(a) Electrocardiograph (b) Sphygmomanometer
(c) Stethoscope (d) Haemometer

129. A system which supplies blood to heart is
(a) Portal system (b) Pulmonary system
(c) Coronary system (d) All of these

130. Hepatic portal system starts from
(a) Digestive system to liver (b) Kidney to liver
(c) Liver to heart (d) Liver to kidney

131. A unique vascular connection that exist between the digestive tract and liver is called
(a) Renal portal system
(b) Hypothalamic-Hypophyseal portal system
(c) Hepatic portal system
(d) All the above

132. Pulmonary circulation is required for
(a) Nutrient supply to lungs
(b) Elimination of waste products from the lungs
(c) Oxygenation of deoxygenated blood
(d) Nutrient supply to heart

133. Which of the following is true about hypertension?
(a) It leads to cardiac diseases.
(b) It affects vital organs like brain and kidney.
(c) It repeats the check of blood pressure of an individual as 140/90 or higher, it shows hypertensions.
(d) All the above

134. Find the incorrect matching:
(a) CAD–Atherosclerosis
(b) Angina–Angina pectoris
(c) Stroke volume–Beat volume
(d) Heart failure–Heart attack

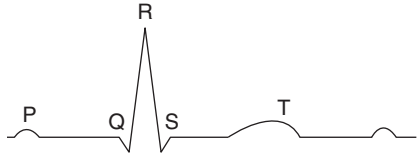
135. Match the Column I with Column II:

Column I		**Column II**
A. Heart failure	–	1. Heart muscle is suddenly damaged by an inadequate blood supply.
B. Cardiac arrest	–	2. Chest pain due to inadequate O_2 reaching the heart muscles.
C. Heart Attack	–	3. Atherosclosis
D. Coronary Artery disease	–	4. Heart not pumping blood effectively enough to meet the needs of the body (CAD).
E. Angina pectoris	–	5. Heart stops beating

	A	B	C	D	E
(a)	4	5	1	3	2
(b)	4	5	3	1	2
(c)	4	3	5	2	1
(d)	5	4	2	3	1

136. It is often referred to as atherosclerosis, it affects the blood vessels that supply blood to the heart muscles. It is caused by the deposition of Ca, fat, cholesterol and fibrous tissues making the lumen of arteries narrow
(a) CAD
(b) SCID
(c) Blue baby
(d) myocarditis

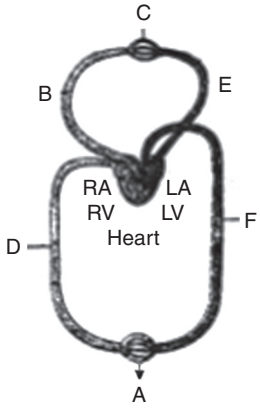
137. The given figure describes the diagrammatic representation of standard ECG.



Column I		**Column II**
A. P-wave	–	I. Ventricular depolarization followed by ventricular contraction
B. QRS complex	–	II. Atrial depolarization followed by systole of both atria
C. T-wave	–	III. Ventricular repolarization followed by ventricular relaxation

(a) A–I, B–II, C–III (b) A–III, B–II, C–I
(c) A–II, B–I, C–III (d) A–II, B–III, C–I

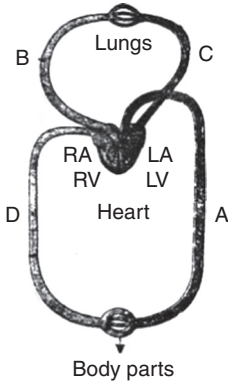
138.



The given figure is the systematic plant of blood circulation in human. Identify from A to F.

	A	B	C	D	E	F
(a)	Body parts	Pulmonary vein	Lungs	Vena cava	Pulmonary artery	Dorsal aorta
(b)	Body parts	Pulmonary artery	Lungs	Vena cava	Pulmonary vein	Dorsal aorta
(c)	Body parts	Pulmonary artery	Lungs	Dorsal aorta	Pulmonary vein	Vena cava
(d)	Lungs	Pulmonary artery	Body parts	Dorsal aorta	Pulmonary vein	Vena cava

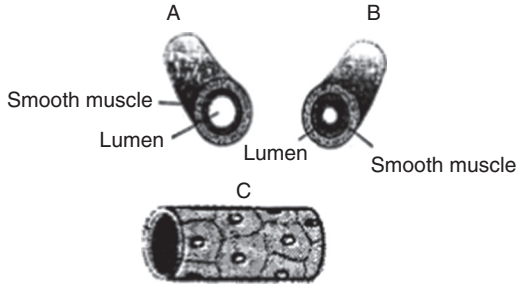
139. Which is the nature of blood passing through blood vessels (A, B, C and D)?



What is the nature of blood passing through blood vessels (A, B, C and D)?

	A	B	C	D
(1)	Oxygenated	Deoxygenated	Oxygenated	Deoxygenated
(2)	Oxygenated	Oxygenated	Deoxygenated	Deoxygenated
(3)	Deoxygenated	Deoxygenated	Oxygenated	Oxygenated
(4)	Deoxygenated	Oxygenated	Deoxygenated	Oxygenated

140. Identify the following blood vessels.



	A	B	C
(1)	Capillary	Artery	Vein
(2)	Vein	Capillary	Artery
(3)	Vein	Artery	Capillary
(4)	Artery	Vein	Capillary

141. The given diagram shows which cell of blood?

(a) Neturophil (b) Basophil (c) Eosinophil (d) Monocyte

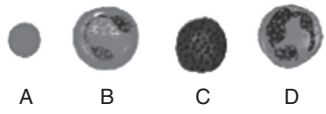
142. Which of the following is a true statement about this diagram?

(a) This is the most abundant cell of blood.
(b) This cell is phagocytic in nature.
(c) Abundance in blood is 60–65%.
(d) This cell secrete histamine, serotonin and heparin.

143. The function of the cell fragments in blood (given in the diagram) is

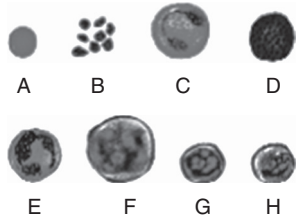
(a) To resist infection
(b) To be responsible for immune response
(c) To help in clotting of blood
(d) To resist allergy

144. Which cell represents the surface antigen for ABO blood group?



(a) A (b) B (c) C (d) D

145. Identify A, B, C, D, E, F, G and H in the given diagram.



	A	B	C	D	E	F	G	H
(a)	Neturophil	Eosinophil	Platelets	Basophil	Neutrophil	Monocyte	T lymphocyte	B lymphocyte
(b)	RBC	Platelets	Basophil	Eosinophil	Monocyte	Neutrophil	T lymphocyte	B lymphocyte
(c)	RBC	Platelets	Eosinophil	Basophil	Neutrophil	Monocyte	T lymphocyte	B lymphocyte
(d)	T lymphocyte	B lymphocyte	Platelets	Eosinophil	Basophil	Neutrophil	Monocyte	RBC

146. Rate of heartbeat is the highest in
(a) Whale (b) Elephant (c) Mouse (d) Man

147. Which of the following pair of terms represent both one and the same thing?
(a) Plasma–Serum (b) Atrioventricular node–Pacemaker
(c) Leucocytes–Lymphocytes (d) Mitral valve–Bicuspid valve

148. How many times a red blood corpuscle will have to pass through the heart in its journey from hepatic artery to the aorta?
(a) Two times (b) Only once
(c) Several times (d) Four times

149. Maximum pressure of blood is experienced
(a) When blood enters from left atrium to aorta
(b) When blood enters from right atrium to aorta
(c) When blood enters from left ventricle to aorta
(d) When blood enters from right ventricle to aorta

150. The blood circulation, which starts and ends into capillaries is
(a) Portal circulation (b) Renal circulation
(c) Hepatic circulation (d) Lymphatic circulation

151. Which one of the following is absent in the human beings?
(a) Hypophyseal-hypothalamic tract (b) Hepatic portal vein
(c) Renal portal vein (d) None of these

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

152. **Assertion:** Simple organism use special fluids within their bodies to transport materials.
Reason: Boold is the only fluid used by higher organism including human for transport of certain substances.

153. **Assertion:** Closed circulatory system is more effective than open type.
Reason: The closed circulatory system considerably enhances the speed, precision and efficiency of circulation.

154. **Assertion:** Cardiac output rises during exercise.
Reason: Cardiac output helps in less oxygen consumption.

155. **Assertion:** Plasma retains water.
Reason: Plasma contains an osmotic protein called albumin.

156. **Assertion:** An artificial pacemaker can replace the sinoatrial node of heart.
Reason: This is because, an artificial pacemaker is capable of stimulating the heart electrically to maintain its beats.

157. **Assertion:** When heart stops beating it is known as cardiac arrest.
Reason: Heart attack occur due to cardic arrest.

158. **Assertion:** Plasma without the clotting factors is called serum.
Reason: Serum contain immunoglobulins.

159. **Assertion:** Heart of fish contains only deoxygenated blood.
Reason: Oxygenated blood do not return back to the heart in fishes.

160. **Assertion:** Basophils are involved in inflammatory reaction.
Reason: Basophils use to secrete histamine,serotonin,heparin, etc.

161. **Assertion:** The reduction in number of platelets can lead to clotting disorders.
Reason: Platelets release a variety of sustances most of which are involved in the clotting of blood.

162. **Assertion:** Blood pressure is arterial blood pressure.
Reason: It is measured by sphygmomanometer.

163. **Assertion:** Body has the ability to alter cardiac output.
Reason: Body has the ability to alter the stroke volume as well as the heart rate.

164. **Assertion:** QRS complex represent the depolarization of atria.
Reason: Biggining of the T-wave marks the end of systole.

165. **Assertion:** WBCs accumulate at the site of wounds by diapedesis.
Reason: It is the squeezing of leucocytes from the endothelium.

166. **Assertion:** Opening of pulmonary trunk and aorta are guarded by valves.
Reason: These valves prevent backward flow of blood in ventricles

167. **Assertion:** SA node is called pacemaker of heart.
Reason: It is responsible for initiating and maintaining the rhythm of heart

168. **Assertion:** The wall of left ventricle is thickest among all four chambers of heart.
Reason: The left ventricle has to pump blood to whole body.

169. **Assertion:** The velocity of flow of blood is minimum in capillaries.
Reason: The surface area of capillaries are maximum among all blood vessels.

170. **Assertion:** Human heart is myogenic.
Reason: Normal activities of heart are regulated intrinsically by specialized muscle.

171. **Assertion:** Circulation in amphibians and reptiles is called incomplete double circulation.
Reason: Deoxygenated and oxygenated blood get mixed up in the single ventricle pumps out mixed blood.

172. **Assertion:** Spleen is called graveyard of RBCs.
Reason: RBCs are destroyed in spleen after completing their average life span of 60 days.

173. **Assertion:** Serum is able to clot blood.
Reason: Serum contains all clotting factors required for clotting of blood.

174. **Assertion:** Individual with 'O' blood group is considered to be universal donor.
Reason: Blood of 'O' blood group individual do not contain antigens on their RBCs.

175. **Assertion:** Erythroblastosis feotalis not observed during first pregnancy although foetus is Rh positive and mother is Rh negative.
Reason: Rh antigens of foetus do not get exposed to Rh negative blood of mother in first pregnancy as the two bloods are well separated by placenta.

176. **Assertion:** Atria and ventricle do not contract simultaneously.
Reason: It occurs due to AV nodal delay.

177. **Assertion:** Starting of ventricular diastole leads to closure of semi lunar valves.
Reason: Ventricular diastole leads to fall in ventricular pressure.

178. **Assertion:** If we cut nerve supply to human heart, there will be no effect on heart beat.
Reason: Human heart is myogenic in nature.

179. **Assertion:** An injury or trauma stimulates the platelets to release certain factors which regulate the mechanism of coagulation.
Reason: Calcium iron is very important for clotting of blood.

180. **Assertion:** The number of eosinophils increases in patients suffering from asthma.
Reason: Asthma is an allergic disease.

181. **Assertion:** The disease erythroblastosis feotalis can be avoided in second pregnancy if Rh negative maternal blood exposed to Rh positive foetal blood during delivery of first child.
Reason: If mother is administered with anti Rh antibodies immediately after the delivery of first child.

PREVIOUS YEAR QUESTIONS

1. Given below are four statements (1 to 4) regarding human blood circulatory system.
[AIPMT MAINS 2010]

(A) Arteries are thick walled and have narrow lumen as compared to veins.
(B) Angina is acute chest pain when the blood circulation to the brain is reduced.
(C) Persons with blood group AB can donate blood to any person with any blood group ABO system.
(D) Calcium ions play a very important role in blood clotting.

Which of the above two statements are correct?

(a) (a) & (d) (b) (a) & (b)
(c) (b) & (c) (d) (c) & (d)

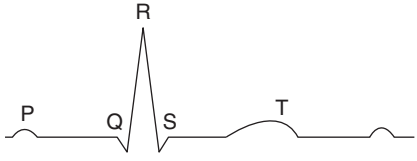
2. The haemoglobin content per 100 ml of blood of a normal healthy human adult is
[AIPMT MAINS 2010]

(a) 5 – 11 mg (b) 25 – 30 mg
(c) 17 – 20 mg (d) 12 – 16 mg

3. If due to some injury the chordae tendineae of the tricuspid valve of the human heart is partially non-functional, what will be the immediate effect?
[AIPMT PRE 2010]

(a) The flow of blood into the aorta will be slowed down.
(b) The 'pacemaker' will stop working.
(c) The blood will tend to flow back into the left atrium.
(d) The flow of blood into the pulmonary artery will be reduced.

4. Given below is the ECG of a normal human. Which one of its components is correctly interpreted below?



[AIPMT MAINS 2011]

(a) Complex QRS-one complete pulse
(b) Peak T-initiation of total cardiac contraction
(c) Peak P and peak R together – systolic and diastolic blood pressure
(d) Peak P – initiation of left atrial contraction only

5. Arteries are best defined as the vessels which:

[AIPMT PRE 2011]

(a) Carry blood away from the heart to different organs.
(b) Break up into capillaries which reunite to form a vein.
(c) Carry blood from one visceral organ to another visceral organ.
(d) Supply oxygenated blood to different organs.

6. Which one of the following statements is correct regarding blood pressure?

[AIPMT PRE 2011]

(a) 100/55 mmHg is considered as an ideal blood pressure.
(b) 105/50 mmHg makes one very active.
(c) 190/110 mmHg may harm vital organs like brain and kidney.
(d) 130/90 mmHg is considered high and requires treatment.

7. A person with unknown blood group under ABO system has suffered more blood loss in an accident and needs immediate blood transfusion. His one friend, who has a valid certificate of his own blood type, offers for blood donation without delay. What would have been the type of blood group of the donor friend?

[AIPMT PRE 2011]

(a) Type AB
(b) Type O
(c) Type A
(d) Type B

8. 'Bundle of His' is a part of which one of the following organs in humans?

[AIPMT PRE 2011]

(a) Heart
(b) Kidney
(c) Pancreas
(d) Brain

9. Which one of the following plasma proteins is involved in the coagulation of blood?

[AIPMT PRE 2011]

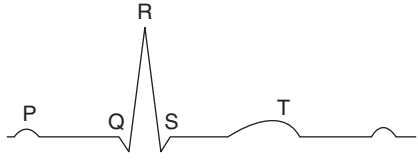
(a) Serum amylase
(b) A globulin
(c) Fibrinogen
(d) An albumin

10. A certain road accident with unknown blood group needs immediate blood transfusion. His one doctor friend at once offers his blood. What was the blood group of the donor?

[AIPMT PRE 2012]

(a) Blood group B
(b) Blood group AB
(c) Blood group O
(d) Blood group A

11. The diagram given here is the standard ECG of normal person. The P wave represents the:



[AIPMT 2013]

(a) Constriction of both the atria
(b) Initiation of the ventricular contraction
(c) Beginning of the systole
(d) End of systole

12. Person with blood group AB is considered as universal recipient because he has
[AIPMT 2014]

(a) Both A and B antigens on RBC but no antibodies in the plasma.
(b) Both A and B antibodies are in the plasma.
(c) No antigen on RBC and no antibody in the plasma.
(d) Both A and B antigens in the plasma but no antibodies.

13. How do parasympathetic neural signals affect the working of the heart?
[AIPMT 2014]

(a) Reduce both heart rate and cardiac output.
(b) Heart rate is increased without affecting the cardiac output.
(c) Both heart rate and cardiac output increases.
(d) Heart rate decreases but cardiac output increases.

14. Erythropoiesis starts in
[AIPMT 2015]

(a) Kidney
(b) Liver
(c) Spleen
(d) Red bone marrow

15. Blood pressure in the mammalian aorta is maximum during:
[AIPMT 2015]

(a) Systole of the left atrium
(b) Diastole of the right ventricle
(c) Systole of the left ventricle
(d) Diastole of the right atrium

16. Which one of the following is correct?
[AIPMT 2015]

(a) Plasma = Blood – Lymphocytes
(b) Serum = Blood + Fibrinogen
(c) Lymph = Plasma + RBC + WBC
(d) Blood = Plasma + RBC + WBC + Platelets

17. Doctors use stethoscope to hear the sounds produced during each cardiac cycle. The second sound is heard when:
[RE-AIPMT 2015]

(a) Ventricular walls vibrate due to gushing in of blood from atria
(b) Semilunar valves close down after the blood flows into vessels from ventricles
(c) AV node receives signal from SA node
(d) AV valves open up

18. Which one of the following animals has two separate circulatory pathways?
[RE-AIPMT 2015]

(a) Lizard (b) Whale
(c) Shark (d) Frog

19. Blood pressure in the pulmonary artery is:
[NEET - I, 2016]

(a) same as that in the aorta
(b) more than that in the carotid
(c) more than that in the pulmonary vein
(d) less than that in the vena cavae

20. Name the blood cells, whose reduction in number can cause clotting disorder, leading to excessive loss of blood from the body. [NEET - II, 2016]
(a) Leucocytes
(b) Neutrophils
(c) Thrombocytes
(d) Erythrocytes

21. Serum differs from blood in [NEET - II, 2016]
(a) Lacking albumins
(b) Lacking clotting factors
(c) Lacking antibodies
(d) Lacking globulins

NCERT EXEMPLAR QUESTIONS

1. Which of the following cells does not exhibit phagocytotic activity?
(a) Monocytes
(b) Neutrophil
(c) Basophil
(d) Macrophage

2. One of the common symptoms observed in people infected with Dengue fever is
(a) Significant decrease in RBC count.
(b) Significant decrease in WBC count.
(c) Significant decrease in platelets count.
(d) Significant increase in platelets count.

3. Which among the following is correct during each cardiac cycle?
(a) The volume of blood pumped out by the right and left ventricles is same.
(b) The volume of blood pumped out by the right and left ventricles is different.
(c) The volume of blood received by each atrium is different.
(d) The volume of blood received by the aorta and pulmonary artery is different.

4. Cardiac activity could be moderated by the autonomous neural system. Pick the correct answer from the following.
(a) The parasympathetic system stimulates the heart rate and stroke volume.
(b) The sympathetic system stimulates the heart rate and stroke volume.
(c) The parasympathetic system decreases the heart rate but increases the stroke volume.
(d) The sympathetic system decreases the heart rate but increases the stroke volume.

5. Mark the pair of substances among the following, which is essential for coagulation of blood.
(a) Heparin and calcium ions
(b) Calcium ions and platelet factors
(c) Oxalates and citrates
(d) Platelet factors and heparin

6. ECG depicts the depolarization and repolarization processes during the cardiac cycle. In the ECG of a normal healthy individual one of the following waves is not represented.
(a) Depolarization of atria
(b) Repolarization of atria
(c) Depolarization of ventricles
(d) Repolarization of ventricles

7. Which one of the following type of cells lacks nucleus?
(a) RBC
(b) Neutrophils
(c) Eosinophils
(d) Monocytes

8. Which one of the following blood cells is involved in antibody production?
(a) B-Lymphocytes (b) T-Lymphocytes
(c) RBC (d) Neutrophils

9. The cardiac impulse is initiated and conducted further up to ventricle. The correct sequence of conduction of impulse is
(a) SA Node → AV Node → Purkinje fibres → AV Bundle
(b) SA Node → Purkinje fibres → AV Node → AV Bundle
(c) SA Node → AV Node → AV Bundle → Purkinje fibres
(d) SA Node → Purkinje fibres → AV Bundle → AV Node

10. The Agranulocytes responsible for immune response of the body are
(a) Basophils (b) Neutrophils
(c) Eosinophils (d) Lymphocytes

11. The second heart sound (dub) is associated with the closure of
(a) Tricuspid valve (b) Semilunar valves
(c) Bicuspid valve (d) Tricuspid and bicuspid valves

12. Which of the following correctly explains a phase/event in cardiac cycle in a standard electrocardiogram?
(a) The QRS complex indicates atrial contraction.
(b) The QRS complex indicates ventricular contraction.
(c) The time between S and T represents atrial systole
(d) The P–wave indicates the beginning of ventricular contraction.

13. Which of the following statements is incorrect?
(a) A person of 'O' blood group has anti 'A' and anti 'B' antibodies in his blood plasma.
(b) A person of 'B' blood group can't donate blood to a person of 'A' blood group.
(c) Blood group is designated on the basis of the presence of antibodies in the blood plasma.
(d) A person of AB blood group is a universal recipient.

14. What would be the cardiac output of a person having 72 heart beats per minute and a stroke volume of 50 mL?
(a) 360 mL (b) 3600 mL
(c) 7200 mL (d) 5000 mL

15. Match the terms given under Column I with their functions given under Column II and select the answer from the options given below:

	Column I		**Column II**
(A)	Lymphatic System	(i)	Carries oxygenated blood
(B)	Pulmonary vein	(ii)	Immune Response
(C)	Thrombocytes	(iii)	To drain back the tissue fluid to the circulatory system
(D)	Lymphocytes	(iv)	Coagulation of blood

(a) (A) – (ii), (B) – (i), (C) – (iii), (D) – (iv)
(b) (A) – (iii), (B) – (i), (C) – (iv), (D) – (ii)
(c) (A) – (iii), (B) – (i), (C) – (ii), (D) – (iv)
(d) (A) – (ii), (B) – (i), (C) – (iii), (D) – (iv)

16. Read the following statements and choose the correct option.
Statement 1: Atria receive blood from all parts of the body which subsequently flows to ventricles.
Statement 2: Action potential generated at the sinoatrial node passes from atria to ventricles.
(a) Action mentioned in Statement 1 is dependent on action mentioned in Statement 2.
(b) Action mentioned in Statement 2 is dependent on action mentioned in Statement 1.
(c) Action mentioned in Statements 1 and 2 are independent of each other.
(d) Action mentioned in Statements 1 and 2 are synchronous.

Answer Keys

Practice Questions

1. (b)	2. (d)	3. (a)	4. (a)	5. (b)	6. (a)	7. (b)	8. (d)	9. (d)	10. (b)
11. (c)	12. (d)	13. (c)	14. (d)	15. (c)	16. (d)	17. (a)	18. (c)	19. (d)	20. (d)
21. (b)	22. (b)	23. (a)	24. (b)	25. (c)	26. (b)	27. (b)	28. (c)	29. (c)	30. (d)
31. (b)	32. (c)	33. (c)	34. (d)	35. (c)	36. (c)	37. (c)	38. (b)	39. (a)	40. (d)
41. (c)	42. (b)	43. (d)	44. (a)	45. (d)	46. (b)	47. (d)	48. (a)	49. (c)	50. (d)
51. (c)	52. (b)	53. (a)	54. (c)	55. (c)	56. (b)	57. (c)	58. (c)	59. (a)	60. (a)
61. (d)	62. (c)	63. (c)	64. (a)	65. (d)	66. (b)	67. (a)	68. (d)	69. (b)	70. (d)
71. (a)	72. (b)	73. (d)	74. (a)	75. (a)	76. (a)	77. (c)	78. (d)	79. (a)	80. (d)
81. (a)	82. (c)	83. (a)	84. (a)	85. (a)	86. (d)	87. (d)	88. (c)	89. (b)	90. (c)
91. (d)	92. (a)	93. (d)	94. (b)	95. (b)	96. (b)	97. (a)	98. (a)	99. (b)	100. (c)
101. (a)	102. (d)	103. (b)	104. (b)	105. (b)	106. (d)	107. (a)	108. (c)	109. (c)	110. (c)
111. (d)	112. (d)	113. (d)	114. (d)	115. (c)	116. (d)	117. (b)	118. (d)	119. (d)	120. (a)
121. (b)	122. (c)	123. (b)	124. (b)	125. (c)	126. (d)	127. (d)	128. (c)	129. (c)	130. (a)
131. (c)	132. (c)	133. (d)	134. (d)	135. (a)	136. (a)	137. (c)	138. (b)	139. (a)	140. (c)
141. (c)	142. (b)	143. (c)	144. (a)	145. (c)	146. (c)	147. (d)	148. (a)	149. (c)	150. (a)
151. (c)									

Assertion and Reason Questions

152. (d)	153. (a)	154. (c)	155. (a)	156. (a)	157. (c)	158. (b)	159. (a)	160. (a)	161. (a)
162. (b)	163. (a)	164. (d)	165. (b)	166. (a)	167. (a)	168. (a)	169. (a)	170. (a)	171. (a)
172. (c)	173. (d)	174. (a)	175. (a)	176. (a)	177. (a)	178. (a)	179. (b)	180. (a)	181. (a)

Previous Year Questions

1. (a)	2. (d)	3. (d)	4. (a)	5. (a)	6. (c)	7. (b)	8. (a)	9. (c)	10. (c)
11. (a)	12. (a)	13. (a)	14. (d)	15. (c)	16. (d)	17. (b)	18. (b)	19. (c)	20. (c)
21. (b)									

NCERT Exemplar Questions

1. (c)	2. (c)	3. (a)	4. (b)	5. (b)	6. (b)	7. (a)	8. (a)	9. (c)	10. (a)
11. (b)	12. (b)	13. (c)	14. (b)	15. (b)	16. (b)				

This page is intentionally left blank.

CHAPTER

19

Excretory Products and Their Elimination

PRACTICE QUESTIONS

Excretory System

1. Select the incorrect statement from the following:
(a) Animals accumulate ammonia, urea, uric acid, CO_2 and water by metabolic activities.
(b) Animal accumulate substances like ions (Na^+, K^+, Cl^-) and urea, ammonia, uric acid, CO_2 and water are removed totally or partially.
(c) Ammonia produced by metabolism is converted into urea in the liver of mammals.
(d) Kidneys play significant role in the removal of ammonia directly.

2. Select ammonotelic from the following
(a) Many bony fishes (b) Aquatic amphibians
(c) Aquatic insects (d) All of these

3. Select the order of toxicity.
A. Ammonia B. Urea C. Uric acid
(a) A > B > C (b) B > A > C (c) C > A > B (d) C > B > A

4. Which excretory product requires maximum water for its elimination?
(a) Ammonia (b) Urea (c) Uric acid (d) Creatinine

5. Select the incorrect statement from the following:
(a) Ammonia is readily soluble in water.
(b) Ammonia is generally excreted by the process of diffusion.
(c) Ammonia is excreted as ammonium ion through gill surface in fishes.
(d) Ammonia is the major and urea and uric acid are the minor forms of nitrogenous waste excreted by animals.

6. Metabolic wastes containing nitrogen in our body are due to
(a) Carbohydrates (b) Proteins (c) Fats (d) Vitamins

7. Excretion involves the process in which
(a) Harmful substances in the body are chemically changed.
(b) Substances of no further use or those present in excessive quantities are thrown out of the body.
(c) Harmful substances are stored in cells before being eliminated.
(d) Expulsion of urine from the urinary bladder and sweat from the skin.

8. Which of the following is Ureotelic?
(a) Mammals (b) Most of the terrestrial amphibians
(c) Marine fishes (d) All the above

9. Ammonia which is produced by metabolism is converted into **A** in the liver of mammals and released into **B** which is filtered and **C** out by kidney
(a) A–Uric acid, B–Blood, C–excreted
(b) A–Urea, B–Blood, C–excreted
(c) A–Amino acid, B–Blood, C–excreted
(d) A–Sugar, B–Blood, C–excreted

10. Which of the following is uricotelic?
(A) Reptiles (B) Birds (C) Insects (D) Land snails
(a) A, B and C only (b) B and C only (c) A and D only (d) All of these

11. With respect to the mode of excretion, bony fish falls into what category of organism?
(a) Ureotelic (b) Uricotelic
(c) Ammonotelic (d) Osmoconformers

12. Aquatic animals are mostly ammonotelic because
(a) Ammonia helps in checking the inflow of water into body.
(b) Excretion of ammonia requires large amount of water which is available to these animals.
(c) Water contains less nitrogen.
(d) These get less light.

13. What gets increased in blood if liver becomes functionless?
(a) Urea (b) Ammonia (c) Uric acid (d) Proteins

14. Nitrogenous excretory product of frog tadpole is
(a) Ammonia (b) Urea (c) Guanine (d) Uric acid

15. In aquatic organisms, the waste end product of nitrogen metabolism is
(a) Urea (b) Nitrogen (c) Ammonia (d) Allantois

16. The chief nitrogenous waste product present in urine of frog is
(a) Ammonia (b) Urea (c) Uric acid (d) Allantoin

17. Nitrogenous waste is excreted mainly as
(a) Urea in both frog and tadpole (b) Urea in frog and ammonia in tadpole
(c) Uric acid in frog and urea in tadpole (d) Urea in tadpole and ammonia in frog

18. Urea is derived from
(a) Fats (b) Amino acids
(c) Carbohydrates (d) Uric acid

19. Which of the following sets of animals produce the same substances as their chief excretory product?
(a) Fish, pigeon and frog (b) Camel, housefly and snake
(c) Frog, monkey and dog (d) Amoeba, ant and antelope

20. Which of the following sets of animals are uricotelic?
(a) Fish, snake, fowl and man (b) Fish, frog, lizard and fowl
(c) Crow, snake, cockroach and lizard (d) Camel, dog, monkey and man

21. Excretion of nitrogenous waste product mainly as uric acid by birds is helpful in
(a) Conserving body heat (b) Conserving water
(c) Eliminating excess water (d) Eliminating excess body heat

22. Uric acid is formed in human being from
(a) Proteins (b) Glucose (c) Purines (d) Pyrimidines

23. Uric acid is excreted by
(a) Pigeon (b) Frog (c) Rabbit (d) Man

24. The least toxic nitrogenous waste is
(a) Ammonia (b) Ammonia + Urea
(c) Urea (d) Uric acid

25. Marine teleost fishes excrete
(a) Uric acid (b) TMO (c) Ammonia (d) All of these

26. Select the correct statement from the following:
(A) In most of the invertebrates, excretory structures are in complex tubular forms.
(B) Vertebrates have simple tubular organ as excretory structure like kidney.
(C) Protonephridia is primarily concerned with excretion.
(D) Protonephridia are excretory structure in rotifers, some annelids and cephalochordates (Amphioxus).
(a) A (b) B (c) C (d) D

27. Excretory and osmoregulatory structure in cockroach is
(a) Flame cells (b) Green glands
(c) Nephridia (d) Malpighian tubules

28. The animal which retains urea for hypertonicity is (most appropriate)
(a) Elasmobranch (b) Man (c) Bird (d) Amphibian

29. Malpighian tubules are the excretory organs in
(a) Platyhelminthes (b) Cockroach (c) Pila (d) Ascaris

30. In annelids, excretory organs are
(a) Nephridia (b) Malpighian tubules
(c) Green glands (d) Kidneys

31. The excretory organs in prawn are
(a) Malpighian tubules (b) Nephridia
(c) Kidneys (d) Green glands or antennal gland

32. Green glands are excretory organs of
(a) Moths (b) Crayfishes (c) Scorpions (d) Spiders

33. Coxal glands are excretory organs in
(a) Spiders and scorpions (b) Insects
(c) Annelids (d) Molluscs

34. Which of these parts in vertebrates functionally corresponds to the contractile vacuole of protozoans?
(a) Heart (b) Cloaca (c) Sweat glands (d) Kidneys

35. In humans, the excretory system coexist of
(a) Pair of kidneys (b) Pair of ureters
(c) A urinary bladder and a urethra (d) All of these

36. Kidneys in human is situated between _____.
(a) T12–L3 (b) T11–L2 (c) T12–L1 (d) T12–L5

37. The correct dimensions of human kidney are

	Length	Width	Thickness	Weight
(a)	10–12 cm	5–7 cm	2–3 cm	120–170 gm
(b)	10–12 cm	2–3 cm	5–7 cm	120–140 gm
(c)	12–14 cm	5–7 cm	2–3 cm	120–140 gm
(d)	12–14 cm	2–3 cm	2–3 cm	120–170 gm

38. Which of the following is correct about hilum of kidney?
(a) It is present on the convex outer surface.
(b) It is present at the inner convex surface.
(c) It is notch through which ureter, nerve and blood vessel enter.
(d) It is the place where the calyces are open.

39. Which of the following is incorrect about human kidney?
(a) Kidney is covered by tough capsule
(b) Kidney is divided into cortex and medulla on the outer side
(c) The cortex is extended in between the medullary pyramid and the renal column of bertini.
(d) Kidney is situated close to the dorsal inner wall of abdominal cavity.

40. Each kidney has (nearly) how many nephrons?
(a) 1 million (b) 2 million (c) ½ million (d) 3 million

41. The extension of cortex in medulla is known as
(a) Columnae carneae (b) Columns of bertini
(c) Renal columns (d) both (b) and (c)

42. Each nephron consists of
(a) Glomerulus (b) Renal tubules
(c) Both (a) and (b) (d) Calyces

43. Glomerules along with Bowman's capsule is called
(a) Renal corpuscle (b) Malpighian tubule
(c) Malpighian body (d) Both (a) and (c)

44. A part of Nephron is situated in cortex completely
A. Malpighian Corpuscle B. PCT
C. DCT D. Loop of Henle
E. Collecting duct
(a) A, B and C only (b) B and C only
(c) A, B, C and D only (d) D and E only

45. Select the incorrect statement from the following:
(a) The DCTs of many nephrons opens into a straight tube called collecting duct.
(b) In cortical nephrons (majority), the loop of Henle is too short and extended only very little in medulla.
(c) In juxta medullary nephrons (minority), the loop of Henle is very long and runs deeply into medulla.
(d) Vasa recta is not a part of peritubular network .

46. Two kidneys of human beings lie
(a) At the level of ovaries
(b) At the same level
(c) Left kidney at a higher level than the right one
(d) Right kidney at a higher level than the left one

47. Which term is used both for a part of kidney and a part of skeleton in the mammals?
(a) Centrum (b) Pelvis (c) Cortex (d) Medulla

48. Mammalian kidney serve to excrete
(a) Excess water, urea and amino acids
(b) Excess salts, urea and excess water
(c) Excess salts, excess water and excess amino acids
(d) Excess salts, urea and water

49. The part through which arteries and veins enter or leave the kidney is called
(a) Major calyces (b) Minor calyces
(c) Hilus (d) Renal pore

50. Cells named podocytes occur in the wall of
(a) Neck region of nephrons (b) Glomerular capillaries
(c) Outer wall of Bowman's capsules (d) Inner wall of Bowman's capsules

51. A malpighian corpuscle is
(a) Another name for nephron
(b) An excretory structure of insects
(c) Combined name for glomerulus and Bowman's capsule
(d) None of the above

52. Blood vessel leading to glomerulus is called
(a) Renal artery (b) Renal vein
(c) Efferent arteriole (d) Afferent arteriole

53. Blood vessel draining the glomerulus in a mammalian nephron is called
(a) Afferent arteriole and is narrower than the vessel entering it.
(b) Efferent venule and is narrower than the vessel entering it.
(c) Efferent arteriole and is narrower than the vessel entering it.
(d) Renal artery and is wider than the vessel entering it.

54. In mammalian kidneys, the Bowman's capsules or Malpighian corpuscles occur in
(a) Cortex (b) Medulla
(c) Pelvis (d) All of these

55. In a glomerulus
(a) Afferent arteriole is thicker than efferent arteriole.
(b) Afferent capillaries are thicker than efferent capillaries.
(c) Afferent capillaries are thinner than efferent capillaries.
(d) Afferent arteriole is thinner than efferent arteriole.

56. Which one of these is not a part of uriniferous tubule?
(a) Loop of Henle (b) Collecting duct
(c) Bowman's capsule (d) Distal convoluted tubule

57. Bowman's capsule is lined by
(a) Ciliated epithelium (b) Squamous epithelium
(c) Cuboidal epithelium (d) Cuboidal and columnar epithelium

58. Brush border is a characteristic of
(a) Neck of nephron (b) Collecting tube
(c) Proximal convoluted tubule (d) All of these

59. Filtration of blood occurs in
(a) Loop of Henle (b) Bowman's capsule (c) Lungs (d) Renal papillae

60. The glomerular filtrate, i.e., the liquid collected in the cavity of Bowman's capsule is
(a) Blood minus proteins (b) Blood minus proteins and corpuscles
(c) Water (d) Urine

61. Normally that is absent in Glomerular filtrate is
(a) Albumin (b) Glucose (c) NaCI (d) Creatinine

62. The glomerular filtration rate would be decreased by
(a) Constriction of the efferent arteriole
(b) An increase in afferent arteriolar pressure
(c) Compression of the renal capsule
(d) An increase in the renal blood flow

63. A minute vessel runs parallel to the Henle's loop forming 'U' shape vasa recta is a part of
(a) Peritubular network (b) Afferent arteriole
(c) Efferent arteriole (d) Bowman's capsule

64. Urine formation mainly involves the process of
(a) Ultrafiltration (b) Selective reabsorption
(c) Secretion (d) All of these

65. How much amount of blood is filtered out by kidney's/min?
(a) 500 ml (b) 1100–1200 ml (c) 1500 ml (d) 125 ml

66. How many layers do filtration membrane consist of?
(a) 1 (b) 2 (c) 3 (d) 4

67. Filtration membrane consist of
(a) Endothelium of glomerular blood vessels
(b) Epithelium of Bowman's capsule
(c) Basement membrane between the above two layers
(d) All the above

Regulation of Organ

68. Which of the following is incorrect about ultrafiltration?
(a) Podocytes are arranged in intricate manner so as to leave minute space called filtration slits and slit pore, filtration occurs finely through these pores.
(b) Filtration is so fine that almost all the constituent of blood except protein pass onto the lumen of Bowman's capsule.
(c) Filtrated fluid is isotonic to blood plasma.
(d) JGA controls the filtration rate of ultrafiltration.

69. The values of GFR in an healthy individual is
(a) 125 ml/min (b) 150 ml/min (c) 100 ml/min (d) 200 ml/min

70. The amount of the filtrate formed by the kidneys are
(a) 125 ml/min (b) 7.5 litre/hr (c) 180 litre/day (d) All of these

71. Select the total number of correct matching.
(1) JGA → Juxtaglomerular Apparatus
(2) GFR → Glomerular Filtration Rate
(3) PCT → Proximal Conducting Tube
(4) DCT → Distal Convoluted Tubule
(5) CD → Conducting Duct
(6) ADH → Antidiuretic Hormone
(a) 6 (b) 5 (c) 4 (d) 2

72. JGA is formed by
(a) Part of DCT (b) Part of afferent arteriole
(c) Both (a) and (b) (d) None of these

73. Following are the points of mechanism of JGA. Arrange them accordingly.
(A) Activation of JG cells
(B) Activated JG cells release renin
(C) Fall in GFR
(D) Increase of glomerular blood flow
(E) GFR back to normal
(a) E, A, D, C, B (b) C, A, B, D, E (c) A, B, C, D, E (d) C, A, D, B, E

74. Nearly how much percent of the filtrate is reabsorbed by the renal tubules?
(a) 70–80% (b) 85% (c) 99% (d) 90%

75. Choose the correct statement about absorption in renal tubules from the following:
(a) Glucose, amino acids and Na^+ reabsorbed actively.
(b) Nitrogenous waste are absorbed by passive transport.
(c) 70–80 per cent of electrolyte and water are absorbed in PCT.
(d) All the above

76. Tubular secretion helps in
(a) Ionic balance of body fluid (b) Acid base balance of body fluid
(c) Both (a) and (b) (d) None of these

77. Which of the following is an incorrect statement about filtration?
(a) Selective process
(b) Non-selective process
(c) Performed by glomerulus
(d) It occurs through the usage of capillary (glomerulus) blood pressure

78. Which of the following is incorrect about PCT?
(a) Lined with simple cuboidal brush border epithelium.
(b) All essential nutrient and 70 to 80 per cent of the electrolyte and water are reabsorbed here.
(c) It helps in the PH maintenance of body fluid by the selective secretion of H^+ ion and by the absorption of HCO_3^-.
(d) It does not help in the maintenance of ionic balance of body fluid.

79. Which of the following part has minimum reabsorption?
(a) PCT (b) HL (c) DCT (d) Collecting duct

80. Select the total number of correct statements about the loop of Henle.
(1) Descending limb is permeable to water.
(2) Descending limb is almost impermeable to electrolyte.
(3) Ascending limb is impermeable to water.
(4) It allows the transport of electrolyte only actively.
(5) At the tip of loop of Henle, the concentration of filtrate is 1200 m osmol/l.
(6) It helps in the maintenance of high osmolarity in medullary interstitium.
(a) 6 (b) 3 (c) 4 (d) 5

81. Which segment helps in the pH maintenance of body fluid?
(a) PCT (b) DCT (c) Collecting duct (d) All

82. DCT helps in
(A) Conditional reabsorption of Na^+ and water
(B) HCO_3^- absorption
(C) pH maintenance
(D) Selective secretion of H^+ and K^+
(a) A, C and D only (b) B, C and D only
(c) All of these (d) C and D only

83. Which of the following segment allows the passage of small amount of urea into modularly interstitium to keep up the osmolarity?
(a) PCT (b) DCT (c) HL (d) Collecting duct

84. At which place we initially used the term 'urine' for filtrate?
(a) PCT (b) DCT
(c) HL (d) Collecting duct (end)

85. Counter-current mechanism is present in
(a) HL (b) Vasa recta
(c) Both (a) and (b) (d) DCT

86. Which of the following is incorrect about counter-current mechanism?
(a) The flow of filtrate in two limbs of vasa recta is in opposite direction.
(b) The flow of blood in two limbs of vasa recta is also in opposite direction.
(c) NaCI is transported by the ascending limb of HL which is exchanged with the descending limb of vasa recta.
(d) NaCI is returned to in interstitium by the ascending portion of vasa recta.

87. Counter current mechanism maintains the concentration gradient in the medullary interstitium. It helps in
(a) Easy passage of water from PCT
(b) Easy passage of water from DCT
(c) Easy passage of water from HL
(d) Easy passage of water from collecting duct

88. The total filtrate formed in 24 hours in human kidney is
(a) 1.8 litre (b) 8.0 litre (c) 18 1itre (d) 180 litre

89. Which of the following is most likely to cause an increase in the glomerular filtration rates?
(a) Blockage of ureter
(b) Dilation of the afferent arterioles
(c) Release of renin from the juxtaglomerular apparatus
(d) Volume depletion

90. Which of these will be completely reabsorbed from glomerular filtrate under normal conditions in the nephrons?
(a) Urea (b) Salts (c) Uric acid (d) Glucose

91. What are mainly reabsorbed from Henle's loops?
(a) Potassium (b) Glucose
(c) Water and NaCl (d) Urea and NaCl

92. The part of the nephron that helps in active reabsorption of sodium is
(a) Bowman's capsule (b) Distal convoluted tubule
(c) Ascending limb of Henle's loop (d) Proximal convoluted tubules

93. Which of the following substance is actively secreted into glomerular filtrate of the kidney tubule?
(a) Amino acids (b) Chloride ions
(c) Na^+ (d) K^+

94. The effect of antidiuretic hormone (ADH) on the kidney is to increase the
(a) Excretion of water
(b) Excretion of Na'
(c) Permeability of the distal nephron to water
(d) Glomerular filtration rate

95. In deficiency of ADH, the rate of micturition
(a) Decreases (b) Increases
(c) Remains the same (d) None of these

96. Volume of urine is regulated by
(a) Aldosterone
(b) Aldosterone and ADH
(c) Aldosterone, ADH and testosterone
(d) ADH alone

97. When a person is suffering from poor renal reabsorption, which one of the following will not help in the maintenance of blood volume?
(a) Increased ADH secretion
(b) Decreased glomerular filtration
(c) Increased arterial pressure in kidneys
(d) Decreased arterial pressure in kidneys

98. The number of nephrons in a kidney is equal to the
(a) Number of Bowman's capsules
(b) Sum of Bowman's capsules and glomeruli
(c) Double the number of Bowman's capsules
(d) Sum of Bowman's capsules and Malpighian corpuscles

99. If Henle's loop were absent from mammalian nephron, which of the following is to be expected?
(a) The urine will be more dilute.
(b) There will be no urine formation.
(c) The urine will have more concentration.
(d) There will be hardly any change in the quality and quantity of urine formed.

100. Which of the following statements is/are true?
1. Urine is hypertonic in distal convoluted tubule.
2. When the urine passes into the collecting tubule it becomes hypotonic.
3. Urine is isotonic in proximal convoluted tubule.
4. Urine becomes more and more hypotonic as it passes through the Henle's loop.
(a) 1 and 4 only (b) 1, 2 and 3 only (c) 2 and 3 only (d) 3 only

101. Which one of the following groups of structures/organs have similar function?
(a) Typhlosole in earthworm, intestinal villi in rat and contractile vacuole in Amoeba.
(b) Nephridia in earthworm, Malpighian tubules in cockroach and urinary tubules in rat.
(c) Antennae of cockroach, tympanum of frog and clitellum of earthworm.
(d) Incisors of rat, gizzard (proventriculus) of cockroach and tube feet of starfish.

102. Ducts of Bellini are present in
(a) Liver (b) Kidney
(c) Intestine (d) Medulla oblongata

103. The human kidney produces how much concentrated urine than the initial filtrate formed?
(a) 2 times (b) 4 times (c) 6 times (d) 3 times

104. What is the ratio of concentration of outer medulla to outer portion of inner medulla?
(a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{4}{3}$ (d) $\frac{1}{4}$

105. The functioning of kidney is regulated by
(a) Hypothalamus (b) JGA (c) Heart (d) All of these

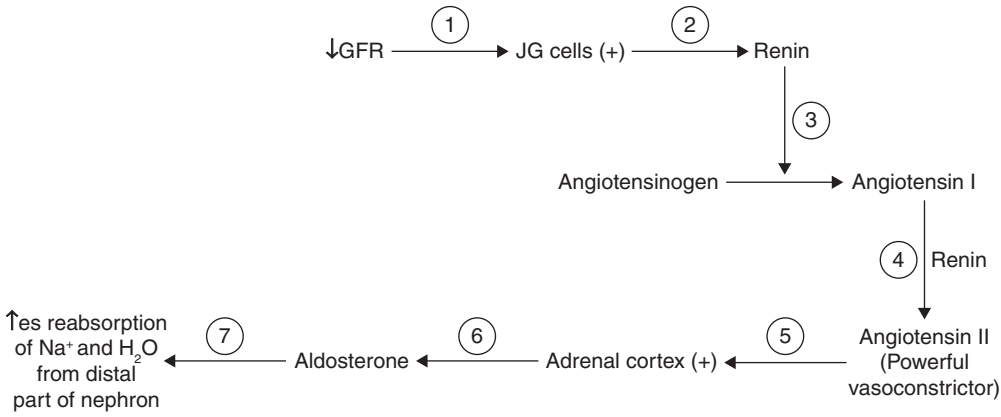
106. ADH causes
(a) Increased water absorption from DCT and CT
(b) Increased GFR by increasing blood pressure
(c) Increases reabsorption of electrolyte from distal tubules
(d) All of these

107. Arrange the following steps in order
(1) Excessive loss of fluid
(2) Stimulation of osmoreceptor
(3) Stimulation of Hypothalamus
(4) Release of ADH or Vasopressin
(5) ADH facilitate water reabsorption from distal tubules
(6) Increase in body fluid switch off osmoreceptor and suppress the release of ADH.
(a) 1, 2, 3, 4, 5, 6 (b) 1, 3, 2, 4, 5, 6 (c) 6, 1, 2, 3, 4, 5 (d) 2, 3, 4, 1, 5, 6

108. Stimulus for activation of JG cells to release rennin is/are
(a) ↓ Glomerular blood flow (b) ↓ Glomerular blood pressure
(c) ↓ GFR (d) All of these

109. RAAS involve
(a) JGA apparatus (b) Angiotensinogen (c) Adrenal cortex (d) All of these

110. Select the incorrect from the following:



(a) 2, 3 (b) 1, 3 (c) 4 (d) 5, 6

111. Increase in blood pressure is caused by
(a) ↑es ADH secretion (b) ↑es Aldosterone secretion
(c) ↑es Angiotensinogen II (d) All of these

112. Which of the following is true about ANF?
(a) Full form is Autonomic Nervous Factor
(b) Antagonistic to Renin–Angiotensin mechanism
(c) It causes vasoconstriction
(d) All are true

113. Find the correct steps for micturition (arrange in order).
(A) Urine filled in urinary bladder
(B) Stretch–receptor activation
(C) Wall of bladder send signal to CNS
(D) Motor message from CNS to urinary bladder and urethral sphincter
(E) Bladder contracts and sphincter dilates leads to micturition
(a) A → B → C → D → E
(b) C → B → A → D → E
(c) B → A → C → D → E
(d) A → B → C → E → D

114. Neural mechanism of micturition is called
(a) Micturition reflex (b) Simple reflex
(c) Conditioned reflex (d) All of these

115. An adult human excretes how much urine per day?
(a) 1–1.5 litre (b) 1.5–2 litre (c) 5–1 litre (d) 3 litre

116. On an average _____ of urea is excreted out per day
(a) 20–25 gm (b) 25–30 gm (c) 25–30 mg (d) 40–45 gm

117. Analysis of urine help in the clinical diagnosis of
(a) Metabolic disorders (b) Malfunctioning of kidney
(c) Diabetes mellitus (d) All of these

118. Select the correct matching:

	Colour	pH	Odour
(a)	Light yellow	7.0	Characteristic
(b)	Light yellow	6.0	Characteristic
(c)	Light yellow	6.5	Pungent
(d)	Light yellow	6.0	Almond

119. Presence of glucose and ketone bodies in urine is called
(a) Glycosuria and ketonuria (b) Glycogenic and ketonuria
(c) Glycosuria and ketonemia (d) Gluconeogenesis and ketonaemia

120. Glycosuria and ketonuria is indicative of
(a) Starvation (b) Diabetes mellitus
(c) Diabetes insipidus (d) All of these

121. Sweat contains
(a) Watery fluid with NaCl (b) Urea
(c) Lactic acid (d) All of these

122. Primary function of sweat is
(a) Removal of excess of water (b) Removal of urea
(c) Cooling of body surface (d) All of these

123. Nitrogenous waste is eliminated through
(a) Kidney (b) Saliva (c) Sweat gland (d) All of these

124. Sterols, hydrocarbons and waxes are eliminated through
(a) Liver (b) Lungs
(c) Sebaceous glands (d) Sweat glands

125. Select the incorrect statement from the following.
(a) Liver is the second largest gland in our body.
(b) Sebum provides protective oily covering for skin.
(c) Bile contains substance like bilirubin, biliverdin, cholesterol, degraded steroid hormones, vitamins and drugs are passed with digestive wastes.
(d) Other than kidneys lungs, liver and skin also helps in the elimination of excretory wastes.

126. Which is not a part of renal tubule?
(a) PCT (b) Bowman's capsule
(c) DCT (d) Collecting duct

127. Select the total number of excretory organ from the following found in various animals:
Protonephridia, SA node, nephridia, Hepatic Cecae, atrium, Malpighian tubules, green glands, kidney, pons, ommatidia, parapodia
(a) 4 (b) 5 (c) 6 (d) 7

128. Excretory organs help in
(a) Excretion only (b) Maintenance of acid–base balance
(c) Maintenance of ionic balance (d) All of these

129. Our lung removes how much of CO_2 per hour from the body
(a) 10 L (b) 20 L (c) 18 L (d) 2 L

130. Inflammation of glomeruli of kidney is
(a) Renal failure (b) Renal calculi
(c) Glomerulonephritis (d) Cystitis

131. Stone and insoluble mass of crystallized salts, formed within the kidney is generally made up of
(a) Calcium carbonate (b) Calcium oxalate
(c) Silica (d) Any of these

132. Which is the ultimate method for the correction of acute renal failure?
(a) Haemodialysis (b) Renal transplantation
(c) Blood transfusion (c) Angioplasty

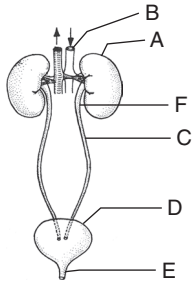
133. Following are the steps of dialysis:
A. Blood is passed into a vein.
B. Blood is mixed with heparin.
C. Blood is mixed with anti-heparin.
D. Blood is drained from convenient artery.
E. Blood is passed through a coiled and porous cellophane tube bathing in dialysis fluid.
F. Removal of nitrogenous wastes from blood.

The correct sequence of steps is
(a) $A \rightarrow B \rightarrow C \rightarrow D \rightarrow E \rightarrow F$ (b) $D \rightarrow B \rightarrow E \rightarrow F \rightarrow C \rightarrow A$
(c) $F \rightarrow C \rightarrow E \rightarrow B \rightarrow A \rightarrow D$ (d) $D \rightarrow C \rightarrow E \rightarrow F \rightarrow B \rightarrow A$

134. Malfunctioning of kidney may lead to the accumulation of _____ in blood.
(a) Glucose (b) Amino acid (c) Urea (d) All of these

135. Which of the following is true about renal transplantation?
(a) Kidney transplantation is the ultimate method at the stage where drug or dialysis do not help.
(b) Immunosuppressive agent are used in kidney transplant patient.
(c) Close relatives are often used as kidney donors to minimise the risk of rejection.
(d) All the above

136. In the diagram of excretory system of human beings given below, different parts have been indicated by alphabets; choose the answer in which these alphabets have been correctly matched with the parts which they represent.



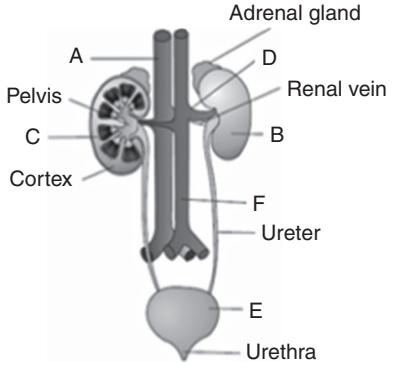
(a) A–Kidney, B–Abdominal aorta, C–Ureters, D–Urinary bladder, E–Urethra, F–Renal pelvis
(b) A–Kidney, B–Abdominal aorta, C–Urethra, D–Urinary bladder, E–Ureters, F–Renal pelvis
(c) A–Kidney, B–Renal pelvis, C–Urethra, D–Urinary bladder, E–Ureters, F–Abdominal aorta
(d) A–Kidney, B–Abdominal aorta, C–Urethra, D–Urinary bladder, E–Renal pelvis, F–Ureters

137. Match the excretory functions of section I with the parts of the excretory system in section II. Choose the correct combinations from among the answers given.

Section I			**Section II**
(i)	Ultrafiltration	–	(a) Henle's loop
(ii)	Concentration of urine	–	(b) Ureter
(iii)	Transport of urine	–	(c) Urinary bladder
(iv)	Storage of urine	–	(d) Malpighian corpuscles
			(e) Proximal convoluted tubules

(a) (i)–(d), (ii)–(a), (iii)–(b), (iv)–(c)
(b) (i)–(d), (ii)–(c), (iii)–(b), (iv)–(a)
(c) (i)–(e), (ii)–(d), (iii)–(a), (iv)–(c)
(d) (i)–(e), (ii)–(d), (iii)–(a), (iv)–(b)

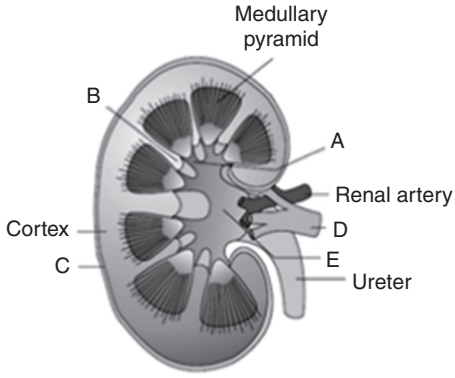
138. Observe the following figure.



Identify A to E structure:

	A	**B**	**C**	**D**	**E**
(a)	Renal artery	Urinary bladder	Inferior vena cava	Kidney	Medulla
(b)	Inferior vena cava	Kidney	Medulla	Renal artery	Urinary bladder
(c)	Urinary bladder	Medulla	Kidney	Inferior vena cava	Renal artery
(d)	Kidney	Renal artery	Inferior vena cava	Urinary bladder	Medulla

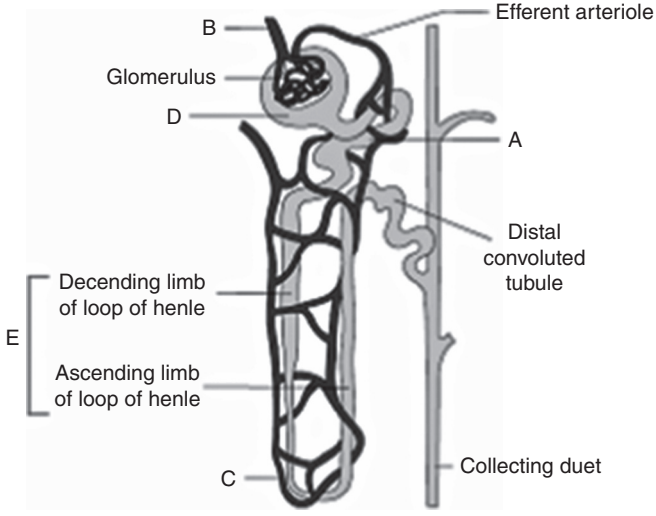
139. Go through the following figure:



Identify A to D.

	A	**B**	**C**	**D**
(a)	Renal column	Renal capsule	Calyx	Renal pelvis
(b)	Renal capsule	Renal pelvis	Renal vein	Calyx
(c)	Calyx	Renal column	Renal capsule	Renal vein
(d)	Renal vein	Calyx	Renal column	Renal capsule

140. Match the following:



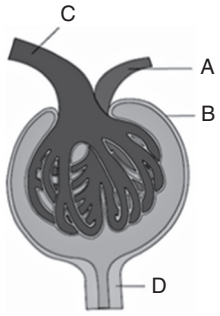
(a) A–Proximal convoluted tubule, B–Afferent arteriole, C–Vasa recta, D–Bowman's capsule, E–Henle's loop

(b) A–Henle's loop, B–Vasa recta, C–Proximal convoluted tubule, D–Bowman's capsule, E–Afferent arteriole

(c) A–Bowman's capsule, B–Henle's loop, C–Proximal convoluted tubule, D–Vasa recta, E–Afferent arteriole

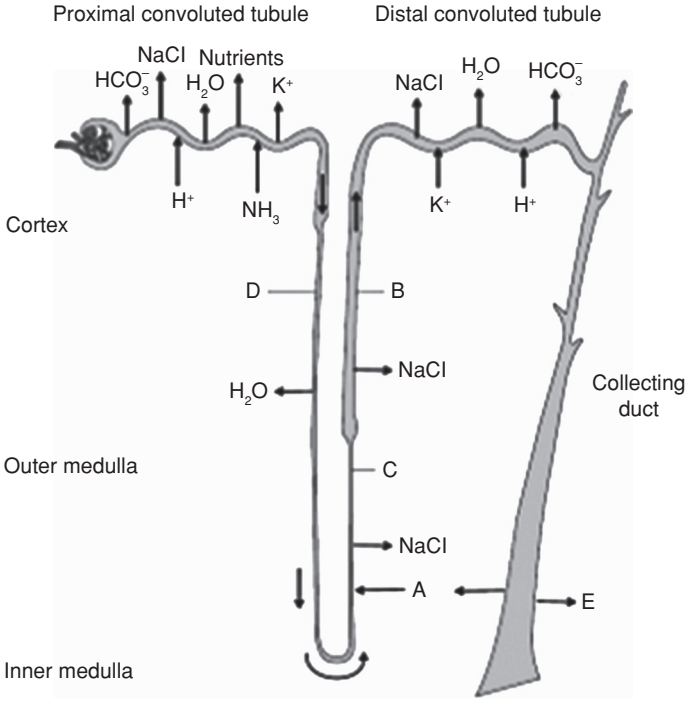
(d) A–Vasa recta, B–Proximal convoluted tubule, C–Bowman's capsule, D–Afferent arteriole, E–Henle's loop

141. The following diagram represents the Malpighian body. Identify A to D.



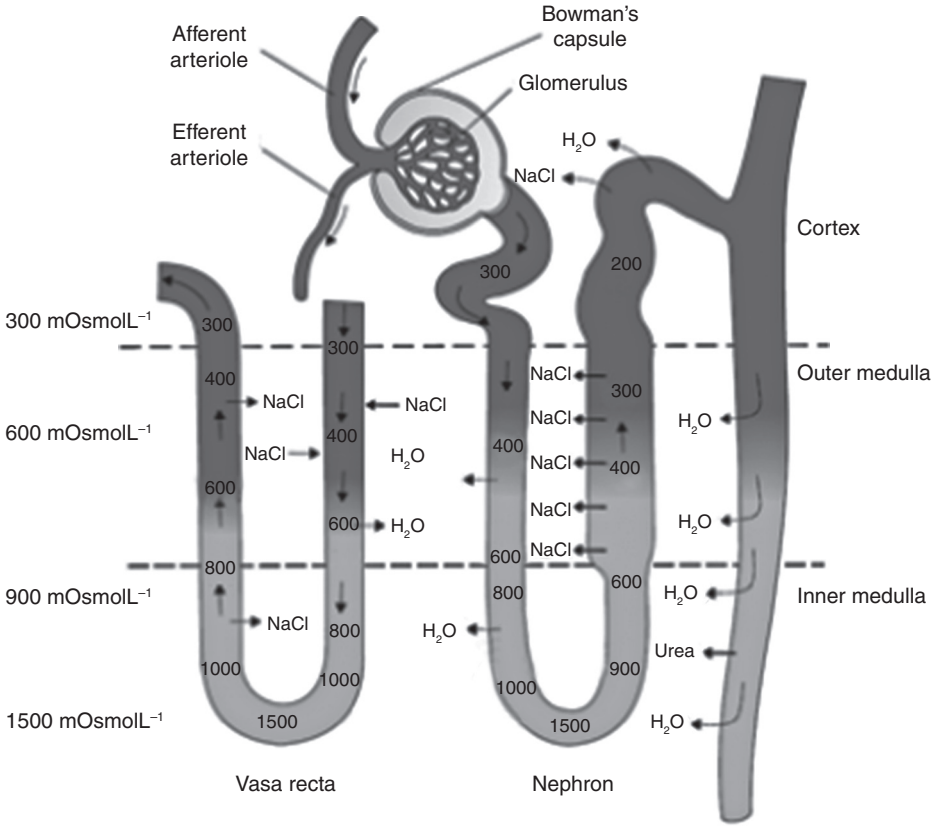
(a) A–Efferent arteriole, B–Afferent arteriole, C–Bowman's capsule, D–DCT
(b) A–Afferent arteriole, A–Efferent arteriole, C–Renal corpuscle, D–Proximal convoluted tubule
(c) A–Efferent arteriole, B–Bowman's capsule, C– Afferent arteriole, D–PCT
(d) A–Afferent arteriole, B–Efferent arteriole, C–Bowman's capsule, D–DCT

142. The diagram following the different parts absorb:



Identify A, B and D
(a) A–Urea, B–Thick segment of ascending limb, D–Descending limb of loop of Henle
(b) A–Descending limb of loop of Henle, B–Thick segment of ascending limb, D–Urea
(c) A–Thick segment of ascending limb, B–Descending limb of loop of Henle, D–Urea
(d) A–Thick segment of ascending limb, B–Thick segment of ascending limb, D–Urea

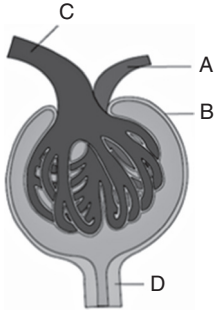
143.



Nephron produces how much concentrated urine?

(a) 4 times (b) 5 times (c) 3 times (d) 2 times

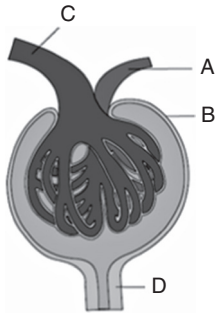
144.



Glomerulus is formed by the branching of

(a) A (b) B (c) C (d) D

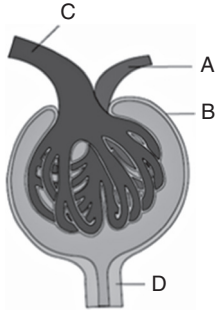
145.



The part 'B' in the above diagram is lined with

(a) Cuboidal epithelium (b) Columnar epithelium
(c) Squamous epithelium (d) Brush border epithelium

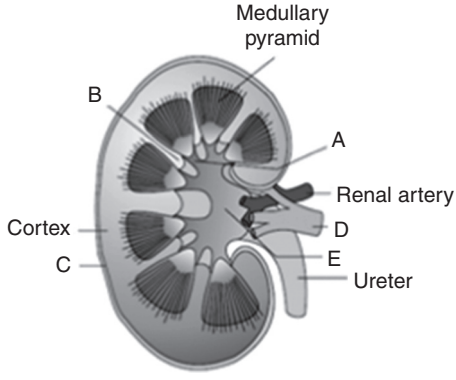
146.



Which part of the above diagram is lined with podocytes?

(a) A (b) B (c) C (d) D

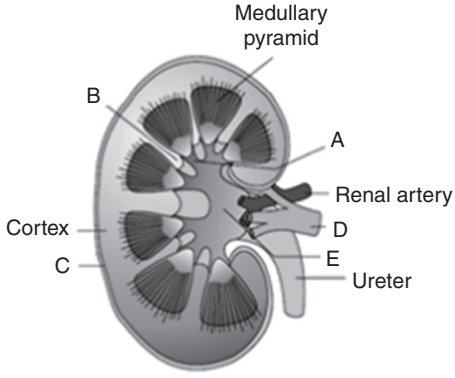
147.



B part of the above diagram contains

(a) PCT (b) DCT (c) HL (d) Blood Vessels

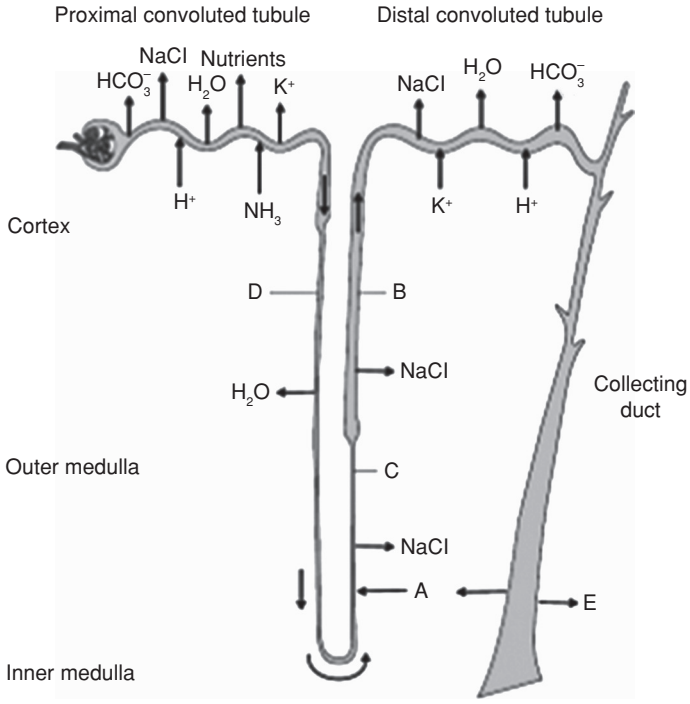
148.



In which part of the diagram calyces opens

(a) A (b) B (c) C (d) E

149. In the below diagram, identify the end excretory product which remains in body to maintain concentration of medullary interstitium?



(a) F (b) G (c) A (d) E

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

150. **Assertion:** Diabetes insipidus is marked by excessive urination and too much thirst for water.
Reason: Anti-diuretic hormone (ADH) is secreted by the posterior lobe of pituitary gland.

151. **Assertion:** Filteration is a selective process performed by the glomerulus using the glomerular capillary blood pressure.
Reason: Blood is filtered through fine pores present in PCT.

152. **Assertion:** The antidiuretic hormone increases the water permeability of distal convoluted tubule.
Reason: In the absence of ADH, water re-absorption is considerably reduced.

153. **Assertion:** Presence of glucose and ketone bodies in urine are indicative of diabetes mellitus.
Reason: Malfunctioning of kidney can lead to accumulation of urea in blood a condition called uremia.

154. **Assertion:** In the descending limb of loop of Henle, the urine is hypertonic, while in ascending limb of loop of Henle, the urine is Hypotonic.
Reason: Descending limb is impermeable to Na^+, while ascending limb is impermeable to H_2O.

155. **Assertion:** Vasa recta is absent or highely reduced in cortical nephrons.
Reason: PCT and DCT are situated in cortical region of kidney.

156. **Assertion:** Ammonia is the excretory product of aquatic amphibian.
Reason: Ammonia is readily soluble in water and requires large amount of water for excretion.

157. **Assertion:** Urinary bladder and ureters are lined by transitional epithelium.
Reason: Ureters carry the urine to urinary bladder where it is stored temporarily.

158. **Assertion:** Kidneys maintain the osmotic concentration of the blood.
Reason: Kidneys eliminate either hypotonic or hypertonic urine according to the need of the body.

159. **Assertion:** In vertebrates, the liver is also referred as an accessory excretory organ.
Reason: Liver helps kidneys in the secretion of urine.

160. **Assertion:** Sharks are said to be ammonotelic animals.
Reason: Sharks can retain considerable amounts of ammonia in their blood.

161. **Assertion:** The glomerular filtrate resembles the protein free plasma in composition and osmotic pressure.
Reason: The glomerular capillary wall and inner membrance of Bowman's capsule are impermeable to large molecules.

162. **Assertion:** PCT reabsorbs nearly all essential nutrients and 70 to 80 per cent of the electrolyte and water from filterate.
Reason: PCT is lined with brush border epithelium.

163. **Assertion:** Counter-current mechanism is responsible for the concentration of urine.
Reason: Counter-current mechanism helps to maintain the concentration gradient in the medullary interstitium.

164. **Assertion:** Aldosterone leads to the increase in blood pressure.
Reason: Aldosterone causes reabsorbtion of sodium ion and water from distal part of tubules.

165. **Assertion:** Some amount of urea is retain in medullary interstitium.
Reason: This is use to maintain require concentration in medullary interstitium.

166. **Assertion:** Urine produced (1 to 1.5 L) per day is far less than the volume of filtrate occur per day (18L).
Reason: 99% of filtrate is reabsorbed by the renal tubules.

167. **Assertion:** Uraemia is harmful condition.
Reason: Uraemia may lead to kidney failure.

168. **Assertion:** Renal tubules use to maintain ionic balance and pH of body fluids.
Reason: H^+, K^+ and NH_3 could be secreted into filtrate by renal tubules.

169. **Assertion:** ANF decreases blood pressure.
Reason: ANF causes vasodilation.

170. **Assertion:** ADH increases GFR.
Reason: ADH cause vasoconstriction thus increase blood pressure, which inturn increase the glomerular blood flow and there by GFR.

171. **Assertion:** Nephridia help in osmoregulation in earthworm.
Reason: Nephridia maintain fluid and ionic balance in earthworm.

172. **Assertion:** Antennal glands perform the excretory function in prawns.
Reason: Malpighian tubules are present in crustacean for osmoregulation.

173. **Assertion:** Glomerular filtration is considered as ultrafilteration.
Reason: Blood is filtered so finely through filtration membrane that almost all the constituent of the plasma except the proteins pass onto the lumen of Bowman 's capsule.

174. **Assertion:** Nitrogenous waste in PCT absorb passively.
Reason: It absorb by the process of diffusion down the concentration gradient.

175. **Assertion:** Uricotelism is terrestrial adaptation.
Reason: Uricotelism is least toxic and require minimum water for its excretion.

176. **Assertion:** Micturition in human is completely an endocrine mechanism.
Reason: Micturition reflex is endocrine reflex completely.

177. **Assertion:** Diabetes mellitus can be diagnosed by urine analysis
Reason: Glucose appear in urine in diabetes mellitus condition termed as glycosuria .

178. **Assertion:** Most of the secretion of liver is pass out along with faecal matter.
Reason: Bile juice is secreted in digestive tract.

PREVIOUS YEAR QUESTIONS

1. In which one of the following organisms its excretory organs are correctly stated?

[AIPMT MAINS 2010]

(a) Humans – Kidneys, sebaceous glands
(b) Earthworm – Pharyngeal, integumentary and septal nephridia
(c) Cockroach – Malpighian tubules and enteric caeca
(d) Frog – Kidneys, skin and buccal epithelium

2. Which one of the following statements with regard to the excretion by the human kidneys is correct?

[AIPMT PRE 2010]

(a) Descending limb of Loop of Henle is impermeable to water.
(b) Distal convoluted tubule is incapable of reabsorbing HCO_3^-.
(c) Nearly 99 per cent of the glomerular filtrate is reabsorbed by the renal tubules.
(d) Ascending limb of loop of Henle is impermeable to electrolytes.

3. The principal nitrogenous excretory compound in humans is synthesized

[AIPMT PRE 2010]

(a) In kidneys but eliminated mostly through liver.
(b) In kidneys as well as eliminated by kidneys.
(c) In liver and also eliminated by the same through bile.
(d) In the liver, but eliminated mostly through kidneys.

4. Which one of the following correctly explains the function of a specific part of a human nephron?

[AIPMT PRE 2011]

(a) Henle's loop – Most reabsorption of the major substance from the glomerular filtrate.
(b) Distal convoluted tubule – Reabsorption of ions into the surrounding blood capillaries.
(c) Afferent arteriole – Carries the blood away from the glomerulus towards the renal vein.
(d) Podocytes – Creates minute space (slit pores) for the filtration of blood into the Bowman's capsule.

5. Which one of the following is not a part of a renal pyramid?

[AIPMT PRE 2011]

(a) Convoluted tubules (b) Collecting ducts
(c) Loops Henle (d) Peritubular capillaries

6. Uricotelic mode of passing out nitrogenous wastes is found in

[AIPMT PRE 2011]

(a) Birds and annelids (b) Amphibians and reptiles
(c) Insects and amphibians (d) Reptiles and birds

7. Which one of the following statements is correct with respect to kidney function regulation? [AIPMT PRE 2011]

(a) Exposure to cold temperature stimulates ADH release.
(b) An increase in glomerular blood flow stimulates the formation of angiotensin II.
(c) During summer when the body loses lot of water by evaporation, the release of ADH is suppressed.
(d) When someone drinks lot of water the ADH release is suppressed.

8. A fall in glomerular filtration rate (GFR) activates [AIPMT MAINS 2012]

(a) Adrenal cortex to release aldosterone
(b) Adrenal medulla to release adrenaline
(c) Posterior pituitary to release vasopressin
(d) Juxtaglomerular cells to release rennin

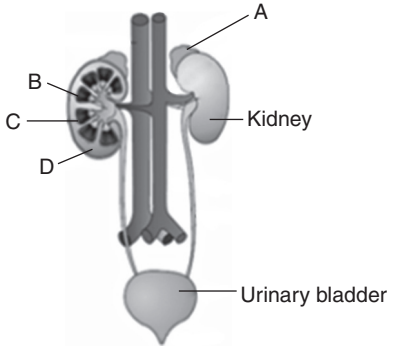
9. Which one of the following option gives the correct categorization of six animals according to the type of nitrogenous wastes {A (Ammonotelic), B (Ureotelic), C (Uricotelic)} they give out? [AIPMT MAINS 2012]

(a) A: Frog, Lizards, B: Aquatic Amphibia, Humans, C: Cockroach, Pigeon
(b) A: Aquatic Amphibia, B: Frog, Humans, C: Pigeon, Lizards, Cockroack
(c) A: Aquatic Amphibia, B: Cockroach, Humans, C: Frog, Pigeon, Lizards
(d) A: Pigeon, Humans, B: Aquatic Amphibia, Lizards, C: Cockroach, Frog

10. The maximum amount of electrolytes and water (70 to 80 per cent) from the glomerular filtrate is reabsorbed in which part of the nephron? [AIPMT PRE 2012]

(a) Ascending limb of loop of Henle
(b) Distal convoluted tubule
(c) Proximal convoluted tubule
(d) Descending limb of loop of Henle

11. Figure shows the human urinary system with structures labelled from A to D. Select the option which correctly identifies them and gives their characteristics and/or functions.



[AIPMT 2013]

(a) A: Adrenal gland – located at the anterior part of kidney, secrete catecholamines, which stimulate glycogen breakdown.
(b) B: Pelvis – broad funnel shaped space inner to hilum, directly connected to loop of Henle.
(c) C: Medulla – inner zone of kidney and contains complete nephrons.
(d) D: Cortex – outer part of kidney and do not contain any part of nephrons.

12. Which of the following causes an increase in sodium reabsorption in the distal convoluted tubule? [AIPMT 2014]

(a) Increase in aldosterone levels
(b) Increase in antidiuretic hormone levels
(c) Decrease in aldosterone levels
(d) Decrease in antidiuretic hormone levels

13. Removal of proximal convoluted tubule from the nephron will result in [AIPMT 2015]
(a) More diluted urine
(b) More concentrated urine
(c) No change in quality and quantity of urine
(d) No urine formation

14. Which of the following does not favour the formation of large quantities of dilute urine? [AIPMT 2015]
(a) Alcohol
(b) Caffeine
(c) Renin
(d) Atrial-natriuretic factor

15. Human urine is usually acidic because [RE-AIPMT 2015]
(a) Excreted plasma proteins are acidic
(b) Potassium and sodium exchange generates acidity
(c) Hydrogen ions are actively secreted into the filtrate
(d) The sodium transporter exchange one hydrogen ion for each sodium ion, in peritubular capillaries.

16. In mammals, which blood vessel would normally carry largest amount of urea? [NEET - I, 2016]
(a) Renal Vein
(b) Dorsal Aorta
(c) Hepatic Vein
(d) Hepatic Portal Vein

17. The part of nephron involved in active reabsorption of sodium is [NEET - II, 2016]
(a) Proximal convoluted tubule
(b) Bowman's capsule
(c) Descending limb of Henle's loop
(d) Distal convoluted tubule

NCERT EXEMPLAR QUESTIONS

1. The following substances are the excretory products in animals. Choose the least toxic form among them?
(a) Urea
(b) Uric acid
(c) Ammonia
(d) Carbon dioxide

2. Filtration of the blood takes place at
(a) PCT
(b) DCT
(c) Collecting ducts
(d) Malpighian body

3. Which of the following statements is incorrect?
(a) ADH prevents the conversion of angiotensinogen in blood to angiotensin.
(b) Aldosterone facilitates water reabsorption.
(c) ANF enhances sodium reabsorption.
(d) Renin causes vasodilation.

4. A larger quantity of one of the following is removed from our body by lungs.
(a) CO_2 only (b) H_2O only
(c) CO_2 and H_2O (d) Ammonia

5. The pH of human urine is approximately
(a) 6.5 (b) 7 (c) 6 (d) 7.5

6. Different types of excretory structures and animals are given below. Match them appropriately and mark the correct answer from among those given below.

Excretory structure/organ	Animals
(A) Protonephridia	(i) Prawn
(B) Nephridia	(ii) Cockroach
(C) Malpighian tubules	(iii) Earthworm
(D) Green gland or Antennal gland	(iv) Flatworms

(a) D – i, C – ii, B – iii and A – iv
(b) B – i, C – ii, A – iii and B – iv
(c) D – i, C – ii, A – iii and B – iv
(d) B – i, C – ii, B – iii and D – iv

7. Which one of the following statements is incorrect?
(a) Birds and land snails are uricotelic animals.
(b) Mammals and frogs are ureotelic animals.
(c) Aquatic amphibians and aquatic insects are ammonotelic animals.
(d) Birds and reptiles are ureotelic.

8. Which of the following pairs is wrong?
(a) Uricotelic ..... Birds
(b) Ureotelic ..... Insects
(c) Ammonotelic ..... Tadpole
(d) Ureotelic ..... Elephant

9. Which one of the following statements is incorrect?
(a) The medullary zone of kidney is divided into a few conical masses called medullary pyramids projecting into the calyces.
(b) Inside the kidney the cortical region extends in between the medullary pyramids as renal pelvis.
(c) Glomerulus along with Bowman's capsule is called the renal corpuscle.
(d) Renal corpuscle, Proximal Convoluted Tubule (PCT) and Distal Convoluted Tubule (DCT) of the nephron are situated in the cortical region of kidney.

10. The condition of accumulation of urea in the blood is termed as
(a) Renal calculi (b) Glomerulonephritis
(c) Uremia (d) Ketonuria

11. Which one of the following is also known as antidiuretic hormone?
(a) Oxytocin (b) Vasopressin
(c) Adrenaline (d) Calcitonin

12. Match the terms given in Column I with their physiological processes given in Column II and choose the answer.

Column I	Column II
(A) Proximal	(i) Formation of concentrated urine
(B) Distal convoluted tubule	(ii) Filtration of blood
(C) Henle's loop	(iii) Reabsorption of 70 to 80 per cent of electrolytes
(D) Counter–current mechanism	(iv) Ionic balance
(E) Renal corpuscle	(v) Maintenance of concentration gradient in medulla

(a) A– iii, B – v, C– iv, D – ii, E – i
(b) A – iii, B – iv, C – i, D – v, E – ii
(c) A – i, B – iii, C – ii, D – v, E – iv
(d) A – iii, B – i, C – iv, D – v, E – ii.

13. Match the abnormal conditions given in Column A with their explanations given in Column B and choose the correct option:

Column I	Column II
(A) Glycosuria	(i) Accumulation of uric acid in joints
(B) Renal calculi	(ii) Inflammation in glomeruli
(C) Glomerular nephritis	(iii) Mass of crystallized salts within the kidney
(D) Gout	(iv) Presence of glucose in urine

(a) A – i, B – iii, C – ii, D – iv
(b) A – iii, B – ii, C – iv, D – i
(c) A – iv, B – iii, C – ii, D – i
(d) A – iv, B – ii, C – iii, D – i.

14. We can produce concentrated/dilute urine. This is facilitated by a special mechanism. Identify the mechanism.
(a) Reabsorption from PCT.
(b) Reabsorption from collecting duct.
(c) Reabsorption/Secretion in DCT.
(d) Counter current mechanism in Henle's loop/Vasa recta.

15. Dialysis unit (artificial kidney) contains a fluid which is almost same as plasma except that it has
(a) High glucose
(b) High urea
(c) No urea
(d) High uric acid

Answer Keys

Practice Questions

1. (d)	2. (d)	3. (a)	4. (a)	5. (d)	6. (b)	7. (b)	8. (d)	9. (b)	10. (d)
11. (c)	12. (b)	13. (b)	14. (a)	15. (c)	16. (b)	17. (b)	18. (b)	19. (c)	20. (c)
21. (b)	22. (c)	23. (a)	24. (d)	25. (b)	26. (d)	27. (d)	28. (a)	29. (b)	30. (a)
31. (d)	32. (b)	33. (a)	34. (d)	35. (d)	36. (a)	37. (a)	38. (c)	39. (b)	40. (a)
41. (d)	42. (c)	43. (d)	44. (a)	45. (d)	46. (c)	47. (b)	48. (b)	49. (c)	50. (d)
51. (c)	52. (d)	53. (c)	54. (a)	55. (a)	56. (b)	57. (b)	58. (c)	59. (b)	60. (b)
61. (a)	62. (c)	63. (a)	64. (d)	65. (b)	66. (c)	67. (d)	68. (b)	69. (a)	70. (d)
71. (c)	72. (c)	73. (b)	74. (c)	75. (d)	76. (c)	77. (a)	78. (d)	79. (b)	80. (d)
81. (d)	82. (c)	83. (d)	84. (d)	85. (c)	86. (a)	87. (d)	88. (d)	89. (b)	90. (d)
91. (c)	92. (b)	93. (d)	94. (c)	95. (b)	96. (b)	97. (c)	98. (a)	99. (a)	100. (d)
101. (b)	102. (b)	103. (b)	104. (b)	105. (d)	106. (d)	107. (a)	108. (d)	109. (d)	110. (c)
111. (d)	112. (b)	113. (a)	114. (a)	115. (a)	116. (b)	117. (d)	118. (b)	119. (a)	120. (b)
121. (d)	122. (c)	123. (d)	124. (c)	125. (a)	126. (d)	127. (b)	128. (d)	129. (c)	130. (c)
131. (b)	132. (b)	133. (b)	134. (c)	135. (d)	136. (a)	137. (a)	138. (b)	139. (c)	140. (a)
141. (c)	142. (a)	143. (b)	144. (c)	145. (c)	146. (b)	147. (d)	148. (d)	149. (c)	

Assertion and Reason Questions

150. (b)	151. (d)	152. (b)	153. (b)	154. (a)	155. (b)	156. (a)	157. (b)	158. (a)	159. (c)
160. (d)	161. (a)	162. (a)	163. (a)	164. (a)	165. (a)	166. (a)	167. (a)	168. (a)	169. (a)
170. (a)	171. (a)	172. (c)	173. (a)	174. (a)	175. (a)	176. (d)	177. (a)	178. (a)	

Previous Year Questions

1. (b)	2. (c)	3. (d)	4. (d)	5. (a)	6. (d)	7. (d)	8. (d)	9. (b)	10. (c)
11. (a)	12. (a)	13. (a)	14. (c)	15. (c)	16. (c)	17. (a)			

NCERT Exemplar Questions

1. (b)	2. (d)	3. (a)	4. (c)	5. (c)	6. (a)	7. (d)	8. (b)	9. (b)	10. (c)
11. (b)	12. (b)	13. (c)	14. (d)	15. (c)					

This page is intentionally left blank.

CHAPTER

20

Locomotion and Movement

PRACTICE QUESTIONS

1. Which of the following is a simple form of movement?
(a) Streaming of protoplasm in amoeba (b) Ciliary movement in paramecium
(c) Flagellar movement in Euglena (d) All of these

2. The movement which results in a change of place or location is known as
(a) Contraction (b) Adduction
(c) Abduction (d) Locomotion

3. Select the correct matching:

Column I		Column II		Column III
A. Paramecium	–	1. Cilia	–	X. Movement of food through cytopharynx and locomotion.
B. Hydra	–	2. Tentacles	–	Y. Capturing of prey and for locomotion.
C. Human	–	3. Limbs	–	Z. Changes in body posture and for locomotion.

(a) A–1–X, B–2–Y, C–3–Z (b) A–1–Z, B–3–X, C–2–Y
(c) A–3–Z, B–1–X, C–2–Y (d) A–2–Y, B–3–X, C–1–Z

4. Select the incorrect statement?
(a) Plant and animal both exhibit movement.
(b) All locomotion are movement but all movement are not locomotion.
(c) Methods of locomotion performed by animals with their habitats and the demand of the situation.
(d) None of the above

5. Locomotion is used for
(A) Search of food and shelter
(B) Search for mate
(C) Search for suitable breeding ground
(D) Escaping from enemies/Predators
(a) All except B (b) All except C (c) All except D (d) All of these

6. Which is the movement exhibited by the cell of a human body?
(a) Amoeboid (b) Ciliary (c) Fagellar (d) All of these

7. Which of the following cells exhibit amoeboid movement?
(a) Macrophages (b) Leucocytes (c) RBC (d) Both (a) and (b)

8. Which of the following is correct about pseudopodia?
(a) Formed by streaming of protoplasm
(b) Formed in amoeba and neutrophile
(c) Both (a) and (b)
(d) None of these

9. Which of the following is involved in amoeboid movement?
(a) Centriole (b) Cilia
(c) Flagella (d) Microfilament

10. Which of the following organs is lined with cilia?
(a) Fallopian tube (b) Trachea (c) Intestine (d) Both (a) and (b)

11. Locomotion requires a perfect coordinated activity of
(a) Muscular system (b) Skeletal system
(c) Neural system (d) All of these

Muscle

12. Muscle is derived from
(a) Mesoderm (b) Ectoderm (c) Endoderm (d) All of these

13. Muscle forms _____ of adult human body.
(a) 30–40% (b) 40–50% (c) 50–60% (d) 60–70%

14. Muscles are characterized by
(a) Excitability and contractility (b) Extensibility
(c) Elasticity (d) All of these

15. Muscles can be classified on which of the following criterion?
(a) Location (b) Appearance
(c) Nature of regulation of their activities (d) All of these

16. How many types of muscles can be identified depending upon the location?
(a) 1 (b) 2 (c) 3 (d) 4

17. Which of the following is incorrect about skeletal muscles?
(a) Striped appearance under microscope hence called striated muscle.
(b) They are voluntary muscles.
(c) Primarily involved in locomotory actions and changes the body postures.
(d) They are Involuntary muscles.

18. Which of the following is incorrect about visceral muscles?
(a) Non-striated muscle (Smooth muscle)
(b) Involuntary muscle
(c) Located in inner walls of hollow visceral organs of the body
(d) They are under in voluntary control

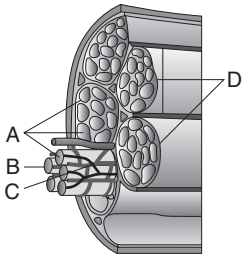
19. Smooth muscles help in
(a) Transportation of food through the digestive tract
(b) Transfer of gametes through genital tract
(c) Micturition by urinary bladder
(d) All the above

20. Cardiac muscle is characterized by
(a) Striated appearance (b) Involuntary control
(c) Branching pattern (d) All of these

21. Which muscle is not under direct control of nervous system?
(a) Skeletal (Striated muscles) (b) Smooth (Non-striated muscles)
(c) Cardiac muscles (d) All of these

22. Muscle fibre is a
(a) Anatomical unit of muscle (b) Physiological unit of muscle
(c) Biochemical unit of muscle (d) None of these

23. Identify A, B, C and D in the given figure.



(a) A–Sarcolemma, B–Blood capillary, C–Fascicle (muscle bundle), D–Muscle fibre (muscle cell)
(b) A–Blood capillary, B–Muscle fibre (muscle cell), C–Fascicle (muscle bundle), D–Sarcolemma
(c) A–Sacrolemma, B–Muscle fibre (muscle cell), C–Fesicle (muscle bundle), D–Blood capillary
(d) A–Muscle fibre (muscle cell), B–Sarcolemma, C–Blood capillary, D–Fascicle (muscle bundles)

24. Each organized skeletal muscle in our body is made up of a number of muscle bundles or fascicles held together by a common collagenous connective tissue layer called
(a) Tunicine (b) Fascia (c) Pellicle (d) Capsule

25. Select the correct matching from the following:
(a) Plasma membrane of muscle fibres – Sarcolemma
(b) Cytoplasm of muscle fibres – Sarcoplasm
(c) Endoplasmic reticulum of muscle fibres – Sarcoplasmic reticulum
(d) All the above

26. Sarcoplasmic reticulum is a storehouse of which ion
(a) Ca^{2+} (b) Na^{+} (c) K^{+} (d) Fe^{2+}

27. Sarcolemma is a membrane found over
(a) Nerve fibre (b) Cardiac muscle
(c) Skeletal muscle fibre (d) Heart

28. The functional unit of the contractile system in the striped muscle is
(a) Z-band (b) A-band (c) Myofibril (d) Sarcomere

29. Contraction of a muscle is caused by
(a) Myosin (b) Actin (c) ATP (d) Actomyosin

30. The dark bands (A-bands) of a skeletal muscle are known as
(a) Isotropic bands (b) Anisotropic bands
(c) Intercalated disc (d) Cross bridges

31. The light bands (I-bands) of a skeletal muscles are known as
(a) Isotropic bands (b) Anisotropic bands
(c) Intercalated disc (d) Cross bridges

32. Ciliary muscles are found in
(a) Diaphragm of a mammal (b) Eyes of vertebrates
(c) Heart of vertebrates (d) Stomach of frog

33. Intercostal muscles are found in
(a) Fingers (b) Thoracic ribs (c) Femur (d) Radius-ulna

34. The special contractile protein actin is found in
(a) Thick filaments of A-bands (b) Thin filaments of I-bands
(c) Both thick and thin bands (d) Whole of myofibril

35. Striped muscles have
(a) One nucleus (b) Many nuclei
(c) Two nuclei (d) No nuclei

36. Contractile fibrils of muscles are called
(a) Neurofibrils (b) Collagen fibres
(c) Myofibrils (d) Elastin

37. Myofibrils show alternate dark and light bands in
(a) Cardiac muscles (b) Smooth muscles
(c) Skeletal muscles (d) Both (a) and (c)

38. Select the correct statement:
(a) A-band is made up of thick myosin filament.
(b) H-zone is present in the middle of A-band.
(c) Actin and myosin are polymerized protein with contractility.
(d) All the above

39. Match the columns:

Column I		**Column II**
(A) Inflammation of joints	–	(1) H-zone
(B) Protein of thick filament	–	(2) Myosin
(C) Protein of thin filament	–	(3) Actin
(D) The central part of thick filament is not overlapped by thin filament	–	(4) Arthritis

(a) A–1, B–2, C–3, D–4 (b) A–1, B–3, C–2, D–4
(c) A–4, B–1, C–2, D–3 (d) A–4, B–2, C–3, D–1

40. Which of the following statements about the striated muscles is false?
1. Thick filaments in the 'A' band are also held together in the middle of this band by a thin fibrous membrane called 'M' line.
2. In the centre of each 'I' band is an elastic fibre called 'Z' line which bisects it.
3. The thin filaments are firmly attached to the 'Z' line.
4. This central part of thick filament, not overlapped by thin filaments is called the 'H' zone.

(a) All of these (b) Only 2
(c) 1 and 4 only (d) None of these

41. Which of the following statements about the molecular arrangement of actin in myofibrils is incorrect?
1. Each actin (thin) filament is made of two 'F' (filamentous) actins helically wound to each other.
2. Each 'F' actin is a polymer of monomeric 'G' (Globular) actins.
3. Two filaments of another protein, tropomyosin also runs close to the 'F' actins throughout its length.
4. A complex protein troponin is distributed at regular intervals on the tropomyosin.

(a) 1 and 2 only (b) 3 only (c) Only 4 (d) None of these

42. Select the total number of true statements from the following.
1. Each myosin (thick) filament is also a polymerized protein.
2. Many monomeric proteins called meromyosins constitute one thick filament.
3. Each meromyosin has two important parts, a globular head with a short arm and a tail, the former being called the heavy meromyosin (HMM) and the latter is called the light meromyosin (LMM).
4. The HMM component, i.e., the head and short arm projects outwards at regular distance and angle from each other from the surface of a polymerized myosin filament and is known as cross arm.
5. The globular head is an active ATPase enzyme and has binding sites for ATP and active sites for actin.

(a) 1 (b) 2 (c) 4 (d) 5

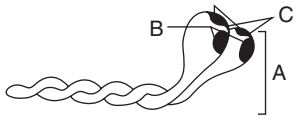
43. Binding of Ca^{2+} with _____ in the skeletal muscles and leads to the exposure of the binding site for _____ on the filament _____.

(a) Troponin, myosin, actin (b) Troponin, actin, relaxin
(c) Actin, myosin, troponin (d) Tropomyosin, myosis, actin

44. Following is the figure of actin (thin) filaments. Identify A, B and C.

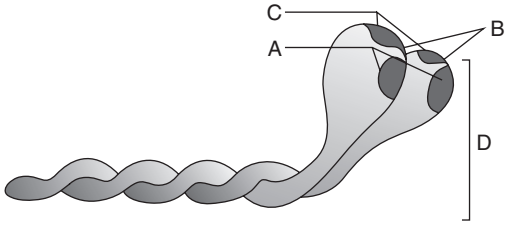
(a) A–Tropomyosin, B–Troponin, C–F actin
(b) A–Tropomyosin, B–Myosin, C–F Tropomyosin
(c) A–Troponin, B–Tropomyosin, C–Myosin
(d) A–Troponin, B–Tropomyosin, C–F actin

45.



The above figure is related to the myosin monomer (meromyosin). Identify A to C.
(a) A–head, B–cross arm, C–GTP binding sites
(b) A−Cross arm, B−ATP Binding sites, C−Head
(c) A–head, B–cross arm, C–ATP binding sites
(d) A–cross arm, B–head C–ATP binding sites

46. Identify A to D in the below figure.



(a) A–Actin binding sites, B–Head, C–Cross arm, D–ATP binding sites
(b) A–Cross arm, B–Actin binding sites, C–ATP binding sites, D–Head
(c) A–ATP binding sites, B–Head, C–Actin binding sites, D–Cross arm
(d) A–Head, B–Cross arm, C–ATP binding sites, D–Actin binding sites

47. Mechanism of muscle contraction is best explained by
(a) All or no law
(b) Sliding filament theory
(c) Blackman's law
(d) All of these

48. ATP provides energy for muscle contraction by allowing for
(a) An action potential formation in the muscle cell.
(b) Cross-bridge detachment of myosin from actin.
(c) Cross-bridge attachment of myosin to actin.
(d) Release of Ca^{2+} from sarcoplasmic reticulum.

49. A motor unit is best described as
(a) All the nerve fibres and muscle fibres in a single muscle bundle.
(b) One muscle fibre and its single nerve fibre.
(c) A single motor neuron and all the muscle fibres that it innervates.
(d) As the neuron which carries the message from muscles to CNS.

50. Motor end plate is a
(a) Neuromuscular junction
(b) Plate of motor neuron
(c) Dendron of motor neuron
(d) Gradient of protein motive force

51. During muscle contraction,
(a) Chemical energy is changed into electrical energy
(b) Chemical energy is changed into mechanical energy
(c) Chemical energy is changed into physical energy
(d) Mechanical energy is changed into chemical energy

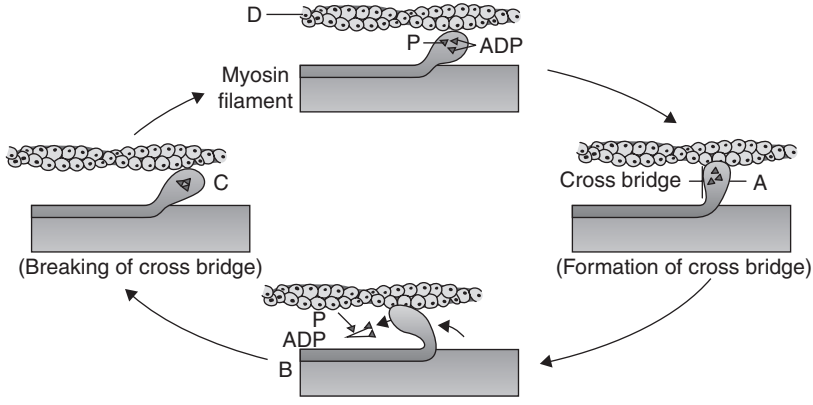
52. Electron microscopic studies of the sarcomeres have revealed that during muscle contraction
(a) The width of A-band remains constant
(b) The width of the H-zone increases
(c) The width of I-band increases
(d) The diameter of the fibre increases

53. According to the sliding filament theory
(a) Actin (thin filament) moves over myosin (thick filament)
(b) Myosin moves over actin
(c) Both myosin and actin move on each other
(d) None of the above

54. Put the following statement in proper order to describe muscle contraction.
1. Signal sent by CNS via motor neuron.
2. Generation of action potential in the sarcolemma.
3. Release of Ca^{+2} from sarcoplasmic reticulum.
4. The neurotransmitter acetycholine released motor endplate.
5. Sarcomere shorterns.

(a) $1 \rightarrow 2 \rightarrow 4 \rightarrow 3 \rightarrow 5$
(b) $1 \rightarrow 4 \rightarrow 2 \rightarrow 3 \rightarrow 5$
(c) $1 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 5$
(d) $5 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 1$

55. Go through the following diagram describing muscle contraction. Identify A to E.

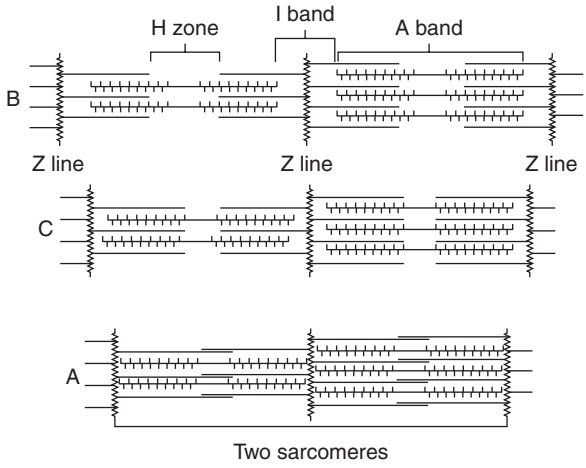


(a) A−Sliding/Rotation, B−Actin filament, C−Myosin head, D−ATP
(b) A–Myosin head, B–Sliding/Rotation, C–ATP, D–Actin filament
(c) A−Sliding/Rotation, B−Myosin head, C−Actin filament, D−ATP
(d) A−Actin filament, B−Sliding/Rotation, C−ATP, D−Myosin head

56. Which of the following muscle gets into fatigue very early?
(a) Skeletal muscle
(b) Smooth muscle
(c) Cardiac muscle
(d) All of these

57. Relaxation of muscle is due to the
(a) Pumping of Ca^{+2} into sarcoplasmic cisternae
(b) Presence of ATP
(c) Conformational change in troponin and masking of actin filaments
(d) Both (a) and (c)

58.



The diagrams given above depicts three different condition of sarcomeres. Identify these conditions:

(a) A–contracting, B–relaxed, C–maximally contracted
(b) A–relaxed, B–contracting, C–maximally contracted
(c) A–maximally contracted, B–relaxed, C–contracting
(d) A–relaxed, B–maximally contracted, C–contracting

59. Repeated activation of the muscles can lead to the accumulation of _____ due to anaerobic breakdown of glycogen in there causing fatigue.

(a) Ethanol (b) Lactic acid
(c) Citric acid (d) Butyric acid

60. A neurotransmitter _____ generates an action potential in the sarcolemma.

(a) GABA (b) Epinephrine (c) Glycine (d) Acetyt choline

61. Which of the following statement is correct?

(a) A motor neuron along with the muscles fibres connected to it constitute a motor unit.
(b) The reaction time of the fibres can vary in different muscles.
(c) Muscle fatigue is due to lactic acid formation due to anaerobic respiration.
(d) All the above

62. The protein which maintains the muscular storage of oxygen is

(a) Myoglobin (b) Actomyosin (c) Myosin (d) Haemoglobin

63. Which is not the correct difference between white and red muscle fibres?

White muscle fibre		**Red muscle fibre**
1. Less myoglobin	–	1. More myglobin
2. Number of mitochondria is less	–	2. Number of mitochondria is more
3. Amount of sarcoplasmic reticulum is low	–	3. Amount of sarcoplasmic reticulum is high
4. Aerobic muscle	–	4. Anaerobic muscle

(a) 1 (b) 2 (c) 3 (d) 4

64. Skeletal system consists of
(a) Framework of bone (b) Few cartilages
(c) Both (a) and (b) (d) None of these

65. Cartilage has slightly pliable matrix due to
(a) Ca^{2+} (b) Mg^{2+}
(c) Chondroitin salts (d) Phosphorus

66. Skull is composed of
(a) Cranial bones (8) (b) Facial bones (14)
(c) Both (a) and (b) (d) None of these

67. The hard and protective outer covering of brain is known as
(a) Cranium (b) Condyle (c) Meninges (d) All of these

68. Human body contains how many ear ossciles?
(a) 3 (b) 4 (c) 5 (d) 6

69. Human skull is
(a) Monocondylic (b) Dicondylic (c) Tricondylic (d) Acondylic

70. Vertebral column in human body is present
(a) Dorsally (b) Ventrally (c) Laterally (d) All of these

71. Which of the following is true about vertebral column?
(a) Each vertebra in vertebral column has a central hollow protein (Neural canal) through which spinal cord pass.
(b) The first vertebra in vertebral column is atlas and it articulates with the occipital condyle.
(c) Vertebral column protects the spinal cord, supports the head and serves as the point of attachment for the ribs and musculature of the back.
(d) All the above

72. The bone present on ventral midline of thorax is
(a) Vertebral column (b) Ribs (c) Scapula (d) Sternum

73. Which of the following is incorrect about ribs?
(a) Each rib is a thin and cat bone connected dorsally to the vertebral column and ventrally to the sternum.
(b) Ribs has two articulation surfaces on its dorsal end which are called bicephalic.
(c) Ventrally ribs are connected to sternum by elastic cartilage.
(d) First 7 pairs are called true ribs. The 8, 9 and 10^{th} pair is known as false (vertebracondral) ribs and the 2 pairs (11^{th} and 12^{th}) are known as floating ribs.

74. Scapula is an example of
(a) Long bone (b) Short bone (c) Flat bone (d) Irregular bone

Skeletal System

75. Number of bones in the adult human body is
(a) 206 (b) 406 (c) 106 (d) 306

76. Number of bones in human axial skeleton is
(a) 120 (b) 142 (c) 80 (d) 206

77. The number of bones in the skull of man is
(a) 14 (b) 28 (c) 8 (d) 22

78. Cranium of man is made up of
(a) 8 bones (b) 12 bones
(c) 16 bones (d) 14 bones

79. Vertebral column of human body is made up of
(a) 33 vertebrae (b) 52 vertebrae
(c) 45 vertebrae (d) 23 vertebrae

80. The number of bones in the vertebral column of man is
(a) 32 (b) 26 (c) 35 (d) 20

81. The human vertebral formula is
(a) C7T12L5S5Cd4 (b) C7T9L5S4Cd1
(c) C7T12L5S1Cd1 (d) C7T12L4S4Cd1

82. The vertebra which bears the whole weight of the skull is
(a) Atlas (b) Axis
(c) Cervical (d) Sacral

83. In man, the ribs are attached to
(a) Clavicle (b) Ileum
(c) Sternum (d) Scapula

84. In case of most of the mammals including man and Giraffe, the numbers of cervical vertebrae are
(a) 8 (b) 7 (c) 9 (d) 10

85. The eighth and ninth ribs are known as false ribs because their external portions are attached to
(a) xiphisternum (b) Costa of 7th rib
(c) They have no costa (d) They are not true ribs

86. Number of bones in face is
(a) 12 (b) 30 (c) 40 (d) 14

87. Axial skeleton is made up of
(a) Skull only (b) Sternum only
(c) Complete vertebral column (d) All of these

88. What is the right sequence of bones in the ear ossicles of a mammal starting from the tympanum inwards?
(a) Malleus, Incus, Stapes (b) Malleus, Stapes, Incus
(c) Incus, Malleus, Stapes (d) Stapes, Incus, Malleus

89. Malleus is a part of
(a) Fore limbs of vertebrates
(b) Reproductive organs of cockroach
(c) Auditory ossicles of middle ear of human
(d) Skull of frog

90. In human beings, the thoracic basket is composed of
(a) Ribs and thoracic vertebrae
(b) Ribs and sternum
(c) Ribs, sternum and vertebrae
(d) Ribs, sternum and thoracic vertebrae

91. The bone which is U-shaped is
(a) Frontal (b) Vomer
(c) Hyoid (d) Molar

92. Match the following:

Bone		**Number**
1. Skull	–	1. 24
2. Vertebrae	–	2. 60
3. Ribs	–	3. 22
4. Sternum	–	4. 1
5. Pectoral girdles	–	5. 2
6. Arms	–	6. 4
7. Ear ossicles	–	7. 6
8. Pelvic girdles	–	8. 33

The correct pairing sequence is
(a) 8–3, 1–4, 6–2, 5–7 (b) 3–8, 1–4, 6–2, 7–5
(c) 3–8, 1–4, 2–6, 7–5 (d) None of these

93. The number of floating ribs in human body is
(a) 6 pairs (b) 3 pairs (c) 5 pairs (d) 2 pairs

94. The foramen magnum, occipital condyles are found in
(a) Parietal bone (b) Ethmoid bone
(c) Sphenoid bone (d) Occipital bone

95. The acromion process articulates with the
(a) Scapula (b) Clavicle
(c) Ribs (d) Vertebral column

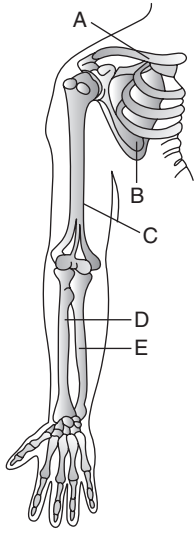
96. The number of lumbar vertebrae in human vertebral column is
(a) 12 (b) 7 (c) 5 (d) 2

97. How many ribs are present in human beings?
(a) 6 pairs (b) 9 pairs (c) 12 pairs (d) 15 pairs

98. The cup-shaped cavity for the articulation of the head of the femur is called
(a) Glenoid cavity (b) Acetabulum
(c) Obturator (d) Sigmoid notch

99. Ribs attached to sternum are
(a) First seven pairs (b) All ten ribs
(c) First ten rib pairs (d) First five rib pairs

100. Which part is indicated as A, B, C, D, and E in the given figure?



(a) A–Clavicle, B–Scapula, C–Humerus, D–Radius, E–Ulna
(b) A–Humerus, B–Clavicle, C–Ulna, D–Scapula, E–Radius
(c) A–Ulna, B–Humerus, C–Clavicle, D–Radius, E–Scapula
(d) A–Radius, B–Ulna, C–Scapula, D–Clavicle, E–Humerus

101. In humans, the radius and ulna are (shown in diagram of question number 100.)
(a) Completely fused together
(b) Completely separated
(c) Fused in middle and separated at both the ends
(d) Separated but united at both the ends

102. A shallow depression in the scapula which receives the head of the upper arm bone is known as the
(a) Acetabulum (b) Neural arch (c) Glenoid cavity (d) None of these

103. Patella, the sesamoid bone is also known as
(a) Pisiform (b) Replacing bone (c) Knee cap (d) None of these

104. Humerus bone is situated in
(a) Thigh (b) Lower arm (c) Upper arm (d) Shank

105. The cup-shaped structure of pelvic girdle, the acetabulum in man is formed by
(a) Ilium, ischium and pubis (b) Ilium, ischium and cotyloid
(c) Ilium and ischium (d) Ilium and cotyloid

106. The pectoral and pelvic girdles and the bones of limb form
(a) Axial skeleton (b) Appendicular skeleton
(c) Visceral skeleton (d) Outer skeleton

107. The total number of bones in your right arm is
(a) 30 (b) 32 (c) 35 (d) 40

108. An acromian process is characteristically found in mammals in
(a) Pelvic girdle (b) Pectoral girdle (c) Skull (d) Sternum

109. Which one of the following component is the part of pectoral girdle?
(a) Acetabulum (b) Hilum (c) Sternum (d) Glenoid cavity

110. Pelvic girdle of human consist of
(a) Ilium, ischium and pubis (b) Ilium, ischium and coracoid
(c) Coracoid, scapula and clavicle (d) Ilium, coracoid and scapula

111. Innominate or hip bone is formed by the fusion of how many bones?
(a) 2 (b) 3 (c) 4 (d) 5

112. Phallangeal formula of hand of man is
(a) 1, 2, 2, 2, 2 (b) 2, 1, 1, 1, 1 (c) 2, 3, 3, 3, 3 (d) 2, 3, 3, 2, 2

113. Appendicular skeleton includes all except
(a) Hind limb (b) Fore limb
(c) Amphicoelous vertebra (d) Pectoral and pelvic girdle

114. Patella is associated with
(a) Elbow (b) Knee (c) Neck (d) Wrist

115. Which one of the cartilage helps in early birth of a child, without damage to the pelvic girdle?
(a) Hyaline cartilage (b) Elastic cartilage
(c) Calcified cartilage (d) Fibrous cartilage

116. The total number of bones in the hind limb of a man is
(a) 14 (b) 21 (c) 24 (d) 30

117. Which of the following is an example of appendicular skeleton?
(a) Bones of skull (b) Bones of vertebral column
(c) Ribs (d) Bones of fore and hind limbs

118. The longest bone of human body is
(a) Femur (thigh bones) (b) Tibia
(c) Patella (knee cap) (d) Humerus

119. All are bones of forelimb except
(a) Radius (b) Ulna (c) Humerus (d) Tibia

120. Carpals, metacarpals, tarsals, metatarsals are ____ and ____ in numbers respectively
(a) 8, 5, 7, 5 (b) 8, 7, 5, 5 (c) 8, 5, 8, 5 (d) 8, 5, 5, 7

121. How many ankle bones are present in the human body?
(a) 7 (b) 5 (c) 8 (d) 14

122. Each girdle of appendicular skeleton is made up of
(a) Two halves (b) Three halves (c) Four halves (d) Five halves

123. Each of the pectoral girdle consists of
(a) Clavicle (b) Scapula (c) Humerus (d) Both (a) and (b)

124. Scapula is a large triangular and flat bone situated in the dorsal part of the thorax between ____ to ____ ribs.
(a) 2, 5 (b) 2, 7 (c) 2, 6 (d) 2, 8

125. Which of the folowing is correct about clavicle?
(a) Known as collar bone (b) Long bone
(c) It has two curvatures (d) All of these

126. Scapula has slightly elevated ridge called the spine, which projects as a flat, expanded process known as
(a) Coracoid (b) Greater tubercle (c) Acromion (d) Lesser tubercle

Joints

127. Joints are lubricated by
(a) Epidermis (b) Dermis
(c) Tympanic membrane (d) Synovial fluid

128. Ball and socket joints can be seen in
(a) Wrist (b) Fingers (c) Neck (d) Shoulders

129. The knee joint in between the thigh and lower leg is a
(a) Hinge joint (b) Gliding joint (c) Pivot joint (d) Fixed joint

130. When the head of humerus fits into glenoid cavity, the joint is
(a) Ball and socket joint (b) Hinge joint
(c) Pivot joint (d) Saddle joint

131. The joint between the carpal bones and tarsal bones is
(a) Gliding joint (b) Ball and socket joint
(c) Hinge joint (d) Saddle joint

132. The joint between femur and tibio–fibula is
(a) Hinge joint (b) Saddle joint (c) Pivot joint (d) Imperfect joint

133. Articulation of the atlas with the axis is an example of
(a) Hinge joint (b) Ball and socket joint
(c) Gliding joint (d) Pivot joint

134. Sutural joints are found between
(a) Parietals of skull (b) Humerus and radius-ulna
(c) Glenoid cavity and pectoral girdle (d) Thumb and metatarsal

135. Synovial joints is
(a) Pivot joint (b) Hinge joint
(c) Ball and socket joint (d) All of these

136. Which of the following pairs is correctly matched?
(a) Hinge joint – Between vertebrae
(b) Gliding joint – Between carpal and metacarpal of thumb
(c) Cartilaginous joint – between carpels
(d) Fibrous joint – Flat skull bones

137. Name the joint that lies between sternum and the ribs in humans?
(a) Fibrous joint (b) Gliding joint (c) Cartilaginous joint (d) Angular joint

138. The shoulder and hip are
(a) Pivot joint (b) Hinge joint
(c) Ellipsoid joint (d) Ball and socket joint

139. Symphysis is made up of
(a) Fibrocartilage (b) Synovial fluid
(c) Elastic cartilage (d) Hyaline cartilage

Disorder of Muscular and Skeletal System

140. Inflammation of joints due to the accumulation of uric acid crystals occurs in
(a) Osteoporosis (b) Gout (c) Tetany (d) Rickets

141. Myasthenia gravis is
(a) auto immune disorder affecting neuromuscular junction leading to fatigue, weakening and paralysis of skeletal muscle
(b) progressive degeneration of skeletal muscle mostly due to genetic disorder
(c) rapid spasms (wild contractions) in muscle due to low Ca^{++} in body fluid
(d) inflammation of joints

142. Progressive degeneration of skeletal muscle, mostly due to genetic disorder, is
(a) Osteoporosis (b) Gout
(c) Tetany (d) Muscular dystrophy

143. Tetany is due to
(a) low Ca^{2+}in body fluid
(b) high Ca^{2+}in body fluid
(c) high concentration of uric acid in boy fluid
(d) all

144. Name age-related disorder which is characterized by decreased bone mass and increased chances of fractures, also decreased level of estrogen is a common cause in it.
(a) Osteoporosis (b) Gout
(c) Tetany (d) Muscular dystrophy

145. Smooth muscle fibres are
(a) cylindrical, unbranched, striated, multinucleate and voluntary
(b) spindle-shaped, unbranched, non-striated, uninucleate and involuntary
(c) cylindrical, unbranched, non-striated, multinucleate and involuntary
(d) spindle-shaped, unbranched, striated, uninucleate and voluntary

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion
(c) If the assertion is true but the reason is false
(d) If both the assertion and reason are false

146. **Assertion:** Ciliary movement occurs in most of our internal tubular organs which are lined by ciliated epithelium.
Reason: Passage of ova through the female reproductive tract is also facilitated by the ciliary movement.

147. **Assertion:** All locomotions are movements but all movements are not locomotion.
Reason: Movement is one of the significant features of living beings.

148. **Assertion:** Ball and socket joints are the most mobile joints.
Reason: Synovial fluid is present here in synovial cavity such arrangement allows considerable movement.

149. **Assertion:** Arthritis or inflammation of a joint makes the joint painful.
Reason: Some toxic substances are deposited at the joint.

150. **Assertion:** Movement of body parts serves to change the body posture.
Reason: Body parts move in relation to the body axis.

151. **Assertion:** There are similarities between the locomotion of unicellular organisms and multicellular animal.
Reason: Ciliary, flagellar and amoeboid movement occur in unicellular organisms.

152. **Assertion:** White muscle fibres have very less quantity of myoglobin.
Reason: White muscle fibres have high number of sarcoplasmic reticulum.

153. **Assertion:** Each myosin filament is a polemerized carbohydrate.
Reason: Actin filament is made up of meromysin.

154. **Assertion:** Skeleton helps in the blood cell formation.
Reason: Blood flows through skeleton.

155. **Assertion:** Biceps and triceps are called antagonistic muscles.
Reason: This is due to the fact that they contract and relax together.

156. **Assertion:** Muscle contraction force increases with rise in strength of stimulus.
Reason: This is due to increased contraction of individual muscle fibres with increase in stimulus strength.

157. **Assertion:** Muscle as a whole doesn't obey all or none law.
Reason: Each muscle fibre contracts maximally whenever it contracts.

158. **Assertion:** Amoeba shows simple form of movement
Reason: Streaming of protoplasm is found in amoeba

159. **Assertion:** Tentacles in hydra perform multiple functions
Reason: Tentacles in hydra use for capture of prey as well as for locomotion.

160. **Assertion:** Macrophages and leucocytes in blood exhibit amoeboid movement
Reason: They can form pseudopodia by streaming of protoplasm

161. **Assertion:** We can remove dust particle and some foreign substances inhaled along with the atmospheric air from trachea
Reason: Trachea is lined with ciliated epithelium

162. **Assertion:** Ca^{2+} ion plays important role in muscle contraction
Reason: Calcium ion binds to subunit of troponin on actin filament and removes the masking of active sites for myosin

163. **Assertion:** Skeletal muscle fibre is a syncitium.
Reason: Sarcoplasm of skeletal muscle fibre contain many nuclei.

164. **Assertion:** Skeletal muscles are striated muscles
Reason: They have striped appearance under the microscope

165. **Assertion:** Smooth muscles are involuntary muscles
Reason: Their activities are not under voluntary control of the nervous system.

166. **Assertion:** Myosin is structural protein but also act as enzyme.
Reason: Myosin is use to form myofibril and can hydrolyse ATP.

167. **Assertion:** Repeated activation of skeletal muscle can lead to fatigue
Reason: Accumulation of lactic acid occur due to anaerobic respiration

168. **Assertion:** Red fibres are referred as aerobic muscles
Reason: These muscles contain large number of mitochondria which utilize the large amount of oxygen stored in them for ATP production.

169. **Assertion:** Bone have very hard matrix
Reason: Matrix of bone contain calcium salt in it

170. **Assertion:** Gout is inflammation of muscles.
Reason: It occur due to deposition of urea in muscles.

171. **Assertion:** In parathyroid tetany rapid spasm of muscle occurs.
Reason: It is due to low calcium ion in body fluid.

172. **Assertion:** Myasthenia gravis is autoimmune disorder.
Reason: It results due to antibodies are formed that block our own nicotinic acetylcholine receptor at neuromuscular junction.

173. **Assertion:** Osteoporosis is characterised by increase in bone mass.
Reason: Its common cause is increased level of oestrogen.

PREVIOUS YEAR QUESTIONS

1. Which one of the following pairs of structures is correctly matched with their corrected description?

[AIPMT MAINS 2010]

Structures		**Description**
(A) Tibia and fibula	→	Both form parts of knee joint
(B) Cartilage and cornea	→	No blood supply but it does require oxygen for respiratory need
(C) Shoulder joint and elbow joint	→	Ball and socket type of joint
(D) Premolars and molars	→	20 in all and 3 rooted

(a) (A) (b) (B) (c) (C) (d) (D)

2. Which one of the following is the correct description of a certain part of a normal human skeleton? [AIPMT MAINS 2010]

(a) Parietal bone and the temporal bone of the skull are joined by fibrous joint.
(b) First vertebra is axis which articulates with the occipital condyles.

(c) The 9th and 10th pairs of ribs are called the floating ribs.
(d) Glenoid cavity is a depression to which the thigh bone articulates.

3. The following pairs of the human skeletal parts are correctly matched with their respective inclusive skeletal category and one pair is not matched. Identify the non-matching pair.
[AIPMT MAINS 2011]

	Pair of skeletal parts	**Category**
(a)	Sternum and ribs	Axial skeleton
(b)	Clavicle and glenoid cavity	Pelvic girdle
(c)	Humerus and ulna	Appendicular skeleton
(d)	Malleus and stapes	Ear ossicles

4. Which one of the following pairs of chemical substances is correctly categorized?
[AIPMT MAINS 2012]

(a) Pepsin and prolactin - Two digestive enzymes secreted in stomach
(b) Troponin and myosin - Complex proteins in striated muscles
(c) Secretin and rhodopsin - Polypeptide hormones
(d) Calcitonin and thymosin - Thyroid hormones

5. Select the correct statement regarding the specific disorder of muscular or skeletal system.
[AIPMT PRE 2012]

(a) Muscular dystrophy: Age related shortening of muscles.
(b) Osteporosis: Decrease in bone mass and higher chances of fractures with advancing age.
(c) Myasthenia gravis: Auto immune disorder which inhibits sliding of myosin filaments.
(d) Gout: Inflammation of joints due to extra deposition of calcium.

6. The H-zone in the skeletal muscles fibre is due to
[AIPMT 2013]

(a) The absence of myofibrils in the central portion of A-band.
(b) The central gap between myosin filaments in the A-band.
(c) The central gap between actin filaments extending through myosin filaments in the A-band.
(d) Extension of myosin filaments in the central portion of the A-band.

7. Select the correct statement with respect to locomotion in humans.
[AIPMT 2013]

(a) A decreased level of progesterone causes osteoporosis in old people.
(b) Accumulation of uric acid crystals in joints causes their inflammation.
(c) The vertebral column has 10 thoracic vertebrae.
(d) The joint between adjacent vertebrae is a fibrous joint.

8. The characteristics and an example of a synovial joint in humans is
[AIPMT 2013]

	Characteristics		**Examples**
(a)	Fluid cartilage between two bones, limited movements	→	Knee joint
(b)	Fluid filled between two joints, provides cushion	→	Skull bones
(c)	Fluid filled synovial cavity between two bones	→	Joint between atlas and axis
(d)	Lymph filled between two bones, limited movement	→	Gliding joint between carpals

9. Select the correct matching of the type of the joint with the example in human skeletal system. [AIPMT 2014]

	Type of joint	**Example**
(a)	Cartilaginous joint	Between frontal and pariental
(b)	Pivot joint	Between third and fourth cervical vertebrae
(c)	Hinge joint	Between humerus and pectoral girdle
(d)	Gliding joint	Between carpals

10. Stimulation of a muscle fibre by a motor neuron occurs at [AIPMT 2014]

(a) The neuromuscular junction
(b) The transverse tubules
(c) The myofibril
(d) The sacroplasmic reticulum

11. The sliding filament theory can be best explained as [AIPMT 2015]

(a) When myofilaments slide pass each other actin filaments shorten while myosin filaments do not shorten.
(b) Actin and myosin filaments shorten and slide pass each other.
(c) Actin and myosin filaments do not shorten but rather slide pass each other.
(d) When myofilaments slide pass each other, the myosin filaments shorten while actin filaments do not shorten.

12. Glenoid cavity articulates [AIPMT 2015]

(a) Clavicle with acromion
(b) Scapula with acromion
(c) Clavicle with scapula
(d) Humerus with scapula

13. Which of the following joints would hallow no movement? [RE-AIPMT 2015]

(a) Cartilaginous joint
(b) Synovial joint
(c) Ball and socket joint
(d) Fibrous joint

14. Which of the following is not a function of the skeletal system? [RE-AIPMT 2015]

(a) Storage of minerals
(b) Production of body heat
(c) Locomotion
(d) Production of erythrocytes

15. Lack of relaxation between successive stimuli in sustained muscle contraction is known as: [NEET - I, 2016]

(a) Spasm
(b) Fatigue
(c) Tetanus
(d) Tonus

16. Name the ion responsible for unmasking of active sites for myosin for cross-bridge activity during muscle contraction. [NEET - II, 2016]

(a) Magnesium
(b) Sodium
(c) Potassium
(d) Calcium

NCERT EXEMPLAR QUESTIONS

1. Match the following and mark the correct option:

Column I	Column II
(A) Fast muscle fibres	(i) Myoglobin
(B) Slow muscle fibres	(ii) Lactic acid
(C) Actin filament	(iii) Contractile unit
(D) Sarcomere	(iv) I-band

Options:

(a) A – i, B – ii, C – iv, D – iii
(b) A – ii, B – i, C – iii, D – iv
(c) A – ii, B – i, C – iv, D – iii
(d) A – iii, B – ii, C – iv, D – i

2. Ribs are attached to
(a) Scapula (b) Sternum (c) Clavicle (d) Ilium

3. What is the type of movable joint present between the atlas and axis?
(a) Pivot (b) Saddle (c) Hinge (d) Gliding

4. ATPase of the muscle is located in
(a) Actinin (b) Troponin (c) Myosin (d) Actin

5. Intervertebral disc is found in the vertebral column of
(a) Birds (b) Reptiles (c) Mammals (d) Amphibians

6. Which one of the following is showing the correct sequential order of vertebrae in the vertebral column of human beings?
(a) Cervical-Iumbar-thoracic-sacral-coccygeal
(b) Cervical-thoracic-sacral-Iumbar-coccygeal
(c) Cervical-sacral-thoracic-Iurnbar-coccygeal
(d) Cervical-thoracic-Iumbar-sacral-coccygeal

7. Which one of following options is incorrect?
(a) Hinge joint – Present between humerus and pectoral girdle
(b) Pivot joint – Present between atlas, axis and occipital condyle
(c) Gliding joint – Present between the carpals
(d) Saddle joint – Present between carpal and metacarpal of thumb

8. Knee joint and elbow joints are examples of
(a) Saddle joint (b) Ball and socket joint
(c) Pivot joint (d) Hinge joint

9. Macrophages and leucocytes exhibit
(a) Ciliary movement (b) Flagellar movement
(c) Amoeboid movement (d) Gliding movement

10. Which one of the following is not a disorder of bone?
(a) Arthritis (b) Osteoporosis
(c) Rickets (d) Atherosclerosis

11. Which one of the following statement is incorrect?
(a) Heart muscles are striated and involuntary.
(b) The muscles of hands and legs are striated and voluntary.
(c) The muscles located in the inner walls of alimentary canal are striated and involuntary.
(d) Muscles located in the reproductive tracts are unstriated and involuntary.

12. Which one of the following statements is true?
(a) Head of humerus bone articulates with the acetabulum of pectoral girdle.
(b) Head of humerus bone articulates with the glenoid cavity of pectoral girdle.
(c) Head of humerus bone articulates with a cavity called acetabulum of pelvic girdle.
(d) Head of humerus bone articulates with a glenoid cavity of pelvic girdle.

13. Muscles with characteristic striations and involuntary nature are
(a) Muscles in the wall of alimentary canal
(b) Muscles of the heart
(c) Muscles assisting locomotion
(d) Muscles of the eyelids

14. Match the followings and mark the correct option:

Column I	**Column II**
(A) Sternum	(i) Synovial fluid
(B) Glenoid Cavity	(ii) Vertebrae
(C) Freely movable joint	(iii) Pectoral girdle
(D) Cartilaginous joint	(iv) Flat bones

Options:
(a) A – ii, B – i, C – iii, D – iv
(b) A – iv, B – iii, C – i, D – ii
(c) A – ii, B – i, C – iv, D – iii
(d) A – iv, B – i, C – ii, D – iii

Answer Keys

Practice Questions

1. (a)	2. (d)	3. (a)	4. (d)	5. (d)	6. (d)	7. (d)	8. (c)	9. (d)	10. (d)
11. (d)	12. (a)	13. (b)	14. (d)	15. (d)	16. (c)	17. (d)	18. (d)	19. (d)	20. (d)
21. (c)	22. (a)	23. (d)	24. (b)	25. (d)	26. (a)	27. (c)	28. (d)	29. (d)	30. (b)
31. (a)	32. (b)	33. (b)	34. (b)	35. (b)	36. (c)	37. (d)	38. (d)	39. (d)	40. (d)
41. (d)	42. (d)	43. (a)	44. (d)	45. (b)	46. (c)	47. (b)	48. (c)	49. (c)	50. (a)
51. (b)	52. (a)	53. (a)	54. (b)	55. (b)	56. (a)	57. (d)	58. (c)	59. (b)	60. (d)
61. (d)	62. (a)	63. (d)	64. (c)	65. (c)	66. (c)	67. (a)	68. (d)	69. (b)	70. (a)
71. (d)	72. (d)	73. (c)	74. (c)	75. (a)	76. (c)	77. (d)	78. (a)	79. (a)	80. (b)
81. (a)	82. (a)	83. (c)	84. (b)	85. (b)	86. (d)	87. (d)	88. (a)	89. (c)	90. (d)
91. (c)	92. (d)	93. (d)	94. (d)	95. (b)	96. (c)	97. (c)	98. (b)	99. (a)	100. (a)
101. (d)	102. (c)	103. (c)	104. (c)	105. (a)	106. (b)	107. (a)	108. (b)	109. (d)	110. (a)
111. (b)	112. (c)	113. (c)	114. (b)	115. (d)	116. (d)	117. (d)	118. (a)	119. (d)	120. (a)
121. (d)	122. (a)	123. (d)	124. (b)	125. (d)	126. (c)	127. (d)	128. (d)	129. (a)	130. (a)
131. (a)	132. (a)	133. (d)	134. (a)	135. (d)	136. (d)	137. (c)	138. (d)	139. (a)	140. (b)
141. (a)	142. (d)	143. (a)	144. (a)	145. (b)					

Assertion and Reason Questions

146. (b) 147. (a) 148. (a) 149. (c) 150. (b) 151. (b) 152. (b) 153. (d) 154. (c) 155. (c)
156. (c) 157. (b) 158. (a) 159. (a) 160. (a) 161. (a) 162. (a) 163. (a) 164. (a) 165. (a)
166. (a) 167. (a) 168. (a) 169. (a) 170. (d) 171. (a) 172. (a) 173. (d)

Previous Year Questions

1. (b) 2. (a) 3. (b) 4. (b) 5. (b) 6. (c) 7. (b) 8. (c) 9. (d) 10. (a)
11. (c) 12. (d) 13. (d) 14. (b) 15. (c) 16. (d)

NCERT Exemplar Questions

1. (c) 2. (b) 3. (a) 4. (c) 5. (c) 6. (d) 7. (a) 8. (d) 9. (c) 10. (d)
11. (c) 12. (b) 13. (b) 14. (b)

CHAPTER

21

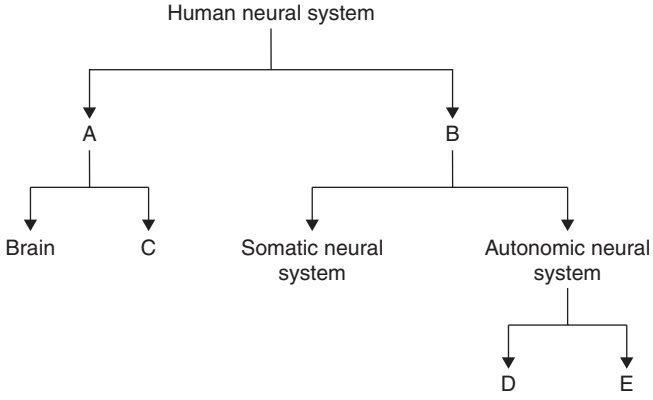
Neural Control and Co-ordination

PRACTICE QUESTIONS

Human Neural System

1. Select the incorrect statement:
(a) Coordination is the process through which two or more organ interact and complement the function of one another.
(b) Neural system provides on organized network of point to point connection for quick coordination.
(c) Neural organization is complex in lower invertebrates.
(d) Vertebrates have more developed neural system.

2.



Identify A, B, C, D and E:
(a) A–Central Nervous System (CNS), B–Peripheral Nervous System (PNS), C–Spinal cord, D–Sympathetic Neural System, E–Parasympathetic Neural System
(b) A–Peripheral Nervous System (PNS), B–Parasympathetic Neural System, C–Central Nervous System (CNS), D–Sympathetic Neural System, E–Spinal cord
(c) A–Parasympathetic Neural System, B–Spinal cord, C–Central Nervous System (CNS), D–Sympathetic Neural System, E–Peripheral Nervous System (PNS)
(d) A–Central Nervous System (CNS), B–Spinal cord, C–Peripheral Nervous System (PNS), D–Sympathetic Neural System, E–Parasympathetic Neural System

3. Somatic neural system transmits impulse to
(a) Skeletal muscles (b) Involuntary organs
(c) Smooth muscles (d) All of these

4. Which of the following lacks a neural system?
(a) Hydra (b) Silver fish
(c) Spongia (Sponges) (d) Ophiura

5. Nervous system of hydra is composed of
(a) Ganglia chain
(b) Vertical ganglion chain interconnected by commissure
(c) Network of nerves
(d) Brain

6. Nissl's granules are found in all except
(a) Cyton (b) Dendrites
(c) Axon (d) Cell body

7. Which of the following system relays impulse from CNS to skeletal muscles?
(a) Somatic neural system
(b) Sympathetic neural system
(c) Parasympathetic neural system
(d) Autonomic neural system

8. Dendrites transmit impulse ____ cell body and axon transmits impulse ____ cell body.
(a) towards, away from (b) away, towards
(c) towards, towards (d) away, away

9. Bipolar axons are found in
(a) Retina of eye (b) Cerebral cortex
(c) Mesencephalon (d) Embryonic stage

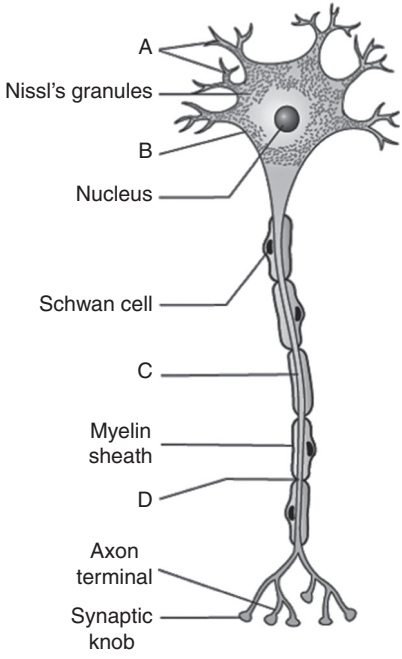
10. Unipolar axons are found in
(a) Respiratory epithelium (b) Retina
(c) Embryo (d) Cerebral cortex

11. Schwann cell is absent in
(a) Myelinated neuron (b) Non myelinated
(c) Astrocytes (d) Both (b) and (c)

12. Neuron can
(a) Detect stimuli (b) Receive stimuli
(c) Transmit stimuli (d) All of these

13. Neuron is a _____ structure composed of three major parts cell body _____ and axon.
(a) Macroscopic, dendrites
(b) Microscopic, dendrites
(c) Microscopic, cyton
(d) Microscopic, soma

14. Question A and B is related to digram given below.



Structure of a neuron

A) Which part do not contain Nissl's granule?
(a) A (b) B (c) C (d) All of these
B) Which path of transmission is correct?
(a) A → B → C (b) B → A → C
(c) C → B → A (d) B → A → B → C

15. Match the Column:

Column I		**Column II**
A. Unipolar	–	1. Cell body with one axon only, found usually in the embryonic stage.
B. Bipolar	–	2. Cell body with one axon and two or more dendrites, found in cerebral cortex.
C. Multipolar	–	3. Cell body with one axon and one dendrite, found in retina of eye.

(a) A–1, B–3, C–2 (b) A–2, B–1, C–3
(c) A–3, B–2, C–1 (d) A–1, B–2, C–3

16. Myelinated nerve fibre is found in
(a) Spinal nerve (b) Cranial nerve
(c) Both (a) and (b) (d) None of these

17. Unmyelinated nerve fibres are commonly found in
(a) ANS (b) Somatic neural system
(c) Both (a) and (b) (d) None of these

Central Nervous System

18. The outermost of the 3 cranial meninges is
(a) Arachnoid (b) Dura (c) Pia (d) Sclera

19. Brain stem is formed by
(a) Fore brain (b) Mid brain (c) Hind brain (d) Both (b) and (c)

20. Right and left cerebral hemispheres are connected via
(a) Corpus striatum (b) Corpus callosum
(c) Thalamus (d) Hippocampus

21. Forebrain consist of
(a) Cerebrum (b) Thalamus (c) Hypothalamus (d) All of these

22. The cerebrum is made up of how many cerebral hemisphere?
(a) 1 (b) 2 (c) 3 (d) 4

23. Select the incorrect statement:
(a) Cerebral cortex, greyish in appearance thrown into prominent folds known as sulci and gyri.
(b) Concentrated neuron cell body gives grey color to the cerebral cortex.
(c) Fibres of the tract, covered with myelin sheath, constitute inner part of cerebral hemisphere.
(d) Cerebrum is wrapped around the structure called medulla.

24. Cerebral cortex contains
(a) Sensory area (b) Motor area
(c) Large association area (d) All of these

25. The association area in cerebral cortex is responsible for
(a) Inter sensory association (b) Memory
(c) Communication (d) All of these

26. The major coordinating centre for sensory and motor signaling is
(a) Thalamus (b) Hypothalamus (c) Medulla (d) Pons

27. Hypothalamus contain the brain centre which controls the
(a) Body temperature (b) Urge for eating
(c) Urge for drinking (d) All of these

28. Which of the following is true about hypothalamus?
(a) Situated at the base of thalamus
(b) Contains neurosecretory cell
(c) It contains the centre for thermoregulation
(d) All of these

29. Limbic system consists of
(a) Amygdala (b) Hippocampus (c) Both (a) and (b) (d) None of these

30. The part of brain located between the thalamus, hypothalamus of fore brain and pons is known as
(a) Mid-brain (b) Hind-brain (c) Limbic system (d) All of these

31. Which of the following is true about midbrain?
(a) A canal called cerebral aqueduct passes through the mid-brain.
(b) The dorsal portion of mid-brain consists of four round swelling called corpora quadrigemina.
(c) It forms the part of brain stem.
(d) All the above

32. The hind-brain consists of
(a) Pons (b) Medulla oblongata
(c) Cerebellum (d) All of these

33. Hypothalamus controls
(a) Body's thermostat (b) Respiration
(c) Gastric secretions (d) All of these

34. Limbic system controls
(a) Sexual behaviour (b) Motivation
(c) Affection (d) All of these

35. Corpora quadrigemina are present on _____ portion of Mesencephalon (midbrain).
(a) Anterior (b) Dorsal (c) Ventral (d) Lateral

36. Which of the following is false about hind-brain?
(a) Pons, a part of it consist of fibre tracts that interconnects different regions of brain.
(b) The cerebellum part of it has very convoluted surface to accommodate many neurons.
(c) Medulla of this part is connected to the spinal cord.
(d) The hind-brain is known for regular excitement, pleasure, rag and fear.

37. Medulla contains the centre for
(a) Respiration (b) Cardiovascular reflex
(c) Gastric Secretion (d) All of these

38. Which of the following consists of fibre tracts interconnecting the different regions of brain?
(a) Cerebellum (b) Pons varoli (c) Medulla (d) All of these

39. Which of the following helps in the regulation of respiration?
(a) Medulla (b) Cerebral cortex (c) Pons (d) Both (a) and (c)

40. Reflex action is under
(a) CNS (b) Spiral cord
(c) Peripheral Nervous Stimulation (d) Voluntary response

41. The dorsal nerve root ganglion is
(a) Bipolar (b) Unipolar (c) Pseudounipolar (d) Multipolar

42. In spiral cord of humans, the grey matter is _____ shaped.
(a) Circular (b) Irregular (c) Butterfly (d) None of these

43. White matter is _____ in brain and _____ in spiral cord (in case of humans)
(a) Outside, inside (b) In, out (c) In, in (d) Out, out

44. Resting axonal membrane is
(a) Unpolarized (b) Unpolarized and more permeable to K^+
(c) Polarized and more permeable to Na^+ (d) Polarized and more permeable to K^+

45. Na/K pumps transports
(a) $3Na^+$ out for $2K^+$ in (b) $3Na^+$ in for $2K^+$ out
(c) $2Na^+$ out for $3K^+$ in (d) $2Na^+$ in for $3K^+$ out

46. Which of the following is true about neural membrane?
(a) Different type of ion channels present.
(b) Ion channels are selectively permeable.
(c) Impermeable to negatively charged protein present in axoplasm.
(d) All the above

47. Axoplasm have (polarized)
(a) High K^+ ion (b) Low Na^+ ion
(c) Negatively charged proteins (d) All of these

48. The electrical potential difference across the resting plasma membrane is called as
(a) Spike potential (b) Action potential
(c) Resting potential (d) All of these

49. Depolarization occurs due to
(a) Influx of Na^+ (b) Eflux of Na^+ (c) Influx of K^+ (d) Eflux of K^+

50. The correct sequence for depolarization and repolarization is
(A) Stimulus applied at a site on polarized membrane
(B) Increase the permeability for Na^+
(C) Generation of A.P.(Action Potential)
(D) Increase the permeability for K^+
(E) Restoration of membrane potential
(a) $A \rightarrow B \rightarrow C \rightarrow D \rightarrow E$ (b) $B \rightarrow A \rightarrow C \rightarrow D \rightarrow E$
(c) $A \rightarrow D \rightarrow C \rightarrow B \rightarrow E$ (d) $A \rightarrow B \rightarrow D \rightarrow C \rightarrow E$

51. Unidirectional transmission of the nerve impulse is maintained by
(a) Interneurons (b) Myelin sheath
(c) Synapse (d) Membrane polarity

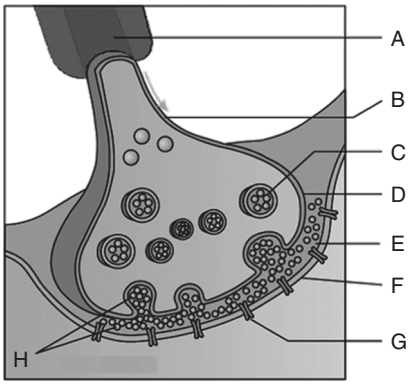
52. Select the total number of true statements from the following.
1) There are two types of synapses, namely electrical synapses and chemical synapses.
2) Electrical synapses are rare in our system.
3) At chemical synapse, the membranes of pre- and post-synaptic neuron are in very close proximity.
4) Transmission of an impulse across electrical synapses is very similar to impulse conduction along a single axon.
5) At a chemical synapse, the membrane of the pre- and post-synaptic neurons are separated by a fluid-filled space called synaptic cleft.
(a) 2 (b) 3 (c) 4 (d) 5

53. Chemicals called _____ are involved in the transmission of impulses at chemical synapse.
(a) Neurohormones (b) Neurotransmitters
(c) Receptors (d) Interferon

54. Which element ion helps in releasing Ach at synaptic cleft?
(a) Na^+ (b) K^+ (c) Ca^{+2} (d) PO_4^{3-}

55. The new potential developed on post-synaptic membrane is
(a) Excitatory always
(b) Inhibitory always
(c) May be excitatory or inhibitory
(d) Neither excitatory nor inhibitory

56. Identify A to H in the given figure.



(a) A—Neurotransmitters, B—Pre-synaptic membrane, C—Receptors, D—Axon, E—Synaptic vesicles, F—Axon terminal, G—Synaptic cleft, H—Post-synaptic membrane
(b) A—Axon, B—Axon terminal, C—Synaptic vesicles, D—Pre-synaptic membrane, E—Synaptic cleft, F—Post-synaptic membrane, G—receptors, H—Neurotransmitters
(c) A—Receptors, B—Post-synaptic membrane, C—Pre-synaptic membrane, D—Axon terminal, E—Neurotransmitters, F—Synaptic cleft, G—Synaptic vesicles, H—Axon
(d) A—Axon terminal, B—Neurotransmitters, C—Synaptic vesicles, D—Axon, E—Pre-synaptic membrane, F—Post-synaptic membrane, G—Synaptic vesicles, H—Synaptic cleft

57. Reflex action
(a) Occurs involuntarily
(b) Requires the involvement of CNS
(c) Protective
(d) All of these

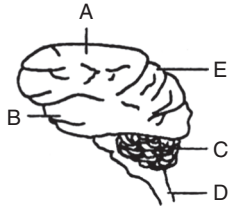
58. Smallest reflex consists of
(a) Afferent neuron (Receptor)
(b) Efferent neuron (effector or excitor)
(c) Both (a) and (b)
(d) None of these

59. In reflex action, the reflex arc is formed by
(a) Muscle, receptor, brain
(b) Brain, spinal cord, muscle
(c) Receptor, spinal cord, muscle
(d) Receptor, muscle, spinal cord

60. Which of the following are due to reflex action?
(a) Vomiting
(b) Sneezing
(c) Coughing
(d) All of these

61. Which of the following are example of reflexes?
(a) Knee-jerk reflex
(b) Corneal reflex
(c) Papillary reflex
(d) All of these

62. In the diagram of the lateral view of the human brain, the parts are indicated by alphabets. Choose the answer in which these alphabets have been correctly matched with the parts which they indicate?



(a) A–Temporal lobe, B–Parietal lobe, C–Cerebellum, D–Medulla oblongata, E–Frontal lobe
(b) A–Frontal lobe, B–Temporal lobe, C–Cerebrum, D–Medulla oblongata, E–Occipital lobe
(c) A–Temporal lobe, B–Parietal lobe, C–Cerebrum, D–Medulla oblongata, E–Frontal lobe
(d) A–Frontal lobe, B–Temporal lobe, C–Cerebellum, D–Medulla oblongata, E–Occipital lobe

63. The site for processing of vision, hearing, speech, memory, intelligence, emotions and thoughts is
(a) Brain (b) Hear
(c) Lungs (d) Kidney

64. Eyes are located in
(a) Eye orbits (b) Depression in sphenoid bone
(c) Both (a) and (b) (d) None of these

65. Choroid is blue due to _____
(a) Lack of O_2 in tissues (b) Due to pigment
(c) Excess of blood vessels (d) None of these

66. Choroid thickens anteriorly to form
(a) Iris (b) Ciliary body
(c) Suspensory ligaments (d) None of these

67. The diameter of pupil is regulated by
(a) Lens (b) Ciliary muscles
(c) Muscles of iris (d) All of these

68. Cells located in retina are
(a) Photoreceptor cells (b) Bipolar cell
(c) Ganglion cells (d) All of these

69. Layers in the wall of eyeballs from inside outwards are
(a) Retina, choroid, sclerotic (b) Sclerotic, choroid, retina
(c) Choroid, retina, sclerotic (d) Choroid, sclerotic, retina

70. Which layer of an eyeball wall contains abundant blood vessels?
(a) Lens (b) Retina (c) Choroid (d) Sclerotic

71. Iris is a part of
(a) Choroid only (b) Retina only
(c) Sclera and choroid (d) Choroid and retina

72. The size of aperture of the pupil of one eye is controlled by
(a) Iris (b) Retina (c) Cornea (d) Conjunctiva

73. Eye lens of a man is
(a) Biconcave (b) Biconvex (c) Concave (d) Convex

74. Cornea is a transparent part of
(a) Choroid (b) Sclera (c) Conjunctiva (d) Retina

75. The second layer of the eyeball is called
(a) Choroid (b) Retina (c) Cornea (d) Sclera

76. The iris of the eye is an extension of
(a) Cornea (b) Sclerotic (c) Retina (d) Choroid

77. The suspensory ligament (Zonule of Zinn) is a part of
(a) Tongue (b) Brain (c) Heart (d) Eye

78. The choroid layer is thin over the _____ of the eye ball
(a) Anterior two-third (b) Posterior two-third
(c) Lateral two-third (d) Posterior one-third

79. Find out the incorrect statement:
(a) Lens is a transparent and crystalline structure.
(b) Iris is pigmented and opaque layer.
(c) The aperture surrounded by iris is called pupil.
(d) Twilight vision is the function of cones.

80. Aqueous humor is present
(a) In front of the retina (b) In front of cornea
(c) Behind the conjunctiva (d) In front of lens

81. Retinal cells involved in colour vision are
(a) Cones (b) Rods (c) Neurons (d) Neuroglial cells

82. Which of the following is not a basic colour in trichromatic vision?
(a) Red (b) Yellow (c) Green (d) Blue

83. Anterior chamber of the eye is the space between
(a) Cornea and lens (b) Cornea and iris (c) Lens and retina (d) Lens and iris

84. Which of the following passes from lens to blindspot?
(a) Eustachian canal (b) Canal of Schlemm
(c) Hyaloid canal (d) Semicircular canal

85. Colour vision in man is
(a) Trichromatic (b) Bichromatic (c) Monochromatic (d) Achromatic

86. Quantum of light entering the eye through the pupil is dependent on
(a) Ciliary body (b) Lens (c) Retina (d) Iris

87. Rhodopsin is a constituent of
(a) Choroid (b) Sclera (c) Cornea (d) None

88. In nocturnal birds, the retina mostly contains
(a) Cones (b) Rods
(c) Both in equal numbers (d) None of these

89. Macula lutea is located
(a) In the middle of retina (b) Below lens
(c) Below pupil (d) At posterior polylateral to blind spot

90. Photopic vision is associated with
(a) Rods (b) Cones (c) Both (a) and (b) (d) None of these

91. Retina is the most sensitive at
(a) Optic disc (b) Periphery (c) Macula lutea (d) Fovea centralis

92. The aperture controlling light passage in the eye is
(a) Pupil (b) Sclerotic (c) Blindspot (d) Iris

93. The space between cornea and lens is
(a) Aqueous chamber (b) Vitreous chamber
(c) Canal of Schlemm (d) Fovea centralis

94. Cones are sensitive to
(a) Dim light only (b) Bright light only
(c) Both dim and bright light (d) None of these

95. Colour is perceived by
(a) Rods in retina (b) Cones in retina
(c) Corneal-lens complex (d) Lens

96. Rhodopsin (visual purple) of the eye will require
(a) Guava (b) Carrot (c) Mango (d) Wheat

97. Area of the most acute vision in the eye where sharp and bright image formed is
(a) Yellow spot (b) Blindspot (c) Pupil (d) Lens

98. An area of the retina which does not have rods or cones are
(a) Red spot (b) Blue spot (c) Blind spot (d) Black spot

99. Vitamin A combines with a protein in the retina to produce
(a) Glaucoma (b) Night blindness
(c) Rhodopsin (d) Colour blindness

100. The fovea is a _____ portion of the _____
(a) Thick-out, sclera (b) Thin-out, choroid
(c) Thin-out, retina (d) Thick-out, retina

101. When all three types of cones are stimulated equally, a sensation of _____ light is produced?
(a) Black (b) White
(c) Blue (d) Green

102. Select the incorrect matching:

	Part		Function
(a)	Optic nerve	–	Carry impulse to visual cortex
(b)	Cones	–	Colour vision
(c)	Cornea and lens	–	Focusing of light on retina
(d)	Pupil	–	Generate action potential

103. Vitreous chamber is filled with
(a) Transparent sol called vitreous humour
(b) Transparent gel called vitreous humour
(c) Opaque sol called vitreous humour
(d) Opaque gel called vitreous humour

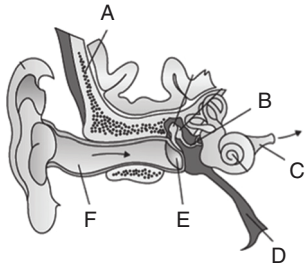
104. Select the incorrect statement from the following:
(a) Rhodopsin is also known as visual purple.
(b) Rods contain a purplish-red protein, which in turn contains the derivative of Vitamin A.
(c) In human eye three type of cones are present.
(d) At fovea of retina, the resolution (visual acuity) is minimum.

105. The location at which Optic nerve leaves the eye balls is
(a) Slightly below the posterior pole of eye ball
(b) Slightly above the posterior pole of eye ball
(c) Anterior pole of eye ball
(d) Macula lutea

106. Arrange the following steps of mechanism of vision in order.
(1) Light induces dissociation of the retinal from opsin.
(2) Change in the structure of opsin.
(3) Change in membrane permeability.
(4) Potential differences are generated in photoreceptor cells.
(5) Generation of AP is ganglion cell through bipolar cells.
(6) AP is transmitted via optic nerve to visual cortex.
(7) At visual cortex, nerve impulses are analysed and the image formed on retina is recognized based on the earlier memory and experience.
(8) Focusing of visible light on retina.
(a) 8,1,2,3,4,5,6,7
(b) 8,1,7,2,6,3,5,4
(c) 1,2,3,4,5,6,7,8
(d) 8,7,6,5,4,3,2,1

107. Ear performs which of the following sensory functions?
(A) Vision
(B) Olfaction
(C) Hearing
(D) Maintenance of body balance
(a) A, B, C
(b) B and C Only
(c) C and D Only
(d) C Only

108. Identify A to F in the given figure.



(a) A–Cochlear nerve, B–Incus, C–Eustachian tube, D–Cochlea, E–External auditory canal, F–Tympanic membrane
(b) A–External auditory canal, B–Eustachian tube, C–Temporal bone, D–Steps in oval window, E–Tympanic membrane, F–Cochlear nerve
(c) A–Cochlea, B–Tympanic membrane, C–Incus, D–Cochlear nerve, E–Eustachian tube, F–External auditory canal
(d) A–Temporal bone, B–Steps in oval window, C–Cochlear nerve, D–Eustachian tube, E–Tympanic membrane, F–External auditory canal

109. Anatomically the ear can be divided into how many major sections?
(a) 1 (b) 2 (c) 3 (d) 4

110. Ear is divided into
(a) Outer ear (b) Middle ear (c) Inner ear (d) All of these

111. Tympanic membrane consists of
(a) Skin on outside (b) Connective tissue in middle part
(c) Mucus membrane on inside (d) All of these

112. The _____ is attached to the tympanic membrane and the _____ is attached to the oval window of the cochlea.
(a) Malleus, Incus (b) Incus, Stapes (c) Malleus, Stapes (d) Stapes, Malleus

113. Select the incorrect statement:
(a) Eustachian tube connects the middle ear cavity with the pharynx.
(b) The eustachian tube helps in equalizing the pressure on either sides of ear drum.
(c) Oval window is a part of cochlea.
(d) The ear ossicle decreases the efficiency of transmission of sound waves to the inner ear.

114. Select the correct matching:
(a) Inner ear ossicle → Malleus, incus and stapes
(b) Scala media → Filled with perilymph
(c) Fluid filled inner ear → Labyrinth
(d) Bony labyrinth → Surrounded by tympanic membrane

115. Inner ear contains all except
(a) Reissner's membrane (b) Basilar membrane
(c) Cochlea (d) Stapes

116. Select the total number of true statement from the following:
(1) Scala vestibuli ends at the oval window.
(2) Scala tympani terminates at round window.
(3) Vestibular apparatus is located above cochlea.
(4) Otolith organ consists of saccule and utricle.
(a) 1 (b) 2 (c) 3 (d) 4

117. Vestibular apparatus consists of
(a) Three semicircular canal (b) Saccule
(c) Utricle (d) All of these

118. Specific receptors of the vestibular apparatus responsible for the maintenance of balance of the body and posture is
(a) Macula (b) Crista (c) Organ of corti (d) Both (a) and (b)

119. Each semicircular canal lies in a different plane at _____ angle to each other.
(a) 45^o (b) 60^o (c) 90^o (d) 120^o

120. In man the receptors stimulated by sound waves are
(a) Organ of corti (b) Semicircular canal
(c) Utriculus (d) Sacculus

121. Scala vestibuli is connected with
(a) Scala media (b) Fenestra ovalis
(c) Scala tympani (d) Fenestra rotundus

122. The cochlea of mammalian internal ear is concerned with
(a) Hearing
(b) Balance of body posture
(c) Both (a) and (b)
(d) Perception changes of atmospheric pressure

123. Identify the correct sequence of organs/regions in the organization of human ear as an auditory mechanoreceptor organ.
(a) Pinna–Cochlea–Tympanic membrane–Auditory canal–Malleus–Stapes–Incus–Auditory nerve
(b) Pinna–Auditory canal–Tympanic membrane–Malleus–Incus–Stapes–Cochlea–Auditory nerve
(c) Pinna–Tympanic membrane–Auditory canal–Incus–Malleus–Stapes–Cochlea–Auditory nerve
(d) Pinna–Malleus–Incus–Stapes–Auditory canal–Tympanic membrane–Cochlea–Auditory nerve

124. Internal ear is filled with
(a) Perilymph (b) Endolymph (c) Lymph (d) Both (a) and (b)

125. Reissner's membrane is found in
(a) Cochlea of mammal (b) Eye of mammal
(c) Heart of mammal (d) Nasal duct of mammal

126. In the internal ear, the organ of Corti which bears hair cells is located in
(a) Sacculus (b) Scala media (c) Scala tympani (d) Scala vestibuli

127. Equilibrium of the body is maintained by
(a) Sacculus and cochlea (b) Semicircular canals and utriculus
(c) Eustachian tube (d) Ear ossicles

128. Which of the following senses is affected if the tectorial membrane is removed from human?
(a) Balance (b) Hearing (c) Vision (d) Smell

129. Malleus (hammer shape), incus (anvil shape) and stapes (stirrup shape) are present in
(a) Internal ear of frog (b) Middle ear of human
(c) Eye of rabbit (d) Eye of frog

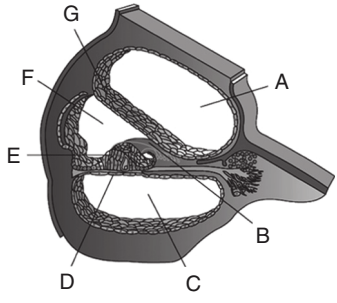
130. The waxy substance that coats the surface of auditory canal is produced by
(a) Harderian glands (b) Meibomian glands
(c) Zeis glands (d) Ceruminous glands (sebaceous gland)

131. Macula in man are present in
(a) Semicircular canals (b) Utriculus
(c) Sacculus (d) Both utriculus and sacculus

132. Which of the following parts in your body is concerned with the sense of balance?
(a) Eustachian tube (b) Cochlea
(c) Eardrum (d) Semicircular canals

133. The fluid present in the semicircular canals of the internal ear of human is
(a) Endolymph (b) Perilymph (c) Lymph (d) Coelomic fluid

134. Identify A, B, C, D, E, F and G in the given figure.



(a) A–Scala vestibuli, B–Tectorial membrane, C–Scala tympani, D–Basilar membrane, E–Organ of corti, F–Scala media, G–Reissner's membrane
(b) A–Scala tympani, B–Reissner's membrane, C–Scala vestibuli, D–Basilar membrane, E–Scala media, F–Organ of corti, G–Tectorial membrane
(c) A–Reissner's membrane, B–Tectorial membrane, C–Scala media, D–Organ of corti, E–Scala vestibuli, F–Scala tympani, G–Basilar membrane
(d) A–Tectorial membrane, B–Scala tympani, C–Reissner's membrane, D–Basilar membrane, E–Scala vestibuli, F–Scala vestibuli, G–Organ of corti

135. Which one of the following is not a part of ear?
(a) Eustachian tube (b) Cone cell
(c) Utriculus (d) Sacculus

136. The base of semicircular canals is swollen and is called _____ which contain a projecting ridges called _____ which ahs hair cells.
(a) Papilla, macula ampullaris (b) Ampulla, crista ampullaris
(c) Ampulla, macula ampullaris (d) Macula, crista ampullaris

137. Otolith organ consist of
(a) Saccule (b) Utricle
(c) Semicircular canal (d) Both (a) and (c)

138. Select the correct statement:
(a) Neural system co-ordinates and integrates functions as well as metabolic and homeostatic activities of all organs
(b) Chemical involved in the transmission of impulse at chemical synapses are always proteins
(c) The electrical potential difference across the resting neural membrane is called the action potential
(d) Organ of Corti influenced by gravity and movement and helps in maintaining balance of the body and posture

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

139. **Assertion:** The sensation of different colours are produced by various combinations of five types of cones found in our eyes.
Reason: Cones are responsible for vision in dim light.

140. **Assertion:** Nerve impulse can never be transmitted from dendrite or cell body of one neuron to the axon of the next neuron, across a synapse.
Reason: This happens because of the synaptic delay at each synapse.

141. **Assertion:** After hearing a sound, the nerve impulse passes from neurons to the brain.
Reason: The neurons which pass nerve impulses from the body organ to the brain is called afferent neuron.

142. **Assertion:** Cerebrospinal fluid is present throughout the central nervous system.
Reason: CSF has no function.

143. **Assertion:** The cerebellum has very convoluted surface.
Reason: It provides additional space for many more neurons.

144. **Assertion:** Some areas of the brain and spinal cord look white.
Reason: This is because cell bodies of neurons are situated in those areas.

145. **Assertion:** Motor neuron terminates on a motor end plate at the neuromuscular junction.
Reason: Motor endplate acts as receptor for detecting changes in the muscle fibres.

146. **Assertion:** Crista and macula are the specific receptors of vestibular apparatus responsible for the maintenance of balance of the body and posture.
Reason: Cochlea helps in hearing.

147. **Assertion:** Spinal cord has a column of both grey and white matter.
Reason: Grey matter forms the central spinal canal.

148. **Assertion:** All motor neurons are efferent neurons.
Reason: Motor neurons conduct nerve impulses from the spinal cord to the brain.

149. **Assertion:** The chemical stored in the synaptic vesicles are termed as neurotransmitters.
Reason: Synaptic vesicles release these chemicals in the synaptic cleft.

150. **Assertion:** Medulla oblongata causes reflex actions like vomiting, coughing and sneezing.
Reason: It has many nerve cells which controls autonomic reflexes.

151. **Assertion:** Transmission of the nerve impulse across a synapse is accomplished by neurotransmitters.
Reason: Transmission across a synapse usually requires neurotransmitters because there is small space, i.e., synaptic cleft, that separates one neuron from another.

152. **Assertion:** The place in retina from which the optic nerve leaves is known as blind spot.
Reason: Because this place is devoid of photoreceptor cells.

153. **Assertion:** Cornea transplants are successful.
Reason: Cornea is avascular and so there is no reaction of immune system.

154. **Assertion:** Owl can see at night.
Reason: They possess a large number of rods and few cones in their retina.

155. **Assertion:** Vitamin – A deficiency produce night blindness.
Reason: Vitamin – A forms retinal, a component of visual pigments in rods and cones.

156. **Assertion:** Surface of cerebrum is highly folded.
Reason: To increase the area for having more neurons.

157. **Assertion:** Person fails to hear by destroying temporal lobe.
Reason: Temporal lobe having auditory area.

158. **Assertion:** Conditioned reflex requires previous experience.
Reason: It is controlled by cerebrum initially.

159. **Assertion:** In a myelinated nerve fibre the impulse jumps from one node of Ranvier to the other.
Reason: Exchange of ions takes place only at node of Ranvier.

160. **Assertion:** No image is formed at the exit of optic nerve.
Reason: It lacks the receptor cells and is insensitive to light.

161. **Assertion:** Unmyelinated fibres are without myelin sheath.
Reason: Schwann cells are absent in unmyelinated fibres.

162. **Assertion:** Ionic gradient is present across the resting membrane in nerve fibre.
Reason: It is due to active transport of ion by sodium and potassium pump.

163. **Assertion:** Hypothalamus is called thermostat of body.
Reason: Hypothalamus contain centre for thermoregulation.

164. **Assertion:** Cerebral cortex is referred as the white matter.
Reason: It is due to its whitish appearance.

165. **Assertion:** We can equalise pressure on either side of ear drum.
Reason: Eustachian tube connects inner ear with pharynx.

166. **Assertion:** Impulse transmission across an electrical synapse is always faster than that across a chemical synapse.
Reason: At electrical synapses, the membranes of pre- and post-synaptic neurons are in very close proximity.

PREVIOUS YEAR QUESTIONS

1. Select the answer with correct matching of the structure, its location and function.

[A: Structure, B: Location, C: Function]

[AIPMT MAINS 2010]

Structure	Location	Function
(a) Eustachian tube	Anterior part of internal ear	Equalizes air pressure on either sides of tympanic membrane.
(b) Cerebellum	Mid-brain	Controls respiration and gastric secretions.
(c) Hypothalamus	Fore-brain	Controls body temperature, urge for eating and drinking.
(d) Blind spot	Near the place where optic nerve leaves the eye	Rods and cones are present but inactive here.

2. The nerve centres which control the body temperature and the urge for eating are contained in [AIPMT PRE 2010]

(a) Hypothalamus (b) Pons
(c) Cerebellum (d) Thalamus

3. The purplish red pigment rhodopsin contained in the rods type of photoreceptor cells of the human eyes is a derivative of [AIPMT PRE 2011]

(a) Vitamin C (b) Vitamin D
(c) Vitamin A (d) Vitamin B

4. When a neuron is in a resting state, i.e., not conducting any impulse, the axonal membrane is [AIPMT PRE 2011]

(a) Equally permeable to both Na^+ and K^+ ions.
(b) Impermeable to both Na^+ and K^+ ions.
(c) Comparatively more permeable to K^+ ions and nearly impermeable to Na^+ ions.
(d) Comparatively more permeable to Na^+ ions and nearly impermeable to K^+ ions.

5. The human hind-brain comprises three parts, one of which is

[AIPMT PRE 2012]

(a) Spinal cord
(b) Corpus callosum
(c) Cerebellum
(d) Hypothalamus

6. Which part of the human ear plays no role in hearing as such but is otherwise very much required?

[AIPMT PRE 2012]

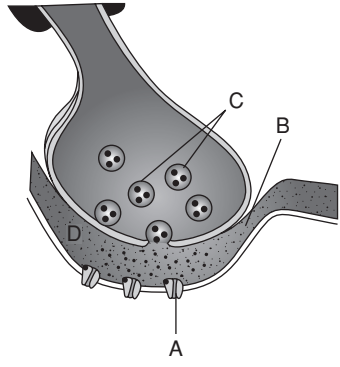
(a) Eustachian tube
(b) Organ of Corti
(c) Vestibular apparatus
(d) Ear ossicles

7. A person entering an empty room suddenly finds a snake right in front of the opening of door. Which one of the following is likely to happen in his neuro-hormonal control system?

[AIPMT PRE 2012]

(a) Sympathetic nervous system is activated releasing epinephrine and norepinephrin efrom adrenal medulla.
(b) Neurotransmitters diffuse rapidly across the cleft and transmit a nerve impulse.
(c) Hypothalamus activates the parasympathetic division of brain.
(d) Sympathetic nervous system is activated releasing epinephrine and the system is activated releasing epinephrine and norepinephrine from adrenal cortex.

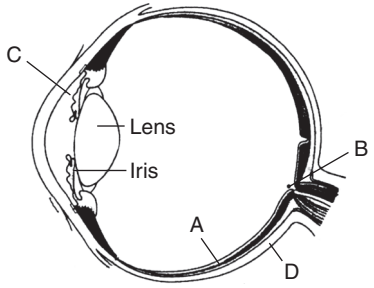
8. A diagram showing axon terminal and synapse is given. Identify correctly at least two of A to D.



[AIPMT 2013]

(a) A – Receptor C – Synaptic vesicles
(b) B – Synaptic connections D – K^+
(c) A – Neurotransmitter B – Synaptic cleft
(d) C – Neurotransmitter D – Ca^{++}

9. The parts A, B, C and D of the human eye are shown in the diagram. Select the option which gives the correct identification along with its function/characteristics.



[AIPMT 2013]

(a) A – Retina – Contains photoreceptors rods and cones
(b) B – Blind spot – Has only a few rods and cones
(c) C – Aqueous chamber – Reflects the light which does not pass through the lens
(d) D – Choroid – Its anterior part forms ciliary body

10. Injury localized to the hypothalamus would most likely disrupt the

[AIPMT 2014]

(a) Short-term memory
(b) Coordination during locomotion
(c) Executive functions, such as decision making
(d) Regulation of body temperature

11. Which one of the following statements is not correct?

[AIPMT 2014]

(a) Retinal is the light absorbing portion of visual photo pigments.
(b) In retina the rods have the photopigment rhodopsin while cones have three different photopigments.
(c) Retinal is a derivative of Vitamin C.
(d) Rhodopsin is the purplish red protein present in rods only.

12. Which of the following regions of the brain is incorrectly paired with its function?

[AIPMT 2015]

(a) Medulla oblongata – Homeostatic control
(b) Cerebellum – Language comprehension
(c) Corpus callosum – Communication between the left and right cerebral cortices
(d) Cerebrum – Calculation and contemplation

13. A gymnast is able to balance his body upside down even in the total darkness because of

[AIPMT 2015]

(a) Cochlea
(b) Vestibular apparatus
(c) Tectorial membrane
(d) Organ of corti

14. In mammalian eye, the 'fovea' is the centre of the visual field, where

[RE-AIPMT 2015]

(a) The optic nerve leaves the eye
(b) Only rods are present
(c) More rods than cones are found
(d) High density of cones occur, but has no rods

15. Destruction of the anterior horn cells of the spinal cord would result in loss of [RE-AIPMT 2015]
(a) Voluntary motor impulse (b) Commissural impulses
(c) Integrating impulses (d) Sensory impulses

16. Photosensitive compound in human eye is made up of: [NEET - I, 2016]
(a) Guanosine and Retinol (b) Opsin and Retinal
(c) Opsin and Retinol (d) Transducin and Retinene

17. Choose the correct statement. [NEET - II, 2016]
(a) Meissner's corpuscles are thermoreceptors
(b) Photoreceptors in the human eye are depolarised during darkness and become hyperpolarized in response to the light stimulus
(c) Receptors do not produce graded potentials
(d) Nociceptors respond to changes in pressure

NCERT EXEMPLAR QUESTIONS

1. Chemicals which are released at the synaptic junction are called
(a) Hormones (b) Neurotransmitters
(c) Cerebrospinal fluid (d) Lymph

2. The potential difference across resting membrane is negatively charged. This is due to differential distribution of the following ions.
(a) Na^+ and K^+ ions (b) CO_3^{++} and Cl^- ions
(c) Ca^{++} and Mg^{++} ions (d) Ca^{++} and Cl^- ions

3. Resting membrane potential is maintained by
(a) Hormones (b) Neurotransmitters
(c) Ion pumps (d) None of these

4. The function of our visceral organs is controlled by
(a) Sympathetic and somatic neural system
(b) Sympathetic and parasympathetic neural system
(c) Central and somatic nervous system
(d) None of these

5. Which of the following is not involved in knee-jerk reflex?
(a) Muscle spindle (b) Motor neuron (c) Brain (d) Inter-neurons

6. An area in the brain which is associated with strong emotions is
(a) Cerebral cortex (b) Cerebellum
(c) Limbic system (d) Medulla

7. Mark the vitamin present in Rhodopsin
(a) Vitamin A (b) Vitamin B (c) Vitamin C (d) Vitamin D

8. Human eyeball consists of three layers and it encloses
(a) Lens, iris, optic nerve
(b) Lens, aqueous humour and vitreous humour

(c) Cornea, lens, iris
(d) Cornea, lens, optic nerve

9. Wax gland present in the ear canal is called
(a) Sweat gland (b) Prostate gland
(c) Cowper's gland (d) Sebaceous gland/ceruminous gland

10. The part of internal ear responsible for hearing is
(a) Cochlea (b) Semicircular canal
(c) Utriculus (d) Sacculus

11. The organ of Corti is a structure present in
(a) External ear (b) Middle ear
(c) Semicircular canal (d) Cochlea

12. While travelling to higher altitudes, people can feel pain in the ear and dizziness. Which part, among the following causes such complications?
(a) Cochlea, ear ossicles
(b) Tympanic membrane
(c) Eustachian tube, utricle, saccule and semicircular canals
(d) None of these

Answer Keys

Practice Questions

1. (c)	2. (a)	3. (a)	4. (c)	5. (c)	6. (c)	7. (a)	8. (a)	9. (a)	10. (c)
11. (c)	12. (d)	13. (b)	14. (i) (c) (ii) (a)		15. (a)	16. (c)	17. (c)	18. (b)	19. (d)
20. (b)	21. (d)	22. (b)	23. (d)	24. (d)	25. (d)	26. (a)	27. (d)	28. (d)	29. (c)
30. (a)	31. (d)	32. (d)	33. (a)	34. (d)	35. (b)	36. (d)	37. (d)	38. (b)	39. (d)
40. (c)	41. (c)	42. (c)	43. (b)	44. (d)	45. (a)	46. (d)	47. (d)	48. (c)	49. (a)
50. (a)	51. (c)	52. (c)	53. (b)	54. (c)	55. (c)	56. (b)	57. (d)	58. (c)	59. (c)
60. (d)	61. (d)	62. (d)	63. (a)	64. (c)	65. (c)	66. (b)	67. (d)	68. (d)	69. (a)
70. (c)	71. (a)	72. (a)	73. (b)	74. (b)	75. (a)	76. (d)	77. (d)	78. (b)	79. (d)
80. (d)	81. (a)	82. (b)	83. (b)	84. (c)	85. (a)	86. (d)	87. (d)	88. (b)	89. (d)
90. (b)	91. (d)	92. (a)	93. (a)	94. (b)	95. (b)	96. (b)	97. (a)	98. (c)	99. (c)
100. (c)	101. (b)	102. (d)	103. (b)	104. (d)	105. (b)	106. (a)	107. (c)	108. (d)	109. (c)
110. (d)	111. (d)	112. (c)	113. (d)	114. (c)	115. (d)	116. (d)	117. (d)	118. (d)	119. (c)
120. (a)	121. (c)	122. (a)	123. (b)	124. (d)	125. (a)	126. (b)	127. (b)	128. (b)	129. (b)
130. (d)	131. (d)	132. (d)	133. (a)	134. (a)	135. (b)	136. (b)	137. (d)	138. (a)	

Assertion and Reason Questions

139. (a)	140. (c)	141. (c)	142. (c)	143. (a)	144. (c)	145. (c)	146. (b)	147. (b)	148. (c)
149. (b)	150. (a)	151. (a)	152. (a)	153. (a)	154. (a)	155. (a)	156. (a)	157. (a)	158. (a)
159. (a)	160. (a)	161. (c)	162. (a)	163. (a)	164. (d)	165. (c)	166. (a)		

Previous Year Questions

1. (c)	2. (a)	3. (c)	4. (c)	5. (c)	6. (c)	7. (a)	8. (a)	9. (a)	10. (d)
11. (c)	12. (b)	13. (b)	14. (d)	15. (a)	16. (b)	17. (b)			

NCERT Exemplar Questions

1. (b)	2. (a)	3. (c)	4. (b)	5. (c)	6. (c)	7. (a)	8. (b)	9. (d)	10. (a)
11. (d)	12. (c)								

CHAPTER

22

Chemical Co-ordination and Integration

PRACTICE QUESTIONS

Endocrine Glands and Hormones

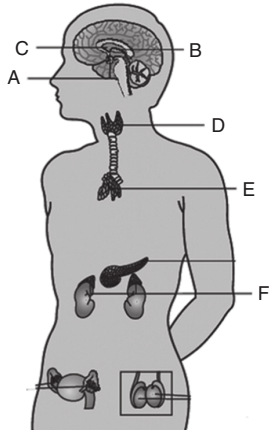
1. Select the incorrect statement from the following:
(a) Neural system provides point to point rapid coordination among organs.
(b) Neural coordination is fast.
(c) Neural coordination is short-lived.
(d) Nerve fibres innervates all the cells of body so cellular function be continuously regulated.

2. Which system jointly coordinates and regulates the physiological functions in the body?
(a) Nervous system
(b) Endocrine system
(c) Both (a) and (b)
(d) Excretory system

3. Hormonal system is very important because
(a) Neural coordination is fast
(b) Nerve fibres do not innervate all the cells of body.
(c) Neural system provides point to point coordination among organs.
(d) Neural coordination is short-lived.

4. Endocrine glands
(a) Are ductless
(b) Secrete hormones
(c) Pour their secretion in blood
(d) All of these

5. Identify A to F in the given figure.



(a) A–Hypothalamus, B–Pineal, C–Thymus, D–Adrenal, E–Pituitary, F–Thyroid and parathyroid
(b) A–Pituitary, B–Pineal, C–Hypothalamus, D–Thyroid and parathyroid, E–Thymus, F–Adrenal
(c) A–Thymus, B–Pituitary, C–Thyroid and parathyroid, D–Pineal, E–Hypothalamus, F–Adrenal
(d) A–Pineal, B–Thyroid and parathyroid, C–Pituitary, D–Hypothalamus, E–Adrenal, F–Pineal

6. Hormones are
(a) Non-nutrient chemicals (b) Intercellular messengers
(c) Produced in traces (d) All of these

7. Select from the following the total number of endocrine glands:
Pituitary, pineal, thyroid, parathyroid, adrenal, pancreas, thymus, gonads
(a) 7 (b) 8 (c) 6 (d) 5

8. The following organs produce hormones except
(a) GIT (b) Liver and kidney
(c) Heart (d) Urinary bladder

9. Hypothalamus contains several groups of neurosecretory cells called _____ which produce hormones.
(a) Ganglion (b) Plexus
(c) Nuclei (d) Astrocytes

10. Hypothalamus is a part of
(a) Forebrain (b) Mid-brain
(c) Hindbrain (d) None of these

11. Hypothalamus is
(a) Roof of diencephalon (b) Basal part of diencephalon
(c) Lateral wall of diencephalon (d) All of these

12. Hypothalamus directly regulates the _____ endocrine gland.
(a) Pituitary (b) Thyroid (c) Thymus (d) Pancreas

13. Releasing hormones and inhibiting hormones are produced by
(a) Pituitary (b) Thyroid (c) Thymus (d) Hypothalamus

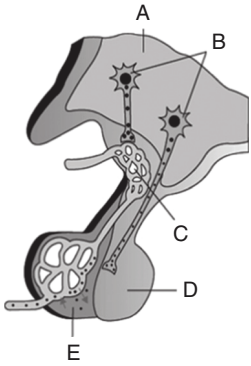
14. *Pars distalis* produces how many trophic hormones?
(a) 4 (b) 5 (c) 6 (d) 8

15. The following hormones are released by hypothalamus except
(a) GnRH (b) Somatostatin
(c) TSH–RH (d) PRL

16. Select the incorrect statement from following:
(a) Invertebrates possess very simple endocrine system.
(b) Anterior pituitary is under control of hypothalamus by portal system.
(c) Posterior pituitary is under direct neural regulation of hypothalamus.
(d) Hypothalamus secretes tropic hormones.

17. Which of the following is incorrect about pituitary?
(a) Located in bony cavity called sella turcica.
(b) Attached to hypothalamus by stalk.
(c) Divided anatomically into adenohypophysis and neurohypophysis.
(d) Secretes released and inhibitory hormones.

18. Identify A to E in the given figure.



(a) A–Hypothalamus, B–Hypothalamic neurons, C–Portal circulation, D–Posterior pituitary, E–Anterior pituitary
(b) Posterior pituitary, B–Hypothalamic neurons, C–Hypothalamus, D–Anterior pituitary, E–Posterior pituitary
(c) A–Anterior pituitary, B–Portal circulation, C–Hypothalamus, D–Posterior pituitary, E–Hypothalamic neurons
(d) A–Hypothalamic neurons, B–Posterior pituitary, C–Anterior pituitary, D–Portal circulation, E–Hypothalamus

19. Adenohypophsyis consists of
(a) *Pars distalis* (b) *Pars intermedia*
(c) *Pars nervosa* (d) Both (a) and (b)

20. Neurohypophysis consist of
(a) *Pars distalis* (b) *Pars intermedia* (c) *Pars nervosa* (d) All of these

21. Which is commonly called anterior pituitary?
(a) *Pars distalis* (b) *Pars intermedia* (c) *Pars nervosa* (d) All of these

22. Which is commonly called posterior pituitary?
(a) *Pars distalis* (b) *Pars intermedia* (c) *Pars nervosa* (d) All of these

23. Which of the following hormones are secreted by pars distalis (find out total numbers)?
GH, PRL, MSH, FSH, LH, TSH, ACTH, ADH
(a) 4 (b) 5 (c) 6 (d) 8

24. Pars intermedia secretes
(a) Follicle stimulating hormone (b) Melanocyte stimulating hormone
(c) Melatonin (d) Prolactin

25. Posterior pituitary stores and release two hormones
(a) Oxytocin (b) Vasopressin (ADH)
(c) Growth hormone (d) Both (a) and (b)

26. Where is oxytocin and ADH synthesized?
(a) Ant pituitary (b) Post pituitary (c) Hypothalamus (d) Thalamus

27. Which of the following hormones regulate the growth of the mammary glands and formation of milk?
(a) GH (b) TSH
(c) Prolactin (PRL) (d) ACTH

28. Which of the hormone stimulates the synthesis and secretion of thyroid hormone?
(a) GH (Growth Hormone) (b) TSH (Thyroid Stimulating Hormone)
(c) PRL (Prolactin) (d) ACTH (Adrenocorticotropic Hormone)

29. Which of the following hormone stimulates the synthesis and secretion of steroid hormones called glucocorticoids from the adrenal cortex?
(a) TSH (b) ACTH (c) LH (d) FSH

30. _____ stimulates the synthesis and secretion of hormone called androgens from testis.
(a) FSH (b) ACTH (c) LH = ICSH (d) GH

31. _____ induces ovulation of fully mature follicle (Graffian follicles) and maintains the corpus luteum, formed from the remnants of the Graffian follicles after ovulation.
(a) FSH (b) ACTH (c) LH (d) GH

32. _____ stimulate growth and development of ovarian follicles in females.
(a) FSH (b) LH (c) PRL (d) TSH

33. Which of the following hormones of anterior pituitary together called gonadotropins?
(a) LH and ACTH (b) FSH and LH (c) TSH and PRL (d) MSH and LH

34. Over-secretion of GH (growth hormone) in child leads to
(a) Dwarfism (b) Cretinism
(c) Gigantism (d) Tetany

35. Low secretion of GH in child leads to
(a) Pituitary dwarfism (b) Gigantism
(c) Cretinism (d) Tetany

36. _____ acts on the smooth muscles of our body and stimulate their contraction.
(a) LH (b) FSH (c) Oxytocin (d) GH

37. In females _____ stimulates a vigorous contraction of uterus at the time of child birth.
(a) LH (b) FSH (c) Oxytocin (d) Relaxin

38. From which part of nephron ADH stimulates reabsorption of water and electrolyte?
(a) PCT (b) HL
(c) Distal tubules (d) Bowman capsule

39. Whoch of the following hormone is known as antidiuretic hormone?
(a) Oxytocin (b) Prolactin
(c) Luteinizing Hormone (d) Vasopressin

40. Diuresis is reduced by
(a) Oxytocin (b) Prolactin
(c) Luteinizing hormone (d) Vasopressin

41. _____ acts on melanocyte (melanin contains cells) and regulates pigmentation of skin.
(a) LH (b) Melatonin (c) FSH (d) TSH

42. Pineal gland is located on
(a) Dorsal side of mid-brain (b) Dorsal side of hindbrain
(c) Dorsal side of forebrain (d) Vertical side of forebrain

43. Pineal gland secretes _____ hormone.
(a) MSH (b) Melatonin (c) FSJ (d) Insulin

44. Melatonin influences
(a) Metabolism, pigmentation (b) Menstrual cycle
(c) Defence capability (d) All of these

45. 24 hour diurnal rhythms of our body is maintained by
(a) Melatonin (b) Glucagon (c) Thymosin (d) Oxytocin

46. Menstruation cycle is affected by the following hormones except
(a) Thyroid (b) Melatonin (c) Oestrogen (d) Oxytocin

47. Thin flap of connective tissue which connects two lobes of thyroid is known as
(a) Lobes (b) Ileum (c) Isthmus (d) Ampulla

48. Which of the following is incorrect about thyroid gland?
(a) It is composed of follicles and stromal tissues.
(b) It secretes tetraiodothyronine or thyroxine (T_4) and triiodothyronine (T_3), TCT.
(c) It consists of 4 lobes.
(d) It is stimulated by the hormone TSH.

49. Enlargement of thyroid gland is called
(a) Hypothyroidism (b) Hyperthyroidism
(c) Goitre (d) Isthmusa

50. The features of cretinism includes
(a) Stunted growth (b) Mental retardation and low IQ
(c) Abnormal skin and deaf mutism (d) All of these

51. Hypothyroidism during pregnancy causes defective development and maturation of growing baby leading to
(a) Addison's disease (b) Cretinism
(c) Creatinine (d) Tetany

52. Hypothyroidism is caused by
(a) Cancer of thyroid gland (b) Development of nodule of thyroid gland
(c) Iodine deficiency (d) Both (a) and (b)

53. Hypothyroidism causes
(a) Irregular menstrual cycle (b) Reduced BMR
(c) Reduced production of RBC (d) All of these

54. Thyroid gland secretes
(a) T_3 (b) T_4 (c) TCT (d) All of these

55. Thyroid controls the metabolism of
(a) Carbohydrates (b) Proteins (c) Lipids (fat) (d) All of these

56. A. Melatonin influences menstrual cycle and our defence capability.
B. In adult women, hypothyroidism may cause menstrual cycle to become irregular.
C. Protein hormone secreted by thyroid, TCT (Thyrocalcitonin) regulates the blood calcium level.
D. Maintenance of water and electrolytes balance is also influenced by thyroid hormone.
E. Oxytocin causes milk ejection from mammary gland.

Select the correct statement:
(a) A, B and C only (b) A, B, C and E only
(c) All except D (d) All statements are correct

57. Which of the following hormones affect Ca^{2+} ion metabolism?
(a) TCT (Thyrocalcitonin) (b) Parathyroid hormone (PTH)
(c) Both (a) and (b) (d) Cortisol

58. The full form of PTH is
(a) Parathyroid hormone (b) Prethyroid hormone
(c) Prothyroid hormone (d) Pretectile hormone

59. PTH is
(a) Protein hormone (b) Peptide hormone
(c) Biogenic amines (d) Steroid

60. The process by which PTH increases blood Ca^{2+} level except
(a) Acts on bones and stimulates the process of bone reabsorption/dissolution/demineralization.
(b) Reabsorption of Ca^{2+} by the renal tubules.
(c) Increases Ca^{2+} absorption from the digested food.
(d) Increases osteoblastic activity.

61. Which of the following is correct about thymus?
(a) Globular structure located on the dorsal side of the heart and aorta.
(b) It plays minor role in the development of the immune system.
(c) The thymus size increases with age.
(d) Thymus doesn't affect the production of antibodies.

62. Thymosin is
(a) Peptide hormone (b) Secreted by pituitary
(c) Helps in RBC production (d) Decreases WBC production

63. Which gland plays major role in the differentiation of T-lymphocyte?
(a) Thyroid (b) Thymus (c) Adrenal (d) Gonads

64. Immune response of old persons are weak because
(a) Thymus is degenerated in old individual (b) Thymus production decreases
(c) Both (a) and (b) (d) None of these

65. The position of adrenal gland is
(a) Anterior part of each kidney (b) Posterior part of each kidney
(c) Ventral part of each kidney (d) Dorsal part of each kidney

66. The term 'Cortex' is used in
(a) Brain (b) Kidney (c) Adrenal gland (d) All of these

67. The adrenal medulla secretes two hormones called adrenaline or epinephrine and nor-adrenaline or nor-epinephrine. These are commonly known as
(a) Steroids (b) Terpenes
(c) Catecholamine (d) Cytokinin

68. Emergency hormone and hormones of fight are
(a) Adrenalin (b) Noradrenaline
(c) Cortisol (d) Both (a) and (b)

69. A. Increase alertness
B. Pupilary constriction
C. Piloerection
D. Increase heart rate
E. Increase respiratory rate
F. Sweating
Which of the above are effects of adrenaline/Noradrenaline?
(a) All except C (b) All except B and F
(c) All except B (d) All except B,E and F

70. Catecholamine causes
(a) Glycogenolysis (b) Proteolysis (c) Lipolysis (d) All of these

71. Glucocorticoid causes all except
(a) Proteolysis (b) Lipolysis
(c) Glycogenolysis (d) Gluconeogenesis

72. Histological adrenal cortex is divided into how many layers?
(a) 1 (b) 2 (c) 3 (d) 4

73. Which of the following layers are present in the adrenal cortex from inner to outer?
(a) Zona reticularis, zona fasciculata, zona glomerulosa
(b) Zona fasciculata, zona glomerulosis, zona reticularis
(c) Zona glomerulosa, zona reticularis, zona fasciculata
(d) Zona glomerulosa, zona fasciculata, zona reticularis

74. The adrenal cortex secretes many hormones commonly called
(a) Catecholamine (b) Peptide
(c) Corticoids (d) All of these

75. In our body the main glucocorticoid is
(a) Adrenaline (b) Aldosterone (c) ADH (d) Cortisol

76. In our body the main mineral corticoid is
(a) Adrenaline (b) Aldosterone (c) ADH (d) Cortisol

77. Which of the following is incorrect about glucocorticoid?
(a) Inhibits cellular uptake and utilization of amino acids.
(b) Maintains cardio vascular system as well as kidney function.
(c) Anti-inflammatory and suppresses the immune response.
(d) Glucocorticoid stimulates gluconeogenesis, lipogenesis and proteolysis.

78. Which of the following are effects of cortisol?
(a) Anti-inflammatory (b) Immunosuppressant
(c) Increases RBC production (d) All of these

79. Aldosterone causes all except
(a) Reabsorption of electrolyte and water from renal tubule
(b) Excretion of K^+
(c) Excretion of PO^{3-}_4 ion
(d) Absorption of K^+

80. Aldosterone helps in the maintenance of
(a) Electrolyte and body fluid volume (b) Osmotic pressure
(c) Blood pressure (d) All of these

81. Androgenic steroids are also secreted by adrenal cortex which causes
(a) Growth of axial hair (b) Growth of pubic hair
(c) Growth of facial hair (d) All of these

82. Adrenal cortex secretes all except
(a) Cortisol (b) Aldosterone
(c) Androgenic steroid (d) Relaxin

83. 1 to 2 million Islets of Langerhans in a human pancreas represents _____ per cent of the pancreatic tissue.
(a) 2–3 (b) 4–6 (c) 10 (d) 1–2

84. Islet of langerhans consists of
(a) ∝–cells (b) β cells (c) δ–cells (d) All of these

85. The following are petide hormones except
(a) Insulin (b) PTH (c) Thymosin (d) T_4

86. A. Acts mainly on liver cells
B. Stimulate glycogenolysis
C. Stimulate gluconeogenesis
D. Reduces glucose uptake and utilization
Which of the following is correct about the action of glucagon from the above statements?
(a) A and B only (b) B and C only (c) A, B and C only (d) All of these

87. Select the incorrect statement:
(a) Insulin and glucagon are peptide hormones.
(b) Insulin acts mainly on hepatocyte and adipocytes and enhance glucose uptake and utilization.
(c) Insulin stimulates glycogenesis.
(d) Glucagon inhibits the process of gluconeogenesis.

88. Following are the functions of insulin except
(a) Glycogenesis
(b) ↑ Glucose utilization by hepatocyte
(c) ↑ Glucose utilization by adipocyte
(d) Gluconeogenesis

89. Diabetes mellitus is characterized by
(a) Ketonuria (b) Glycosuria
(c) Prolonged hyperglycemia (d) All of these

90. Select the correct matching.
(a) Insulin — ↓es the uptake of glucose utilization by hepatocyte and adipocytes
(b) Cortisol — ↓es RBC production, causes inflammation
(c) Thymosin — Promotes the production of antibodies to provide humoral immunity also
(d) Thyroxine — No role in water and electrolyte balance

91. Select the incorrect matching.
(a) Zona fasciculata — Glucocorticoids (b) ∝–cell — Glucagon
(c) β–cell — Insulin (d) Follicular cells of thyroid — TCT

92. Testis act as the
(a) Primary sex organ (b) Endocrine gland
(c) Both (a) and (b) (d) None of these

93. Leydig cells or interstitial cells secretes
(a) Oestrogens (b) Progesterone (c) Testosterone (d) Relaxin

94. Androgens from the following are
(a) Oestrogens (b) Progesterone
(c) Testosterone (d) Relaxin

95. A. Anabolic effect on protein and carbohydrate metabolism.
B. Influences male sexual behaviour (libido).
C. Stimulates spermatogenesis.
D. Muscular growth, aggressiveness, low pitch voice.
Above are the functions of which of the following hormones?
(a) Oestrogens (b) Progesterone (c) Testosterone (d) Relaxin

96. Select the total number of male accessory sex organs from the following:
*Epididymis, Vas deferens, Seminal vesicle, Prostate, Urethra***.**
(a) 2 (b) 3 (c) 4 (d) 5

97. Androgen regulates the _____ of male accessory sex organ.
(a) Development (b) Maturation (c) Function (d) All of these

98. Testis is composed of
(a) Uriniferous tubules (b) Seminiferous tubules
(c) Nephron (d) Neuron

99. Select the correct matching:
(a) Interstitial cells–Testosterone (b) β-cells–Glucagon
(c) ∝-cells–Insulin (d) Follicular cells–TCT

100. Which one is correct about testis in human?
(a) Situated in scrotal sacs (outside the abdomen)
(b) Consists of seminiferous tubule and Leydig cells
(c) Secretion effect of male sexual behaviour (libido)
(d) All of these

Hormones of Heart, Kidney

101. ANF leads to
(a) Dilation of blood vessels
(b) ↓es blood pressure
(c) Both (a) and (b)
(d) ↑es blood pressure

102. Match the column:

Column I (Production Site)		**Column II (Hormones)**
A. Atrial wall	–	1. ANF
B. Thyroid gland	–	2. PTH
C. Parathyroid	–	3. T_3,T_4, TCT
D. GIT	–	4. CCK, GIP, gastrin and secretin

(a) A–2, B–4, C–1, D–3
(b) A–1, B–3, C–2, D–4
(c) A–4, B–2, C–3, D–1
(d) A–4, B–3, C–2, D–1

103. Match the Column:

Hormone		**Function**
A. Gastrin	–	1. Act on exocrine pancreas and stimulates the secretion of water and bicarbonate ion
B. Secretin	–	2. Action both pancrease and gall bladder and stimulates secretion of pancreatic enzyme and bile juice respectively.
C. CCK (Cholesystokinin)	–	3. Acts on gastric gland and stimulates the secretion of HCl and pepsinogen.
D. GIP (Gastric Inhibitory Peptide)	–	4. Inhibits gastric secretion and motility.

(a) A–3, B–1, C–2, D–4
(b) A–1, B–3, C–4, D–2
(c) A–1, B–2, C–3, D–4
(d) A–4, B–3, C–1, D–2

104. The _____ of kidney produces peptide hormone called _____ which stimulate erythropoiesis.
(a) Podocyte, Erythropoietin
(b) JG cells, Erythropoietin
(c) JG cells, Rennin
(d) JG cells, Renin

105. Select the incorrect statement:
(a) GIT secretes four major peptide hormones.
(b) Several other non-endocrine tissues secrete hormones called growth factors.
(c) Hormone receptors are located in target tissues only.
(d) Hormone receptors are non-specific in nature.

106. By which organ the hormones are secreted which are non endocrine gland?
(a) Heart
(b) Kidney
(c) GIT
(d) All of these

107. Select the incorrect matching:
Hormone target organ
(a) Secretin pancreas
(b) CCK pancreas and Gallbladder
(c) ANF atrial wall
(d) Gastrin gastric glands

108. Match the source gland with its respective hormone as well as the function.

Source gland	Hormone	Function
(a) Posterior pituitary	Vasopressin	Stimulates reabsorption of water in the distal tubules in the nephron
(b) Corpus luteum	Oestrogen	Supports pregnancy
(c) Thyroid	Thyroxine	Regulated blood calcium level
(d) Anterior	Oxytocin	Contraction of uterus muscles during child birth

109. Select the total number of peptide hormones from the following:
Erythropoietin, Gastrin, Secretin, GIP, CCK, Insulin, Glucagon, Thymosin, PTH, ANF
(a) 8 (b) 7 (c) 9 (d) 10

110. Match the Column I with Column II:

Column I		**Column II**
A. Peptide, polypeptide protein hormones	–	1. Epinephrine
B. Steroid	–	2. T_3 and T_4 (thyroid hormones)
C. Iodothyronines	–	3. Cortisol, testosterone, estradiol, progesterone, aldosterone
D. Amino acid derivatives	–	4. Pituitary hormones, pancreatic hormones, hypothalamic hormone

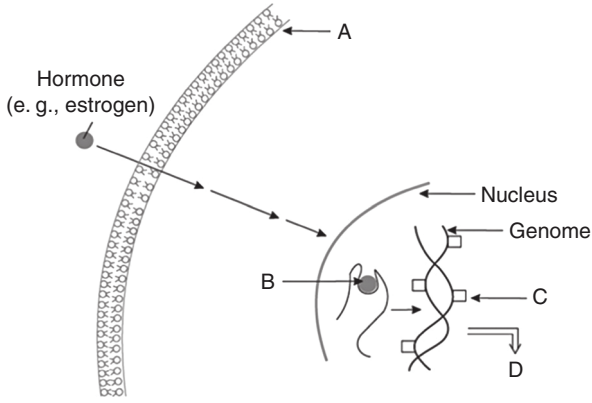
(a) A–1, B–2, C–3, D–4
(b) A–4, B–3, C–2, D–1
(c) A–4, B–3, C–1, D–2
(d) A–1, B–4, C–3, D–2

111. A steroid hormone typically alters the activity of its target cells by
(a) Changing membrane permeability of cells
(b) Entering the cell and altering gene expression
(c) Activation of IP_3
(d) Conversion of ATP to cAMP

112. Hormone receptors are located in target tissue only. Their position is
(a) In plasma membrane
(b) In cytoplasm
(c) In nucleus
(d) Any of the above depending on type of hormone

113. Find out the correct statement from the following:
1) Hormones interact with membrane bound receptors normally do not enter the target cells.
2) Iodothyronines have membrane bound receptors.
3) Hormones which interact with intracellular receptors mostly regulate gene expression.
4) Steroid hormones generate second messengers.
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 2 and 4 only

114. Identify A, B, C and D in the given figure.



(a) A–Physiological response, B–Proteins, C–Receptor-hormone complex, D–Uterine cell membrane
(b) A–Receptor-hormone complex, B–Proteins, C–Uterine cell membrane, D–Physiological response
(c) A–Uterine cell membrane, B–Receptor-hormone complex, C–Proteins, D–Physiological response
(d) A–Proteins, B–Uterine cell membrane, C–Physiological response, D–Receptor-hormone complex

115. Find the total no. of hormones from the following which binds to intracellular receptors.
Cortisol, Testosterone, T3, Glucagon, Oxytocin, FSH, Progesterone, ICSH, Oestrogen, GH
(a) 4 (b) 5 (c) 6 (d) 7

116. Which of the following act as secondary messenger?
(a) Ca^{2+} (b) IP_3 (c) cAMP (d) All 2Ca 3IP

117. Following hormones are iodothyronines
(a) T3 (b) T4 (c) TCT (d) Both (a) and (b)

118. Which is steroid hormone?
(a) GH (b) Insulin
(c) Aldosterone (d) Epinephrine

119. Which of the following hormones do not act by a second messenger system?
(a) GH (b) Epinephrine
(c) ICSH (d) Oestrogen

120. Chemically epinephrine is
(a) Amino acid derivative (b) Peptide hormone
(c) Steroid hormone (d) Iodothyronines

121. Which hormone receptors are present in cytoplasm of target cell?
(a) Thyroxin (b) Oestrogen (c) Insulin (d) All

122. Arrange in sequence, working of 'FSH'?
(1) Binding to membrane receptor
(2) Biochemical response
(3) Generation of second messenger
(4) Physiological response (ev. Ovarian growth)
(a) $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$ (b) $1 \rightarrow 3 \rightarrow 2 \rightarrow 4$
(c) $4 \rightarrow 3 \rightarrow 2 \rightarrow 1$ (d) $3 \rightarrow 1 \rightarrow 4 \rightarrow 2$

123. Which hormone directly affect transcription by acting on gene?
(a) FSH (b) GH (c) Oestrogen (d) CCK

124. Following hormones responsible for maintenance of blood pressure.
(a) Aldosterone (b) Renin (c) ANF (d) All

ASSERTION AND REASON QUESTIONS

*Read the **assertion** and **reason** carefully to mark the correct option out of the options given below:*

(a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
(b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
(c) If the assertion is true but the reason is false.
(d) If both the assertion and reason are false.

125. **Assertion:** Aldosterone increases the volume of blood and other extracellular fluids.
Reason: The secretion of aldosterone is stimulated by a fall in the circulating volume of blood.

126. **Assertion:** FSH is also known as interstitial cell stimulating hormone.
Reason: It is because of the fact that FSH stimulates the interstitial cells of testis.

127. **Assertion:** Oxytocin is also known as Antidiuretic Hormone (ADH).
Reason: Oxytocin can cause an increase in the renal reabsorption of water.

128. **Assertion:** Failure of secretion of thyroid gland hormones from childhood causes cretinism disease.
Reason: Thyrotropin hormone maintains BMR and promotes the growth of body tissues.

129. **Assertion:** Hormones are similar to enzymes in their action and chemical nature.
Reason: Hormones and enzymes are proteinaceous in nature and acts as informational molecules.

130. **Assertion:** Glucagon is said to lower down the blood sugar level.
Reason: Glucagon increases the utilization of glucose in the tissue and the synthesis of liver glycogen.

131. **Assertion:** Prolactin is also called the 'Milk ejection hormone'.
Reason: Prolactin stimulates the smooth muscle contractions of the mammary glands.

132. **Assertion:** A tumor of adrenal cortex may cause addison's disease.
Reason: This happens due to over secretion of cortisol by the tumour.

133. **Assertion:** Neurohypophysis(Pars nervosa) is also known as posterior pitutary.
Reason: Posterior pitutary stores and releases two hormones called oxytocin and vasopressin.

134. **Assertion:** Vasopressin is also known as antidiueretic hormone.
Reason: Vasopressin stimulates the reabsorption of water and electrolyte by distal tubules and there by reduces diuresis.

135. **Assertion:** Enlargement of thyroid gland is known as goitre.
Reason: Goitre occurs due to the deficiency of iodine only.

136. **Assertion:** Immune response of old person becomes weak.
Reason: Thymus is degenerated in old individuals.

137. **Assertion:** Adrenal cortex can be removed without causing death.
Reason: Adrenal cortex is not vital for survival.

138. **Assertion:** Failure of secretion of somatotropin from an early age causes dwarfism in the patient.
Reason: Somatotropin hormone stimulates the body growth and elongation of long bones.

139. **Assertion:** Thyroxine is lipid soluble hormone.
Reason: Receptor for thyroxine is situated in cytoplasm.

140. **Assertion:** Hormones are nutrient substances which act as intercellular messengers.
Reason: Hormones are produced in large amount.

141. **Assertion:** The posterior pituitary is under the direct neural regulation of the hypothalamus.
Reason: Hypothalamic Neuron via axon sent their secretion to posterior pituitary for release.

142. **Assertion:** Over secretion of GH leads to gigantism.
Reason: It leads to abnormal growing body.

143. **Assertion:** Thyroid gland use to regulate blood calcium level.
Reason: Thyroid gland use to secret protein hormone called thyrocalcitonin which affects blood calcium level.

144. **Assertion:** MSH regulates pigmentation of skin.
Reason: MSH acts on melanin containing cells.

145. **Assertion:** Oxytocin is called 'birth hormone'.
Reason: In female it stimulates a vigorous contraction of smooth muscle of uterus at the time of child birth.

146. **Assertion:** Polycythemia is common in hyperthyroidism
Reason: Thyroid hormone accelerate the process of red blood cell formation

147. **Assertion:** PTH increases the Ca^{2+} level in blood
Reason: PTH stimulates the process of bone resorption.

148. **Assertion:** PTH and thyrocalcitonin have antagonistic effect
Reason: PTH increases where as thyrocalcitonin decreases blood

149. **Assertion:** Catecholamine increases the concentration of glucose in blood
Reason: Catecholamine stimulates glycogenolysis

150. **Assertion:** Cortisol is useful in organ transplantation
Reason: Cortisol suppresses immune response

151. **Assertion:** Glucagon is a hypoglycaemic hormone
Reason: Glucagon stimulates glycogenesis

152. **Assertion:** Androgen affects male sexual behaviour (Libido)
Reason: Oestrogen regulates female sexual behaviour

153. **Assertion:** Secretin act on endocrine part of pancreas.
Reason: Secretin stimulates secretion of insulin.

154. **Assertion:** CCK stimulates secretion of bile juice.
Reason: CCK act on liver.

PREVIOUS YEAR QUESTIONS

1. Select the correct matching of a hormone, its source and function.

[AIPMT MAINS 2010]

Hormone	Source	Source
(a) Vasopressin	Posterior pituitary	Increases loss of water through urine
(b) Norepinephrine	Adrenal medulla	Increases heartbeat, rate of respiration and alterness
(c) Glucagon	Beta-cells of islets of Langerhans	Stimulates glycogenolysis
(d) Prolactin	Posterior pituitary	Regulates growth of mammary glands and milk formation in females

2. Injury to adrenal cortex is not likely to affect the secretion of which one of the following?

[AIPMT PRE 2010]

(a) Aldosterone
(b) Both androstenedione and dehydroepiandrosterone
(c) Adrenaline
(d) Cortisol

3. Low Ca^{2+} in the body fluid may be the cause of

[AIPMT PRE 2010]

(a) Tetany (b) Anaemia
(c) Angina pectoris (d) Gout

4. Which one of the following pairs is incorrectly matched?

[AIPMT PRE 2010]

(a) Glucagon – Beta cells (source)
(a) Somatostatin – Delta cells (source)
(b) Corpus luteum – Relaxin (secretion)
(c) Insulin – Diabetes mellitus (disease)

5. The toxic agents present in food which interfere with thyroxin synthesis lead to the development of

[AIPMT PRE 2010]

(a) Toxic goitre
(b) Cretinism
(c) Simple goitre
(d) Thyrotoxicosis

6. Match the source gland with its respective hormone as well as the function.

[AIPMT PRE 2011]

Source gland	Hormone	Function
(a) Posterior pituitary	Vasopressin	Stimulates reabsorption of water in the distal tubules in the nephron
(b) Corpus luteum	Oestrogen	Supports pregnancy
(c) Thyroid	Thyroxine	Regulated blood calcium level
(d) Anterior	Oxytocin	Contraction of uterus muscles during child birth

7. Given ahead is an incomplete table about certain hormones, their source glands and one major effect of each in the human body. Identify the correct option for the three blanks A, B and C.

Gland	Secretion	Effect on body
A	Oestrogen	Maintenance of secondary sexual characters
Alpha cells of islets of Langerhans	B	Raises blood sugar level
Anterior pituitary	C	Over secretion leads to gigantism

[AIPMT PRE 2011]

Options:
(a) A: Placenta, B: Insulin, C: Vasopressin
(b) A: Ovary, B: Insulin, C: Calcitonin
(c) A: Placenta, B: Glucagon, C: Calcitonin
(d) A: Ovary, B: Glucagon, C: Growth hormone

8. The 24 hours (diurnal) rhythm of our body such as the sleep-wake cycle is regulated by the hormone

[AIPMT MAINS 2011]

(a) Calcitonin
(b) Prolactin
(c) Adrenaline
(d) Melatonin

9. The Leydig cells which are found in the human body are the secretory source of
[AIPMT PRE 2012]

(a) Progesterone
(b) Intestinal mucus
(c) Glucagon
(d) Androgens

10. Which one of the following pairs of hormones are the examples of those that can easily pass through cell membrane and the target cell and binds to a receptor inside it (mostly in the nucleus)?
[AIPMT PRE 2012]

(a) Insulin, glucagon
(b) Thyroxin, insulin
(c) Somatostatin, oxytocin
(d) Cortisol, testosterone

11. What is correct to say about the hormone action in humans?
[AIPMT PRE 2012]

(a) Glucagon is secreted by β-cells of islets of Langerhans and stimulates glycogenolysis.
(b) Secretion of thymosins is stimulated with aging.
(c) In females, FSH first binds with specific receptors on ovarian cell membrane.
(d) FHS stimulates the secretion of oestrogen and progesterone.

12. Which of the following statements is correct in relation to the endocrine system?
[AIPMT 2013]

(a) Adenopophysis is under direct neural regulation of the hypothalamus.
(b) Organs in the body like gastrointestinal tract, heart, kidney and liver do not produce any hormones.
(c) Non-nutrient chemicals produced by the body in trace amount that act as intercellular messenger are known as hormones.
(d) Releasing and inhibitory hormones are produced by the pituitary gland

13. A pregnant female delivers a baby who suffers from stunted growth, mental retardation, low intelligence quotient and abnormal skin.
[AIPMT 2013]

(a) Deficiency of iodine in diet
(b) Low secretion of growth hormone
(c) Cancer of the thyroid gland
(d) Over secretion of pars distalis

14. Select the answer which correctly matches the endocrine gland with the hormone it secretes and its function/deficiency symptom. (A: Endocrine gland, B: Hormone, C: Function/deficiency symptoms)
[AIPMT 2013]

A	**B**	**C**
(a) Anterior pituitary	Oxytocin	Stimulates uterus contraction during child birth
(b) Posterior pituitary	Growth hormone (GH)	Over secretion stimulates abnormal growth
(c) Thyroid	Thyroxin	Lack of iodine in diet results in goitre
(d) Corpus luteum	Testosterone	Stimulates spermatogenesis

15. Identify the hormone with its correct matching of source and function:
[AIPMT 2014]
(a) Oxytocin – Posterior pituitary, growth and maintenance of mammary glands
(b) Melatonin – Pineal gland, regulates the normal rhythm of sleepwake cycle
(c) Progesterone – Corpus luteum, stimulation of growth and activities of female secondary sex organs
(d) Atrial natriuretic factor – Ventricular wall increases the blood pressure.

16. Fight-or-flight reactions can cause the activation of
[AIPMT 2014, RE-AIPMT 2015]
(a) The parathyroid glands, leading to increased metabolic rate.
(b) The kidney, leading to suppression of rennin-angiotensin-aldosterone pathway.
(c) The adrenal medulla, leading to increased secretion of epinephrine and norepinephrine.
(d) The pancreas leading to a reduction in the blood sugar levels.

17. Which one of the following hormones is not involved in sugar metabolism?
[AIPMT 2015, RE-AIPMT 2015]
(a) Aldosterone (b) Insulin
(c) Glucagon (d) Cortisone

18. A chemical signal that has both endocrine and neural roles is
[AIPMT 2015]
(a) Melatonin (b) Calcitonin
(c) Epinephrine (d) Cortisol

19. Which one of the following hormones though synthesized elsewhere, is stored and released by the master gland?
[RE-AIPMT 2015]
(a) Luteinizing hormone (b) Prolactin
(c) Melanocyte stimulating hormone (d) Antidiuretic hormone

20. Which of the following pairs of hormones are not antagonistic (having opposite effects) to each other? [NEET - I, 2016]
(a) Parathormone–Calcitonin (b) Insulin–Glucagon
(c) Aldosterone–Atrial Natriuretic Factor (d) Relaxin–Inhibin

21. Changes in GnRH pulse frequency in females is controlled by circulating levels of:
[NEET - I, 2016]
(a) Estrogen and progesterone (b) Estrogen and inhibin
(c) Progesterone only (d) Progesterone and inhibin

22. Identify the correct statement on 'inhibin': [NEET - I, 2016]
(a) Inhibits the secretion of LH, FSH and Prolactin
(b) Is produced by granulose cells in ovary and inhibits the secretion of FSH
(c) Is produced by granulose cells in ovary and inhibits the secretion of LH
(d) Is produced by nurse cells in testes and inhibits the secretion of LH

23. Graves' disease is caused due to [NEET - II, 2016]
(a) Hypersecretion of thyroid gland (b) Hyporsecretion of adrenal gland
(c) Hypersecretion of adrenal gland (d) Hyporsecretion of thyroid gland

24. Name a peptide hormone which acts mainly on hepatocytes, adipocytes and enhances cellular glucose uptake and utilization. [NEET - II, 2016]
(a) Glucagon (b) Secretion
(c) Gastrin (d) Insulin

25. Osteoporosis, an age-related disease of skeletal system, may occur due to [NEET - II, 2016]
(a) High concentration of Ca++ and Na+
(b) Decreased level of estrogen
(c) Accumulation of uric acid leading to inflammation of joints
(d) Immune disorder affecting neuromuscular junction leading to fatigue

26. The posterior pituitary gland is not a 'true' endocrine gland because [NEET - II, 2016]
(a) It only stores and releases hormones
(b) It is under the regulation of hypothalamus
(c) It secretes enzymes
(d) It is provided with a duct

NCERT EXEMPLAR QUESTIONS

1. Select the right match of endocrine gland and their hormones among the options given below:

A. Pineal	i. Epinephrine
B. Thyroid	ii. Melatonin
C. Ovary	iii. Oestrogen
D. Adrenal medulla	iv. Tetraiodothyronine

(a) A – iv, B – ii, C – iii, D – i
(b) A – ii, B – iv, C – i, D – iii
(c) A – iv, B – ii, C – i, D – iii
(d) A – ii, B – iv, C – iii, D – i

2. Listed below are the hormones of anterior pituitary origin. Tick the wrong entry
(a) Growth hormone (b) Follicle stimulating hormone
(c) Oxytocin (d) Adrenocorticotropic hormone

3. Mary is about to face an interview. But during the first five minutes before the interview she experiences sweating, increased rate of heart beat, respiration, etc. Which hormone is responsible for her restlessness?
(a) Oestrogen and progesterone (b) Oxytocin and vasopressin
(c) Adrenaline and noradrenaline (d) Insulin and glucagon

4. The steroid responsible for the balance of water and electrolytes in our body is
(a) Insulin (b) Melatonin
(c) Testosterone (d) Aldosterone

5. Thymosin is responsible for
(a) Raising the blood sugar level (b) Raising blood calcium level
(c) Increased production of T-Iymphocytes (d) Decrease in blood RBC

6. In the mechanism of action of a protein hormone, one of the second messengers is
(a) Cyclic AMP (b) Insulin
(c) T_3 (d) Gastrin

7. Leydig cells produce a group of hormones called
(a) Androgens (b) Oestrogens
(c) Aldosterone (d) Gonadotropins

8. Corpus luteum secretes a hormone called
(a) Prolactin (b) Progesterone
(c) Aldosterone (d) Testosterone

9. Cortisol is secreted from
(a) Pancreas (b) Thyroid
(c) Adrenal (d) Thymus

10. A hormone responsible for normal sleep-wake cycle is
(a) Epinephrine (b) Gastrin
(c) Melatonin (d) Insulin

11. Hormones are called chemical signals that stimulate specific target tissues. Their specificity is due to the presence of signal receiving 'receptors' only in the respective target tissues. Where are these receptors present in case of hormones of protein nature?
(a) Extracellular matrix (b) Blood
(c) Plasma membrane (d) Nucleus

12. Choose the correct answer among the following options:

(A) Epinephrine	(i) Increase in muscle growth
(B) Testosterone	(ii) Decrease in blood pressure
(C) Glucagon	(iii) Decrease in liver glycogen content
(D) Atrial natriuretic factor	(iv) Increased heart beat

(a) A – ii, B – i, C – iii, D – iv
(b) A – iv, B – i, C – iii, D – ii
(c) A – i, B – ii, C – iii, D – iv
(d) A – i, B – iv, C – ii, D – iii.

13. Blood calcium level is a resultant of how much dietary calcium is absorbed, how much calcium is lost in the urine, how much bone dissolves releasing calcium into the blood and how much calcium from blood enters tissues. A number of factors play an important role in these processes. Mark the one which has no role
(a) Vitamin D (b) Parathyroid hormone
(c) Thyrocalcitonin (d) Thymosin

14. All the following tissues in mammals except one consist of a central 'medullary' region surrounded by a cortical region. Mark the wrong entry.
(a) Ovary (b) Adrenal
(c) Liver (d) Kidney

15. Which one of the following conditions is not linked to deficiency of thyroid hormones?
(a) Cretinism (b) Goitre
(c) Myxedema (d) Exophthalmia

Answer Keys

Practice Questions

1. (d)	2. (c)	3. (b)	4. (d)	5. (b)	6. (d)	7. (b)	8. (d)	9. (c)	10. (a)
11. (b)	12. (a)	13. (d)	14. (c)	15. (d)	16. (d)	17. (d)	18. (a)	19. (d)	20. (c)
21. (a)	22. (c)	23. (c)	24. (b)	25. (d)	26. (c)	27. (c)	28. (b)	29. (b)	30. (c)
31. (c)	32. (a)	33. (b)	34. (c)	35. (a)	36. (c)	37. (c)	38. (c)	39. (d)	40. (d)
41. (c)	42. (c)	43. (b)	44. (d)	45. (a)	46. (d)	47. (c)	48. (c)	49. (c)	50. (d)
51. (b)	52. (d)	53. (d)	54. (d)	55. (d)	56. (d)	57. (c)	58. (a)	59. (b)	60. (d)
61. (a)	62. (a)	63. (b)	64. (c)	65. (a)	66. (d)	67. (c)	68. (d)	69. (c)	70. (d)
71. (c)	72. (c)	73. (a)	74. (c)	75. (d)	76. (b)	77. (d)	78. (d)	79. (d)	80. (d)
81. (d)	82. (d)	83. (d)	84. (d)	85. (d)	86. (d)	87. (d)	88. (d)	89. (d)	90. (c)
91. (d)	92. (c)	93. (c)	94. (c)	95. (c)	96. (d)	97. (d)	98. (b)	99. (a)	100. (d)
101. (c)	102. (b)	103. (a)	104. (b)	105. (d)	106. (d)	107. (c)	108. (a)	109. (d)	110. (b)
111. (b)	112. (d)	113. (c)	114. (c)	115. (b)	116. (d)	117. (d)	118. (c)	119. (d)	120. (a)
121. (a)	122. (b)	123. (c)	124. (d)						

Assertion and Reason Questions

125. (b)	126. (d)	127. (d)	128. (c)	129. (d)	130. (d)				
131. (d)	132. (d)	133. (b)	134. (a)	135. (c)	136. (a)	137. (d)	138. (a)	139. (c)	140. (d)
141. (a)	142. (a)	143. (a)	144. (a)	145. (a)	146. (a)	147. (a)	148. (a)	149. (a)	150. (a)
151. (d)	152. (b)	153. (d)	154. (c)						

Previous Year Questions

1. (b)	2. (c)	3. (a)	4. (a)	5. (c)	6. (a)	7. (d)	8. (d)	9. (d)	10. (d)
11. (c)	12. (c)	13. (a)	14. (c)	15. (b)	16. (c)	17. (a)	18. (c)	19. (d)	20. (d)
21. (b)	22. (d)	23. (a)	24. (d)	25. (b)	25. (a)				

NCERT Exemplar Questions

1. (d)	2. (c)	3. (c)	4. (d)	5. (c)	6. (a)	7. (a)	8. (b)	9. (c)	10. (c)
11. (c)	12. (b)	13. (d)	14. (c)	15. (d)					

This page is intentionally left blank.

This page is intentionally left blank.

This page is intentionally left blank.