INDEX

CLASS - IX

GENERAL INSTRUCTIONS FOR CBSE TEST PAPERS 1 & 2

SUBJECT : MATHEMATICS

CLASS – IX

Time : 3 Hr.   **Max. Marks : 80**

GENERAL INSTRUCTION

1.   All questions are compulsory.

2.   The questions paper consists of 30 questions divided into the four sections A,B,C and D. Section A contains 10 questions of 1 mark each, section B is of 05 questions of 2 marks each, section C is of 10 questions of 3 marks each and section D is of 05 questions of 6 marks each.

3.   Write the serial number of questions before attempting.

4.   In questions of construction, the drawing should be neat and exactly as per the given measurements.

5.   Use of calculator is not permitted. However, you may ask for mathematical tables.

INSTRUCTIONS :

**Section A : Q 1 to Q . 10 carries 1 mark each.**

Section B : Q 11 to Q. 15 carries 2 marks each.

Section C : Q 16 to Q. 25 carries 3 marks each.

Section D : Q 26 to Q. 30 carries 6 marks each.

SECTION # A

1. Express $0.\overline{05}$ as a vulager fraction.

2. Find the value of a if (x - a) is a factor of the polynomial $x^4 - a^2x^2 + 3x - 6a$.

3. The cost of a book is one third the cost of a pen. Write a linear equation in two variables to represent this statement.

4. Find out how many non zero integer solutions can be possible for $3x + 2y = 18$.

5. In which quadrant do the following pints lie ?

    (i) (-3, 2)   (ii) (2.5, 0)

6. The difference of two supplementary angles is 40^0, find the angles.

7. In the given figure, OP and OQ are opposite rays. Find x.
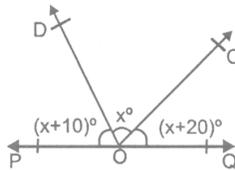
8. The class marks of distribution are : 6, 10, 14, 18, 22, 26, 30. Find the class size and the class interval.

9. If $\dfrac{\sqrt{7}-1}{\sqrt{7}+1} - \dfrac{\sqrt{7}+1}{\sqrt{7}-1} = a + b\sqrt{7}$, , find the values of a and b.

10. Find the remainder when $x^{51} + 51$ is divided by x+ 1.

SECTION # B

11. Plot the points A(2, 0), B(2, 2), C(0, 2) and draw the line segments OA, AB, BC and CO. What figure do your obtain ?

12. Using factor theorem, show that a - b is the factor of $a(b^2 - c^2) + b(c^2 - a^2) + c(a^2 - b^2)$

13. Three cubes each of side 6 cm are joined end to end. Find the surface area of the resulting cuboids.

14. The mean of 13 observation is 14. If the mean of the first 7 observation is 12 and that of last 7 observation is 16, find the 7th observation.

15. Find x^2 if $x = \dfrac{\sqrt{\sqrt{5}+2} + \sqrt{\sqrt{5}-2}}{\sqrt{\sqrt{5}+1}}$.

SECTION # C

16. Factorise : $p^2 + pq + \dfrac{q^2}{4} + 1 + 2p + q$

17. Let A and B are the remainder when the polynomial $y^3 + 2y^2 - 5ay - 7$ and $y^3 + ay^2 - 12y + 6$ are divided by $y + 1$ and $y - 2$ respectively. If $2A + B = 6$ then find the value of a.

18. If the work done by a body on application of a constant force is directly proportional to the distance traveled by the body. Express this is the form of an equation is two variables and draw the graph of the same by taking the constant forces as 5 units. Also read from the graph the work done when the distance traveled by the body is (i) 2 units (ii) 0 units.

19. Prove that the sum of the three sides of a triangle is greater than the sum of its three median.

20. Construct a triangle ABC is which BC = 4.5 cm, $\angle B = 45^0$ and AB - AC = 2.5 cm.

21. The perimeter of a triangle is 36 cm and its sides are in the ratio 3 : 4 : 5. Find the area of the triangle.

22. A park in the shape of a quadrilateral ABCD has $\angle C = 90^0$. AB = 18 m, BC = 24 m, CD = 10 m and AD = 16m. How much area does it occupy ?

23. A solid cylinder has a total surface area 462 sq. cm. Its curbed surface area is one-third of the total surface area. Find the volume of the cylinder.

24. The record of a weather station shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times..
(i) What is the probability that on a given day it was correct ?
(ii) What is the probability that it was not correct on a given day ?

25. Plot the points A(0, 5), B(8, 0), (8, 5) and join them. What figure do you obtain ?

SECTION # D

26. Prove that $(a + b)^3 + (b + c)^3 + (c + a)^3 - 3(a + b) (b + c) (c + a) = 2 (a^3 + b^3 + c^3 - 3abc)$

27. In figure, ABC is a triangle, D is the mid-point of AB, P is any point on BC. Line CQ is drawn parallel to PD to intersect AB at Q. PQ is joined. Show that $ar\ (\Delta ABP) = \dfrac{1}{2} ar(\Delta ABC)$.

28. O_1 and O_2 are the centres of two congruent circles intersecting each other at points C and D. The line joining their centres intersects the circles in points A and B such that $AB > O_1O_2$. If CD = 6 cm and AB = 12 cm, determine the radius of either circle.

29. Students of a school stages a rally for cleanliness campaign. They walked through the lanes in two groups. One group walked through the lanes AB, BC and CA; while the other through AC, CD and DA. Then they cleaned the area enclosed within their lanes. If AB = 9m, C = 40 m, CD = 15 m, DA = 28 m and $\angle B = 90^0$, which group cleaned more area and by how much ? Find the total area cleaned by the students.

30. Draw a Histogram and frequency polygon from the following data :

Class Interval	21-24	26-29	31-34	36-39	41-44	46-49
Class frequency	30	24	52	28	46	10

TEST PAPER # 2

INSTRUCTIONS :

> Section A : Q. 1 to Q. 10 carry 1 mark each.
>
> Section B : Q. 11 to Q. 15 carry 2 marks each.
>
> Section C : Q. 16 to Q. 25 carry 3 marks each.
>
> Section D : Q. 26 to Q. 30 carry 6 marks each.

SECTION # A

Directions : Answer the questions (1 to 10)

1. Express $0.4\overline{18}$ as a vulager fraction.

2. Find the zero of the polynomial in each of the following cases :

p(x) = cx + d, c $\neq$ 0, c, d are real numbers.

3. Find a value for a so that each of the following equations may have x = 1, y = 1 as a solution :
3x + ay 6

4. In supplementary angles one is twice the other. Find the angles.

5. In the given figure, AOB is a line, determine x.
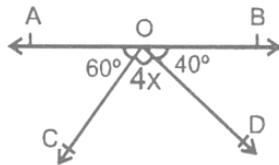
6. ABCD is a parallelogram. If the two diagonals are equal, find the measure of $\angle ABC$.

7. Find the lateral surface area of a cube of edge 20 m.

8. The mean of 10, 12, 16, 20, p and 26 is 17. Find the value of p.

9. Which of the following points lie on the x-axis >

(i) (1, 1), (ii), (1, 0), (iii), (0, 1) (iv), (0, 0)

10. Calculate the mean of all possible factor of 10.

SECTIONS # B

11. Simplify $\dfrac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} - \dfrac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} - \dfrac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}}$

12. Determine the number of sides of polygon whose exterior and interior angles are in the ratio 1 : 5.

13. Plot the points A(4, 4) and B(-4, 4) and join the lines OA, OB and BA. What figure do you obtain ?

14. The taxi fare in a city is as follows. For the first kilometre, the fare is Rs. 8 and for the subsequent distance it is Rs. 5 per km. Taking the distance covered as x km. and the total fare as Rs. y, write a linear equation for this information and draw its graph.

15. Find the area of triangle two sides of which are 16 cm and 22 cm and perimeter is 64 cm.

SECTION # C

16. Two regular polygons are such that the ratio between their number of sides is 1 : 2 and the ratio of measures of their interior angles is 3 : 4. Find the number of sides of each polygon.

17. Construct a triangle ABC whose perimeter is 12 cm, $\angle B = 60^0$ and C = $\angle 45^0$

18. How many spherical lead shots each 4.2 cm in diameter can be obtained from a rectangular solid lead with dimensions 66 cm, 42 m and 21 m?

19. Find the mean of each of the following distributions :

x:	10	15	20	25	30	35	40
f:	4	6	8	18	6	5	3

20. An insurance company selected 2000 drivers at random (i.e., without any preference of one driver over another) in a particular city to find a relationship between age and accidents. The data obtained are given in the following table :

Age of drivers (in years)	Accidents in one yeaers				
	0	1	2	3	Over 3
18 – 29	440	160	110	61	35
30 – 50	505	125	60	22	18
Above 50	360	45	35	15	9

Find the probabilities of the following events for a driver chosen at random form the city :

(i) being 18 - 29 years of age and having exactly 3 accidents in one year.

(ii) being 30 - 50 years of age and having one or more accidents in a year.

(iii) having no accident in one year.

21. Factorise :

$y^3 - 7y + 6$

**22.** See the given figure and write the following :
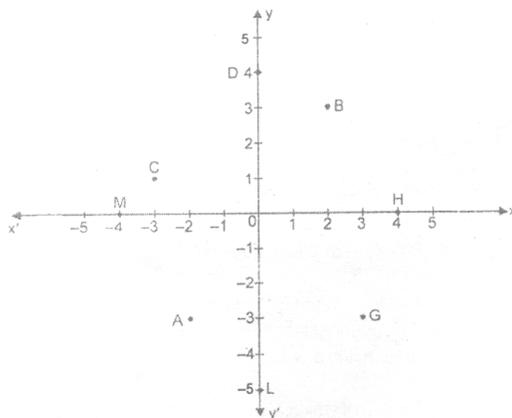
    (i)   The point identified by the coordinates of (-2, -3).

    (ii) The point identified by the coordinates of (3, -3).

    (iii) The abscissa of point D.

    (iv) The abscissa of the point H.

    (v) The coordinates of the point L.

    (vi) The coordinates of the point M.

23. Find the area of quadrilateral PQRS whose sides are 9 m, 40 m, 28 m and 15 m respectively and the angle between first two sides is a right angle.

24. The diameter of a sphere is 42 cm. It is melted and drawn into a cylindrical wire of 28 cm diameter. Find the length of the wire.

25. Sunita has a piece of land which is in the shape of a rhombus. She wants her one daughter and one son to work on the land and produce different crops to suffice the needs of their family. She divided the land in two equal parts. If the perimeter of the land is 400 m and one of the diagonal is 160 m, how much area each of them will get >

SECTION # D

26. In the given figure, $\triangle ABC$ is isosceles with AB = AC. D, E and F are respectively the mid-points of ides BC, CA and AB. Show that the line segment AD is perpendicular to the line segment EF and is bisected by it.
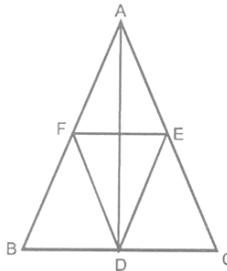
27. ABCD is a rhombus and AB is produced to E and F such that AE = AB = BF. Prove that ED and FC are perpendicular to each other.

28. Prove that the sum of either pair of opposite angles of a cyclic quadrilateral is 180^0.
Using the above, do the following :
In the given figure ABCD is a cyclic quadrilateral.
Side CD is produced on both sides such that $\angle BCP = 110^0$ and $\angle ADQ = 95^0$
Find the value of $\angle A$ and $\angle B$.
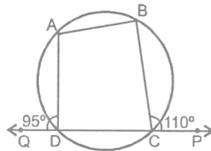
29. If $x^3 + mx^2 + nx + 6$ has x - 2 as a factor and leaves a remainder 3, when divided by x - 3, find the values of m and n.

30. Plot a cumulative frequency diagram for the following distribution :

C.l.	0-9	10-19	20-29	30-39	40-49	50-59	60-69
Frequency	5	15	20	23	17	11	9

GENERAL INSTRUCTIONS FOR CBSE TEST PAPER 1 & 2

SUBJECT : SCIENCE AND TECHNOLOGY

CLASS - IX

**Time : 21/2 Hr.**   **Max. Marks : 60**

GENERL INSTRUCTION

1.   The question paper comprises of two Section A and B. Attempt both the Sections.

2.   The candidates are advised to attempt all the questions of Section A and Section B separately.

3.   All questions are compulsory.

4.   Marks allocated to each question are indicated against it.

5.   Question number 1 to 6 in Section A and 19 to 21 in Section B are very short answer question. These are to be answered in one word or one sentence only.

6.   Question number 7 to 12 in Section A and 22 to 24 in Section B are short answer questions. These are to be answered in about 30-40 words each.

7.   Question number 13 to 16 in Section A and 25, 26 in Section B are also short answer questions. These are to be answered in about 40-50 words each.

8.   Question number 17 to 18 in Section A and 27 in Section B are long answer questions. These are to be answered in about 70 words each.

TEST PAPER # 1

SECTION # A

1. Write the formula for distance covered in n^{th} second. [1]

2. Convert 1 radian (c) in to degree (^{0}) [1]

3. Define Newton's' second law of motion. [1]

4. Sponge is considered as solid yet we are able to compress it. Why ? [1]

5. What is the meaning of 15% solution of NaCl ? [1]

6. Write the names of gases which can be separated from air by fractional distillation. [1]

7. Define scalar and vector quantities and given two examples of each. [2]

8. A body moves from A to B and come back to A and then goes to C point. Find distance and displacement of the body. [2]
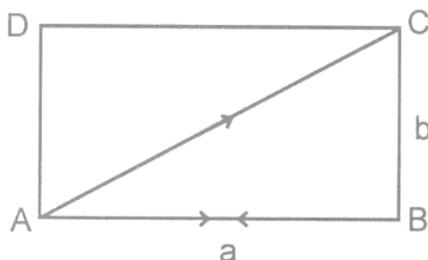
9. Convert 1 KWh into Joule.

10. Write the two reasons of using ultrasonic waves is SONAR [2]

11. (a) Write the conditions to liquefy atmospheric gases [2]
    (b) What do LPG and CNG stand for ? [2]

12. The mass number of an element is 63. It contains 29 electrons. What is the number of protons and neutrons in its nucleus ? Write the electronic configuration of the element ? [2]

13. Two bodies A and B having mass m and 2m respectively are kept at a distance d apart. Where should a small particle be placed so that the net gravitational force on it due to the bodies A and B is zero ? [3]

14. A bullet of mass 10 g is fired from a gun of mass 5.0 kg. If the velocity of bullet is 250m/s. Find the recoil velocity of the gun. [3]

15. Calculate the weight of iron which is converted into its oxide by the action of 18g of steam. [3]

16. (a) Define the term mole.
    (b) If 1 g of carbon contains x atoms, what will be the number of atoms in 1 g of magnesium ?
    [C = 12u, Mg = 24u] [3]

17. Prove mathematically that the mechanical energy of a freely falling body remains constant. [5]

18. (a) On heating, potassium chlorate decomposes to potassium chloride and oxygen. In one experiment 30g of potassium chlorate generates 14.9g of potassium chloride and 9.6g of oxygen. What mass of potassium chlorate remains unrecompensed ?
    (b) Write two characteristic properties of nucleus. Compare these with the properties of an electron. [5]

SECTION # B

19. What do you mean by semiautonomous cell organelles ? [1]

20. Which tissue is responsible for the outer most conversing in animals > [1]

21. What are acute diseases ? Name any three acute diseases. [1]

22. Draw a well labelled diagram of plant cell. [2]

23. Explain the main characteristic of phylum thallophytic. Write any two groups included in it. [2]

24. Write the difference between blood, lymph and serum. [2]

25. Fertilizers which are used in farming are good and bad both, explain why ? [3]

6. Write down four main differences between prokaryotic and eukaryotic cells. [3]

27. Write the difference between striated, non striated and cardiac muscle ? [5]

TEST PAPER # 2

SECTION # A

1. Can the internal forces acting among the parts of a system change the linear momentum of the system ? [1]

2. In which of the three media-air, water or steel does sound travel the fastest ? [1]

3. A particle is moving with a uniform velocity. What is its acceleration ? [1]

4. State two characteristics of matter demonstrated by : [1]
   (a) diffusion   (b) Brownian motion

5. Define valence shell. [1]

6. What are the fourth and fifth states of mater ? **[1]**

7. If a bulb of 100 W is lit for 6 hours, how much electric energy would be consumed ?
   [2]

8. A car moves through 10 km at a speed of 50 km/h and the next 10 km at a speed of 40 km/h. Calculate its average speed. **[2]**

9. A dog barks in a park and hear its echo after 2.5 s. If the sound of its bark got reflected by a nearby building, find the distance between the dog and the building. Take the speed of sound in air as 340 m/s. [2]

10. A man pushes a box of 50 kg with a force of 200 N. What will be the acceleration of the box due to this force ? What would be the acceleration if the mass is halved ? [2]

11. Describe the drawbacks of Rutherford's atomic model. [2]

12. Differentiate between solid, liquid and gas on the basis of rigidity and compressibility ?
    [2]

13. How much momentum will a dumb-bell of mass 15 kg transfer to the floor if it falls from a height of 19.6 m ? (Take $g = 9.8$ m/s^2) [3]

14. Derive the first and second equation of motion [3]

15. Write the constituents of gun powder. How can you separate different constituents of gun powder ? [3]

16. Which method is used for the separation of a mixture of alcohol and water. Draw a well labelled diagram of the apparatus used in above separating technique. [3]

17. Explain the working of human ear with the help of a diagram [5]

18. (a) The average atomic mass of sample of element X is 16.2 u. What are the percentage of isotopes $_{8}^{16}X$ and $_{8}^{18}X$ is the sample ?

(b) Name an element whose nucleus does not contain any neutrons.
(c) Hydrogen has three isotopes written as :

$_{1}^{1}H, _{1}^{2}H, _{1}^{3}H$

Explain why these isotopes have almost identical chemical properties. [5]

SECTION # B

19. What are chronic disease ? Write the three name of chronic diseases. [1]

20. In plant which tissue is responsible for growth ? [1]

21. Write the name of substance. Which is responsible for ozone layer depletion ? [1]

22. Define the term hermaphrodite. Give two examples. [2]

23. Describe the **"Green house effect".** [2]

24. Write the difference between mixed cropping and Inter cropping. [2]

25. Draw an outline of Echiler classification and write down the characteristic features of bryophyte. [3]

26. Write the three main difference between animal cell and plant cell. [3]

27. Write in brief about the five kingdom as explained in 'Five kingdom classification'. [5]

GENERAL INSTRUCTIONS FOR CBSE TEST PAPERS 1 & 2

SUBJECT : SOCIAL SCIENCE

CLASS - IX

Time : 3 Hr.   **Max. Marks : 80**

GENERAL INSTRUCTIONS

1.   There are 29 questions in all. All questions are compulsory.

2.   Questions from serial number 1 to 10a are 1 mark questions.

        Answer to these questions may be from one word to one sentence.

3.   Questions from serial number 11 to 18 are 3 marks questions

        Answers to these questions should not exceed 80 words each.

4.   Questions from serial number 19 to 28 are 4 marks questions.

        Answers to these questions should not exceed 100 words each.

5.   Questions No. 29 is map question. Attach the map inside your answer book.

TEST PAPER # 1

1. Name of the first Indian cricket club. When was it established

OR

What is Gandhian Cap ?

2. Give the extent of India in latitudes an longitudes
3. What does the 'breaking of monsoon' mean ?
4. Why are Himalayan river called Perennial rivers ?
5. Explain the term 'universal adult franchise'.
6. What is EVM ?
7. Name the tree categories of minister
8. What are the function of FCI ?
9. What is food security ?
10. What is poverty ?

Below are given three groups A, B & C o \f question s 11 and 12. Select any one group for answering these two questions.

GROUP - A

11. The introduction of railway had an adverse impact on the forest. Justify by giving examples.
12. Who were Kalangs ? Mention any four characteristics of this community ?

GROUP - B

11. Explain the major characteristics of pastoral nomodism.
12. The pastoral groups had sustained by a careful consideration of a host of factor". Explain these factors.

GROUPS - C

11. Who was Captain Swing ? What did the name symbolise or represent?
12. Why were threshing machines opposed by the poor in England ?
13.1 What was Rabindranath Taore's opinion regarding the national dress ?

OR

13.2 How was the cricket used by the Britishers to spread their policy of racism ?
14. Distinguish between : Evergreen and deciduous forests.
15. What are the Fundamental Rights guaranteed in our Constitution ?
16. In which field do you think India can build the maximum employment opportunity ? Explain ? Explain.
17. What is the major objectives of Prime Minister Rozgar Yozana ?
18. How is Lok Sabha more powerful than Rajya Sabha ?
19. Who was Napoleon ? Mention any two steps taken by him to modernise France. Explain the racial policy of Hitler or Nazis.

20. How have advances in technology, especially television technology affected the development of contemporary cricket ?

<div align="center">OR</div>

21. Give an account of the weather conditions and characteristics of the cold season.

22. Describe the formation of Himalayas.

23. "It is said elections are the barometer of democracy." Elaborate.

24. Enumerate the stages through which a bill moves before it becomes a low.

25. Explain the nature of Fundamental Rights in the Constitution.

26. Why is there need for food security in India ?

27. How did the spread of electricity helps farmers in Palampur ?

28. Discuss the major reasons for poverty in India.

29.1 On the given outline political map of the world name and mark : (Any two)

(i) A country where Bolsheviks revolution took place

(ii) A cotton belt of U.S.A.

(iii) A country where Bastar forest movement was launched

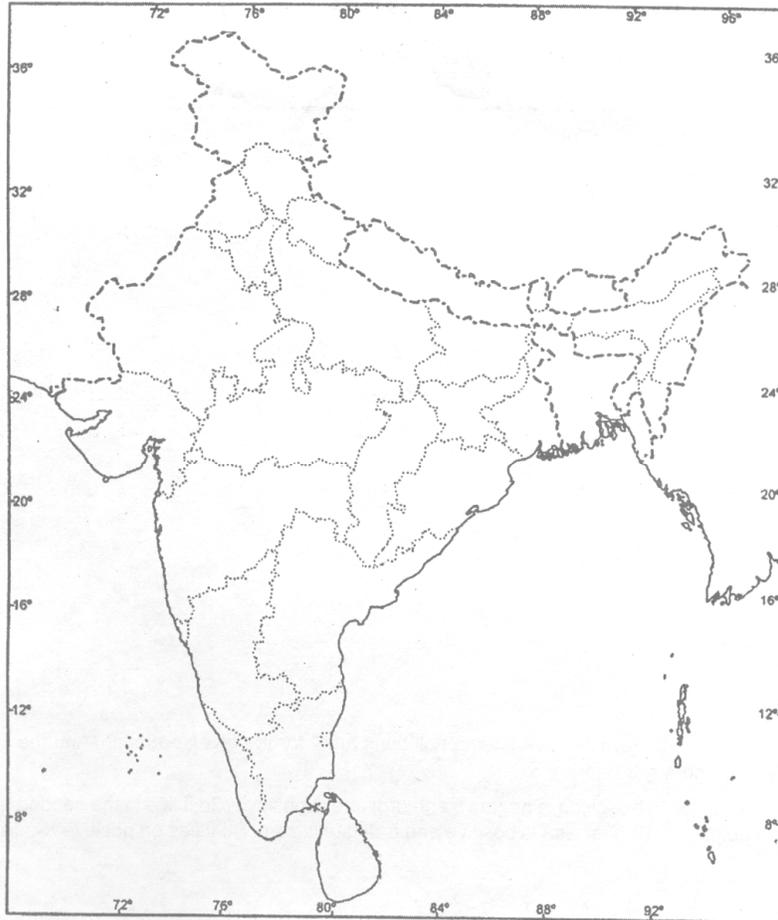(iv) An one central power during the first world war.

29.2 In the given outline map of India, locate the following carefully with appropriate symbols and write the name of each item near its location.

(i) Simplipal National Park   (ii) River Mahanadi

(iii) Sambhar Lake   (iv) Gulf of Mannar

TES PAPER # 2

1. What is hyperinflation ? Mention the factor responsible for this.

OR

Describe the Bloody Sunday.

2. State in brief the theory of plate tectonics.
3. Which two peninsular rivers flow through troughs ?
4. Distinguish between wind ward side and leeward side.
5. What do you mean by universal adult franchise ?
6. What is a constituency ?
7. What is parliament ? Name the two houses of the Parliament.
8. Define green revolution.
9. Mention some factors on which the quality of population depends.
10. What is fixed capital ?

Below are given three groups A, B & C of questions 11 and 12, Select any one group for answering these two questions.

GROUP - A

11. Who are Kalangs ? Why did they attack the Dutch forts at Joana ?
12. Mention any three factors which prompted Samins to revolt against the Dutch.

GROUPS - B

11. Explain the movement of Gujjar Bakarwals of Jammu and Kashmir.
12. Give reasons to explain why the Maasai comunity last their grazing lands.

GROUP - C

11. Why were Indian formers reluctant to grow Opium ?
12. Explain the Dust Bowl tragedy.
13. What was the difference between the Amateurs and the professionals ?

OR

How did the British rule affect the Indian textile industry ?

14. Mention any four characteristics of the Ganga - Brahmaputra delta.
15. Describe four features of democracy as a form of government.
16. What is the role of education in human capital formation ?
17. What is the difference between disguised unemployment and seasonal unemployment ?

18. Distinguish between a nominal democracy and an ideal democracy.

19. Why were jews classified as undesirable by the Nazir ?

<div align="center">**OR**</div>

Describe the incidents that led to the storming of the Bastille.

20. Discuss the causes of the French Revolution of 1789.

<div align="center">**OR**</div>

Why did the Tsarist autocracy collapse in 1917 ?

21. Discuss the mechanism of monsoons.

22. Every species has role to play in the ecosystem. Elaborate.

23. Explain the manor features of democratic governments.

24. Mention the Fundamental Rights that are given in the Indian constitution.

25. What are the different measures taken to ensure free and fair elections in India.

26. Why is the buffer stock created by the government ?

27. Mention some measures to reduce poverty in India.

28. What are the various activities undertaken in the primary sector secondary sector and the e tertiary sectors ?

29.1 On the given outline political map of the world name and mark : (Any two)

(i) A region of Africa known for pastoralists.

(ii) A country associated with swing movement.

(iii) A country where a revolution took place in 1789.

(iv) A test playing country of Asia.

29.2 In the given outline map of India, locate the following carefully with appropriate symbols and write the name of each item near its location.

**(i) Kaziranga   (ii) River Narmada   (iii) Mangrave Forest   (iv) Shivalik Range**

HINTS & SOLUTIONS (MATHEMATICS)

TEST PAPER # 1

SECTION # A

1. Let $x = 0.\overline{05}$ ...(i)
   $\Rightarrow 100x = 5.\overline{05}$ .....(ii)
   from eq^n (i) & (ii)
   $\Rightarrow 99x = 5$
   $\Rightarrow x = \dfrac{5}{99}$

2. Let $p(x) = x^4 - a^2x^2 + 3x - 6 + a$
   Since, $(x + a)$ is a factor of $p(x)$, then $p(a) = 0$ by factor theorem.
   $$p(a) = 0 \Rightarrow (a)^4 - a^2 (a)^2 + 3(a) - 6a = 0$$
   $$\Rightarrow a^4 - a^2 \times a^2 + 3a - 6a = 0$$
   $$\Rightarrow a^4 - a^4 - 3a = 0$$
   $$\Rightarrow a = 0$$

3. Let, the cost of pencil = x,
   and, the cost of a pen = y.
   Then, ATQ
   $$x = \dfrac{1}{3}y$$
   $\Rightarrow \quad 3x = y$
   $\Rightarrow \quad 3x - y = 0$

4. Total number of non zero positive integer solutions are 2 for the given equation. An the solutions are x = 4, y = 3 and x = 2 y = 6.

5. (i) In the point (-3, 2) abscissa is negative and ordinate is positive. So it lies in the second quadrant.
   (ii) In the point (2.5, 0) abscises is positive and ordinate is zero. So it lies on positive X - axis.

6. Let first angle be 'a'
   Then second angle will be (a + 40)
   Now, $a + (a + 40^0) = 180^0$
   $\Rightarrow \quad 2a = 140^0$
   $\Rightarrow \quad a = 70^0$
   So, first angle = 70^0
   and second angle = $70^0 + 40^0$
   $\qquad\qquad\qquad = 110^0$

7. A.T.Q. $(x + x + 10^0 + x + 20^0) = 180^0$
   $\Rightarrow \quad 3x = 150^0$
   $\Rightarrow \quad x = 50^0$

8. Class size = 4, 1st class interval = 4 - 8

9. $\dfrac{\sqrt{7}-1}{\sqrt{7}+1} + \dfrac{\sqrt{7}+1}{\sqrt{7}-1} = a + b\sqrt{7}$

   L.H.S. $= \dfrac{\sqrt{7}-1}{\sqrt{7}+1} - \dfrac{\sqrt{7}+1}{\sqrt{7}-1}$
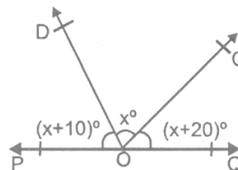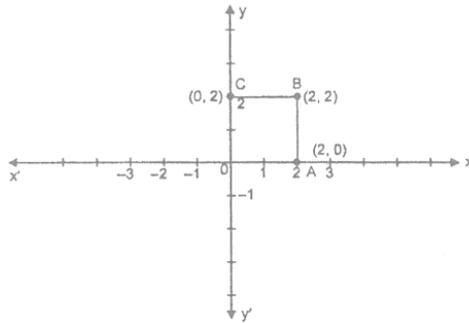
$$= \frac{(\sqrt{7}-1)^2 - (\sqrt{7}+1)^2}{(\sqrt{7}+1)(\sqrt{7}-1)}$$

$$= \frac{(7+1-2\sqrt{7}) - (7+1+2\sqrt{7})}{(\sqrt{7})^2 - (1)^2}$$

$$= \frac{8 - 2\sqrt{7} - 8 - 2\sqrt{7}}{7-1} = \frac{4\sqrt{7}}{8} = -\frac{2}{3}\sqrt{7}$$

$$\therefore \quad -\frac{2}{3}\sqrt{7} = a + b\sqrt{7}$$

Hence, a = 0 and b = $-\frac{2}{3}$.

10. Let $P(x) = x^{51} + 51$ be the given polynomial
If $(x + 1)$ is a factor of $P(x)$ $\Rightarrow$ $P(-1) = 0$
but $P(-1) = (-1)^{51} + 51 = -1 + 51 = 50$.
So, the remainder is 50.

SECTION # B

11.

On joining OA, AB, BC and CO, we get a square of each side 2 units.

12. By factor theorem, (a - b) will be the factor of the given expression if it vanishes by substituting a = b is it Substituting a = b in the given expression, we have
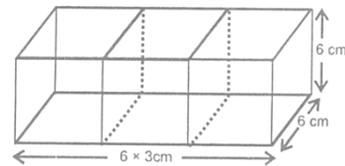$a(b^2 - c^2) + (c^2 - a^2) + c(a^2 - b^2) = b(b^2 - c^2) + b(c^2 - b^2) + c(b^2 - b^2)$
$\qquad\qquad\qquad = b^2 - bc^2 + bc^2 - b^3 + c(b^2 - b^2) = 0$
$\therefore$ (a - b) is a factor of a $(b^2 - c^2) + b(c^2 - a^2) + c(a^2 - b.^2)$
Hence, (a - b) is a factor of the given expression.

13. The dimension of the cuboids so formed are length = 18 cm
breath = 6 cm and height = 6 cm.
Surface area of cuboids = 2 ($\ell \times b + b \times h + \ell \times h$)
$\qquad\qquad\qquad\qquad = 2 \times [18 \times 6 + 6 \times + 18 \times 6]$
$\qquad\qquad\qquad\qquad = 504 \text{ cm}^2$

14. Let the 7th observation be p. Now,
Sum of 13 observation $\qquad\qquad$ = 13 × 14 = 182.
Sum of first 7 observation = 12 × 7 = 84.
Sum of last 7 observation = 16 × 7 = 112.
Sum of last 6 observation = 112 - p.
$\therefore$ Sum of 13 observation = Sum of first 7 observation + Sum of last 6 observation
$\qquad\qquad\qquad\qquad = 84 + 112 - p = 196 - p$
So, 196 - p = 182
$\Rightarrow$ p = 196 - 182 = 14.
Thus, the 7th observation is 14.

15. $x^2 = \dfrac{\sqrt{5}+2+\sqrt{5}-2+2\sqrt{((\sqrt{5^2})-2^2)}}{\sqrt{5}+1} = \dfrac{2\sqrt{5}+2}{\sqrt{5}+1} = \dfrac{2(\sqrt{5}+1)}{\sqrt{5}+1} = 2$

16. $p^2 + pq + \dfrac{q^2}{4} + 1 + 2p + q$

$= p^2 + \dfrac{q^2 4}{} + 1 + pq + q + 2p$

$= (p)^2 + \left(\dfrac{q}{2}\right)^2 + (1)^2 + 2(p)\left(\dfrac{q}{2}\right) + 2\left(\dfrac{q}{2}\right)(1) + 2(1)(p)$

$= \left(p + \dfrac{q}{2} + 1\right)^2$ 　　　　　　　　$[\because a^2 + b + c^2 + 2ab + 2bc + 2ca = 2(a + b + c)^2]$

$= \left(p + \dfrac{q}{2} + 1\right)\left(p + \dfrac{q}{2} + 1\right)$

17. Let $p(y) = y^3 + 2y^2 - 5ay - 7$ and $q(y) = y^3 + ay^2 - 12y + 6$ be the given polynomials.
Now, A = Remainder when $p(y)$ is divided by $(y + 1)$
$\Rightarrow$ A = p (-1)$\Rightarrow$　　A = $(-1)^3 + 2(-1)^2 - 5a(-1) - 7$　　　$[\because p(y) = y^3 + 2y^2 - 5y - 7]$
$\Rightarrow$ A = -1 + 2 + 5a - 7　　　$\Rightarrow$　　　A = 5a - 6
And B = Remainder when $q(y)$ is divided $(y - 2)$
$\Rightarrow$ B = q(2)　$\Rightarrow$　　B = $(2)^3 + a(2)^2 - 12 \times 2 + 6$　　　$[\because q(y) = y^3 + ay^2 - 12y + 6]$
$\Rightarrow$ B = 8 + 4a - 24 + 6　　　$\Rightarrow$　　　B = 4a - 10
Substituting the values of A and B is 2A + B = 6, we get
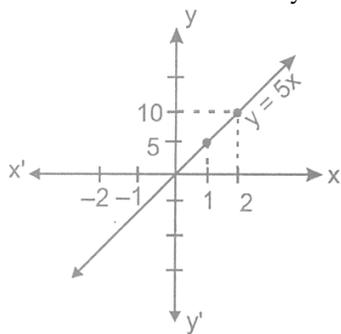　　　　　　　　2(5a - 6) + (4a - 10) = 6
$\Rightarrow$　　　　　　　　10a - 12 + 4a - 10 =6
$\Rightarrow$　　　　　　　　14a - 22 = 6
$\Rightarrow$　　　　　　　　14a = 28
$\Rightarrow$　　　　　　　　a = 2.

18. $y = 5a$, where x = distance traveled, y = work done (i) 10 units (ii) 0 unit

19. **Given :** A $\triangle ABC$ with AD, Be and CF as medians.
To prove : AB + BC + CA > AD + BE + CF
Proof : Since, AD is median with D as point of BC
$\therefore$　AB + AC > 2AD　　　　....(i)
BE is median with E on AC
$\therefore$　AB + BC > 2BE　　　　....(ii)
CF is median on side AB
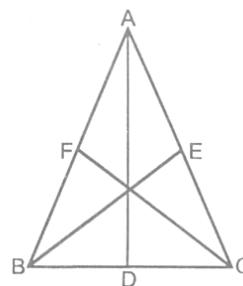$\therefore$　AC + BC > 2CF　　　　....(iii)
Adding (i), (ii) and (iii),

　　　　　　　　2(AB + BC + CA) > 2(AD + BE + CF)
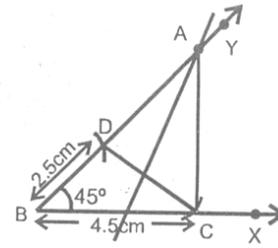or　　　　　　　　AB + BC + CA > AD + BE + CF
$\Rightarrow$ Sum of the three sides of triangle is greater than its three median.

20. We are given BC = 4.5 cm, $\angle B = 45^0$ and AB - AC = 2.5 cm

Steps of Construction :

(i) Draw a ray BX and cut off a line segment BC = 4.5 cm from it.

(ii) Construct $\angle XBY = 45^0$

(iii) Cut off a line segment BC = 2.5 m from BY.

(iv) Join AC.

(v) Draw perpendicular bisector of CD cutting BY at a point A.

(vi) Join AC.

So, $\triangle ABC$ is the required triangle.

21. Let sides are a, b and c, a = 3x, b = 4x, c = 5x

Perimeter = a + b + c

$\Rightarrow$ 36 = 3x + 4x + 5x

$\Rightarrow$ x = 3

$\therefore$ a = 9 cm, b = 12 cm and c = 15 cm

$\Rightarrow \therefore$

Area $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{18(18-9)(18-12)(18-15)} = \sqrt{18\times9\times6\times3} = 54\,cm^2$

22. A.T.Q. $\angle C = 90^0$

So, that $\triangle BCD$ is right angled triangle
By using Pythagoras theorem.

$\therefore$ $BD^2 = BC^2 + CD^2$

$\Rightarrow$ $BD^2 = 2a^2 + 10^2$

$\Rightarrow$ BD = 676

$\Rightarrow$ BD = 26 m

Now, $ar(\triangle BCD) = \frac{1}{2} \times 24 \times 10 = 120$ m^2
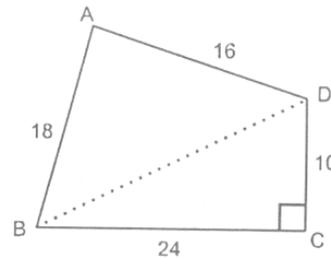
and $ar(\triangle BCD) = \sqrt{s(s-a)(s-b)(s-c)}$

where a = 18, b = 26, c = 16

and $s = \frac{18+26+16}{2} = \frac{60}{2} = 30$

So, $ar(\triangle ABD) = \sqrt{30\times14\times12\times4}$

$= 24\sqrt{35}$

So, $ar(\triangle ABD)$ = 120 + $\sqrt{35}$ sq m

23. Let r be the radius of the base and h be the height of the cylinder.

Total surface area $2\pi r(r+h) = 462$ cm^2 ...(i)

and curbed surface area $(2\pi rh) = \frac{1}{3}\times462 = 154\,cm^2$ ....(ii)

$\Rightarrow$ $2\pi rh + 2\pi r^2 = 462$ [From (i)]

$\Rightarrow$ $154 + 2\pi r^2 = 462$ [From (ii)]

$\Rightarrow$ $2\pi r^2 = 462 - 154 = 308$

$\Rightarrow$ $r^2 = \frac{308\times7}{2\times22} = 49$ $\Rightarrow$ r = 7 cm

From (ii) we have, the curved surface area,

$2\pi rh = 2\times\frac{22}{7}\times7\times h = 154$ $\Rightarrow$ $h = \frac{7}{2}$ cm.

$\therefore$ Volume of the cylinder = $\pi r^2 h = \frac{22}{7}\times7\times7\times\frac{7}{2} = 539\,cm^3$.

24. The total number of days for which the record is available = 250

    (i) P(the forecast was correct on a given day)

$$= \frac{\text{Number of days when the forecast was correct}}{\text{Total number of days for which the record is available}} = \frac{175}{250} = 0.7$$

    (ii) The number of days when the forecast was not correct = 250 - 175 = 75

    So, P(the forecast was not correct on a given day) $= \frac{75}{250} = 0.3$

25.
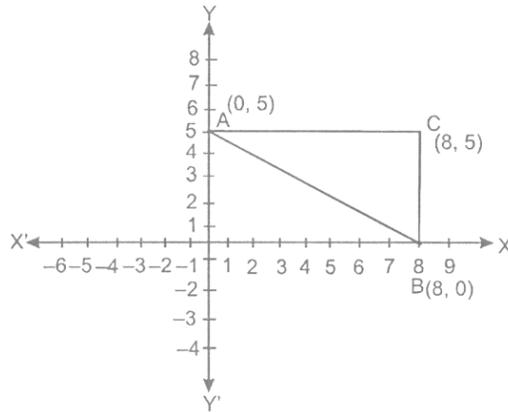
The figure obtained by joining the given three points A, B, & C is right angled triangle.

SECTION # D

26. Let $a + b = x$; $b + c = y$; $c + a = z$

L.H.S. $(a + b)^3 + (b + c)^3 + (c + a)^3 - 3(a + b)(b + c)(c + a)$

$$= x^3 + y^3 + z^3 - 3xyz$$
$$= (x + y + z)(x^2 + y^2 + z^2 - xy - yz - xz)$$
$$= \frac{1}{2}(x + y + z)(2x^2 - 23y^2 + 2z^2 - 2xy - 2yz - 2xz)$$
$$= \frac{1}{2}(x + y + z)[(x^2 - 2xy + y^2) + (y^2 + 23yz + z^2) + (z^2 - 2xz - x^2)]$$
$$= \frac{1}{2}(x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$$

Now, $x + y + z = (a + b) + (b + c) + (c + a)$
$$= 2a + 2b + 2c$$
$$= 2(a + b + c)$$

$x - y = a - c$, $y - z = b - a$, $z - x = c - b$

$\therefore$ L.H.S. $= \frac{1}{2} \cdot 2(a + b + c)[(a - b)^2 + (b - a)^2 + (c - b)^2]$
$$= (a + b + c)(a^2 - 2ac + c^2 + b^2 - 2ab + a^2 + c^2 - 2bc + b^2)$$
$$= 2(a + b + c)(a^2 + b^2 + c^2 - ab - bc - ac)$$
$$= 2(a^2 + b^3 + 3 - 3abc) \qquad \textbf{Hence Proved}$$

27. **Construction :** Join CD.

Since, D is the mid-point of AB. So, in $\triangle ABC$, CD is the median.

$\Rightarrow \qquad\qquad ar(\triangle BCD) \qquad = \frac{1}{2} ar(\triangle ABC) \qquad ...(i)$

Since, $\triangle PDQ$ and $\triangle PDC$ are on same base PD and between same parallels PD and CQ.

$\therefore \qquad\qquad ar(\triangle PDQ) \qquad = ar(\triangle PDC)$

Now, from (i), $\qquad ar(\triangle BCD) \qquad = \frac{1}{2} ar(\triangle ABC)$

$\Rightarrow \qquad ar(\triangle BDP) + ar(\triangle PDC) \qquad = \frac{1}{2} ar(\triangle ABC)$

$\Rightarrow \qquad ar(\triangle BDP) + ar(\triangle PDQ) \qquad = \frac{1}{2} ar(\triangle ABC)$
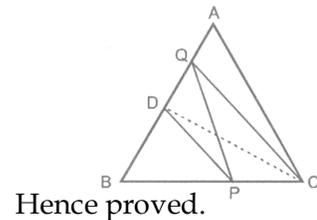
$\Rightarrow \qquad\qquad ar(\triangle BPQ) \qquad = \frac{1}{2} ar(\triangle ABC) \qquad\qquad$ Hence proved.

28. Let, radius of each circle = r cm

AB = 12 cm

$\therefore O_1O_2 = 12 - 2r$

In quadrilateral O_1DO_2C, $O_1D = O_2C$

$O_1C = O_2D$ [Radii of congruent circles]

$\therefore$ O_1DO_2 is a rhombus

$\therefore$ $CD \perp O_1O_2$ and CD bisect O_1O_2

$\therefore$ $CP = \frac{1}{2} \times CD = 3$ cm.
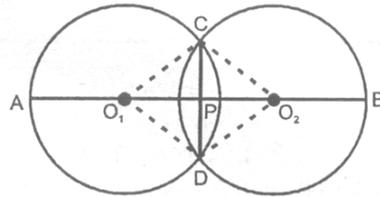
and $O_1P = \frac{1}{2}(O_1O_2) = \frac{1}{2}(12 - 2r) = (6 - r)$ cm

Now in right ΔCPO_1, $(O_1C)^2 = (O_1P0^2 + (PC)^2$

$\Rightarrow r^2 = (6 - r)^2 + (3)^2$

$\Rightarrow r^2 = 36 + r^2 - 12r + 9$

$\Rightarrow 12r = 45 \Rightarrow r = \frac{45}{12} \Rightarrow r = 3.75$ cm

29. Since AB = 9 m and BC = 40 m, $\angle B = 90^0$, we have :

$\begin{aligned} AC &= \sqrt{9^2 + 40^2}\,m \\ &= \sqrt{81 + 1600}\,m \\ &= \sqrt{1681} = 41\,m \end{aligned}$

Therefore, the first group has to clean the area of triangle ABC, which is right angled.

$\begin{aligned} \text{Area of } \Delta ABC &= \frac{1}{2} \times \text{base} \times \text{height} \\ &= \frac{1}{2} \times 40 \times 9\ m^2\ 180\ m^2. \end{aligned}$
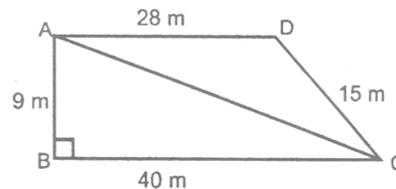
The second group has to cleem the area of triangle ACD, which is scalene has having sides 41 m, 15m and 28m.

Here $s = \frac{41 + 15 + 28}{2}m = 42\,m$

Therefore, area of ΔACD $\begin{aligned} &= \sqrt{s(s-a)(s-b)(s-c)} \\ &= \sqrt{42(42-41)(42-15)(42-28)}\,m^2 \\ &= \sqrt{42 \times 1 \times 27 \times 14}\,m^2 = 126\,m^2 \end{aligned}$

So, first group cleaned 180 m^2 which is (180 - 126) m^2, i.e., 54m^2 more than the area cleaned by the second group. Total area cleaned by all the students = (180 + 126) m^2 = 306 m^2.

30.

C.I.	Frequency	C.I. (adjusted)
21-24	30	20-25
26-29	24	25-30
31-34	52	30-35
36-39	28	35-40
41-44	46	40-45
46-49	10	45-50
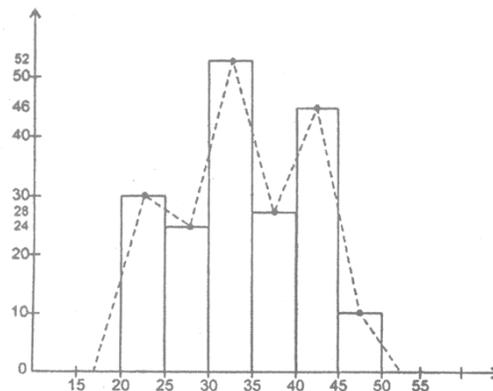
HINTS & SOLUTIONS (MATHEMATICS)

TEST PAPER # 2

SECTION # A

Directions : Answer the questions (1 to 10)

1. Let $x = 0.4\overline{18}$

Then, $x = 0.4181818....$ (i)

multiplying eq. (i) by 10

    $10x = 4.181818$ ....(ii)

again multiplying eg. (ii) by 100

    $1000x = 418.181818$ ....(iii)

subtracting (ii) from (iii), we get :

$\Rightarrow$ $990x = 414$

$\Rightarrow$ $x = \dfrac{414}{990} = \dfrac{23}{55}$.

Hence, $0.4\overline{18} = \dfrac{23}{55}$.

2. -d/c

3. (i) $3x + ay = 6$

If $x = 1, y = 1$ is a solution, then it must satisfy the equation.

$\therefore$ $3(1) + a(1) = 6$

$\Rightarrow$ $a = 6 - 3 = 3$

4. $60^0 \, 120^0$

5. $60^0 + 40^0 + 4x = 180$

$4x = 20^0$

$x = 20^0$

20^0
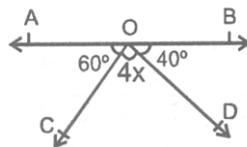
6. Parallelogram whose diagonals are equal is a square hence $\angle ABC = 90^0$

7. L.S.A. of a square $= 4 \times side^2 = 4 \times 20^2 = 4 \times 400 = 1600 \text{ cm}^2$

8. $\overline{x} = \dfrac{10 + 12 + 16 + 20 + p + 26}{6} = 17$

$\Rightarrow$ $\dfrac{84 + p}{6} = 17$

$\Rightarrow$ $\dfrac{14 + \dfrac{p}{6}}{} = 17$

$\Rightarrow$ $\dfrac{p}{6} = 17 - 14 = 3$

i.e., $p = 3 \times 6 = 18$.

9. Points of the form (a, 0), i.e., the points in which ordinate is 0, those points lie on the x-axis. The points in which abscissa is 0, lie on the y-axis. (ii) (1, 0) and (iv) (0, 0).

10. A.T.Q. $\dfrac{1 + 2 + 5 + 10}{4} = \dfrac{18}{4} = 4.5$

11. $\dfrac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} - \dfrac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} - \dfrac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}}$ .....(i)

Let, I = A - B - C

Where $A = \dfrac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}}$ and $B = \dfrac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}}$

$A = \dfrac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} \times \dfrac{\sqrt{10}-\sqrt{3}}{\sqrt{10}-\sqrt{3}}$ and $B = \dfrac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} \times \dfrac{\sqrt{6}-\sqrt{5}}{\sqrt{6}-\sqrt{5}}$

$\Rightarrow A = \dfrac{7\sqrt{3}(\sqrt{10}-\sqrt{3})}{10-3}$ and $B = \dfrac{2\sqrt{30}-2\times 5}{6-5}$

$\Rightarrow A = \sqrt{3}(\sqrt{10}-\sqrt{3})$ and $B = 2\sqrt{30}-10$ .....(iii)

$\Rightarrow A = \sqrt{30}-3$ ....(ii)

and $C = \dfrac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}} \times \dfrac{\sqrt{15}-3\sqrt{2}}{\sqrt{15}-3\sqrt{2}} = \dfrac{3\sqrt{30}-18}{15-18} = \dfrac{3\sqrt{30}-18}{-3} = -\sqrt{30}+6$

So, I = A - B - C

$= (\sqrt{30}-3)-(2\sqrt{30}-10)-(\sqrt{30}+6)$

$= \sqrt{30}-3-2\sqrt{30}+10+\sqrt{30}-6$

$= 2\sqrt{30}-2\sqrt{30}-3+10-6$

$= 1$ **Hence proved**

12. Let exterior and interior angles be x^0 and $5x^0$ also $(x + 5x^0) = 180^0$, $(x^0 = 30^0)$ and x. n = 360^0 where n is number of sides of polygon.

So, $30 \times x = 360^0$

$x = 12$

13.
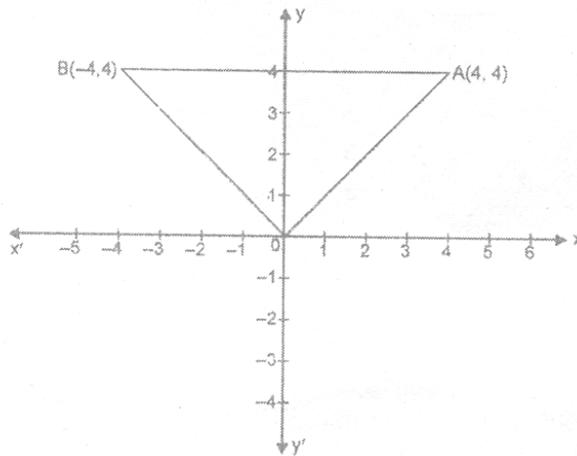
Joining OA, OB and BA, we get a triangle.

14. The given equation is 5x - y + 3 =0
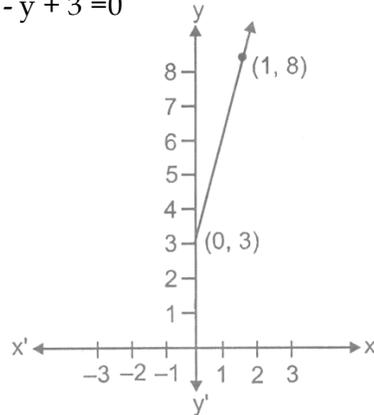
15. Here a = 16 cm, b = 22, let c = x cm

Now perimeter = a + b + c

$\Rightarrow$ 64 = 16 + 22 + c

c = 26 cm

$s = \dfrac{a+b+c}{2} = \dfrac{64}{2} = 32$

Area $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{32(32-16)(32-22)(32-26)}$

$= \sqrt{16 \times 16 \times 10 \times 6}$

$= 32\sqrt{15}$ cm^2

SECTION # C
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16. Let the number of sides be n and 2n. Then their interior angles are $\left(\dfrac{2n-4}{n} \times 90\right)$ and

$\left(\dfrac{2(2n)-4}{2n} \times 90\right)$.

$\dfrac{\dfrac{2n-4}{n} \times 90}{\dfrac{2(2n-4)}{2n} \times 90} = \dfrac{3}{4}$

$\dfrac{2n-4}{2n-2} = \dfrac{3}{4}$ $\qquad \Rightarrow \qquad$ $\dfrac{n-2}{n-1} = \dfrac{3}{4}$

4n – 8 = 3n – 3

N = 5

So that the number of sides are 5 and 10.

17. We are given that perimeter of triangle = 12 cm, $\angle$B = 60^0 and $\angle$C = 45^0

Steps of Construction

(i) Draw a ray PX and cut off a line segment PQ = 12 cm from it.

(ii) At P, construct $\angle$YPQ = 30^0 (1/2 × 60^0).

(iii)AT Q, construct $\angle$ZOP = 22.5^0 (1/2 × 45^0)

(iv)Let the rays PY and QZ intersect at A.

(v) Draw the perpendicular bisector of AP intersecting PQ at a point B.

(vi)Draw the perpendicular bisector of AQ intersecting PQ at a point C.

(vii)   Join AB and AC.

So, Δ ABC is the required triangle.
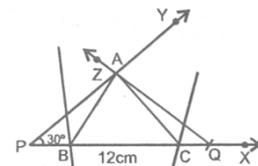
18. Dimensions of the rectangular solid are 66 cm, 42 cm 21 cm.

Volume of the solid = $66 \times 42 \times 21$ cm^3

Diameter of a spherical lead shot = 4.2 cm

$\Rightarrow$ radius = 2.1 cm

Volume of a spherical lead shot $= \frac{4}{3} \times \frac{22}{7} \times (2.1)^3$

$\therefore$ Number of lead shots $= \dfrac{\text{Volume of the recangular solid}}{\text{Volume of one spherical shot}}$

$= \dfrac{66 \times 42 \times 21 \times 21}{88 \times (2.1)^3}$

19.

xi	fi	fixi
10	4	40
15	6	90
20	8	160
25	18	450
30	6	180
35	5	175
40	3	120
Total	**50**	**1215**

So, $\bar{x} = \dfrac{\sum f_i x_i}{\sum f_i} = \dfrac{1215}{50} = 24.30$

20. Total number of drivers = 2000.

(i) The number of drivers who are 18 - 29 years old and have exactly 3 accidents in one year is 61. So, P(driver is 18 - 29 years old with exactly 3 accidents) $= \dfrac{61}{2000} = 0.0305 = 0.031$

(ii) The number of drivers 30 - 50 years of age and having one or more accidents in one year = 125 + 60 + 22 + 18 = 225

So, P (driver is 30 - 50) years of age and having one or more accidents) $= \dfrac{225}{2000} =$

$0.1125 \approx 0.113$

(iii) The number of drivers having no accidents in one year = 440 + 505 + 360 = 1305

So, P(no accidents) $= \dfrac{1305}{2000} = 0.6525$

21. Let p(y) = y^3 - 7y + 6

Constant term f p(y) is 6.

Factors of 6 are $\pm 1, \pm 2, \pm 6$,

p(1) = 1 - 7 + 6 = 0

$\Rightarrow$ (y - 1) is a factor of p(x).

Dividing p(y) by (y - 1), we find the other factor.

p(y) = (y - 1) (y^2 + y - 6)

= (y - 1 (y^2 + 3y - 2y - 6)

= (y - 1) [y(y + 3) - 2(y + 3)]

= (y - 1) (y + 3) (y - 2)

22. (i) A   (ii) G   (iii) 0   (iv) 4   (v) (0, -5)   (vi) (-4 , 0)

23. Let PQRS be the given quadrilateral.

PQ = 9 m, OR = 40m, SR = 28 m, PS = 15m, ∠PQR = 90.0

$\Rightarrow$ PR^2 = 9^0 + 4^2

$\Rightarrow$ PR = 41 cm.

$\therefore$ Area of ΔPQR = $\dfrac{1}{2}$ × PQ × QR = $\dfrac{1}{2}$ × 9 × 40 = 180 cm^2

In ΔPRS, PR = 41, SR = 28, PS = 15

$s = \dfrac{41 + 28 + 15}{2} = 42$

area of ΔPRS $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{42(42-41)(42-28)(42-15)}$

$= \sqrt{42 \times 1 \times 14 \times 27} = 126\,m^2$

$\therefore$ Area of ΔPQRS = area ΔPQR + area ΔPRS

= 180 + 126 = 306 m^2
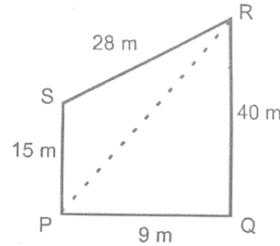
24. $\dfrac{4}{3}.\pi\left(\dfrac{42}{2}\right)^3 = \pi\left(\dfrac{28}{2}\right)^2 .x$, where x would be length of wire.

x = 63 cm

25. Let ABCD be the field.

perimeter = 400 m

So, each side = 400 m ÷ 4 = 100 m.

i.e. AB = D = 100

Let diagonal BD = 160 m

Then semi-perimeter of ΔABD is given by

$s = \dfrac{100 + 100 + 160}{2}\,m = 180\,m$

Therefore, area of ΔABD

$= \sqrt{180(180-100)(180-100)(180-160)}$

$= \sqrt{180 \times 80 \times 80 \times 20}\,m^2 = 4800\,m^2$

Therefore, each of them will get an area of 4800 m^2, and the total area

= 2 × 4800 m^2 = 9600 m^2.
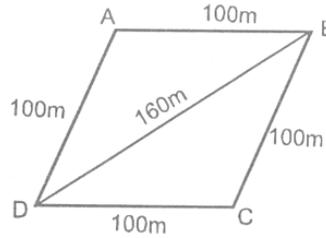
SECTION # D

26. **Given :** ΔABC is isosceles with AB = AC, E and F are the mid-point of BC, CA and AB.

To prove : AD $\perp$ EF and is bisected by it

Construction : Join D, E and F

Proof: DE $\parallel$ AC and DE = $\dfrac{1}{2}$ AB

and DF $\parallel$ AE and DF = $\dfrac{1}{2}$ AC
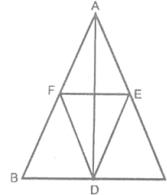
[Line segment joining mid-points of two sides of a triangle is parallel to the third side and is half of it.]

DE = DF [$\therefore$ AB = AC]

Also AF = AE [$\therefore$ AF = $\dfrac{1}{2}$ AB, AE = $\dfrac{1}{2}$ AC]

$\therefore$ DE = AE = AF = DF

and also DF $\parallel$ AE and DE $\parallel$ AF

$\Rightarrow$ DEAF is a rhombus.

Since diagonals of a rhombus bisect each other at right angles.

$\therefore$ AD $\perp$ EF and is bisected by it.

27. **Given :** ABCD is a rhombus. AB produced to E and F such that AE = AB = BF

Construction : Join ED and CF and produce it to meet at G.

To prove : $ED \perp FC$

Proof : AB is produced to points E and F such that.

$$AE = AB = BF$$

Also, since ABCD is a rhombus

$$AB = CD = BC = AD \qquad ...(ii)$$

Now, in ΔBCF, $\quad BC = BF \qquad$ [From (i) and (ii)]

$$\Rightarrow \qquad \angle 1 = \angle 2$$
$$\angle 3 = \angle 1 + \angle 2 \qquad \text{[Exterior angle]}$$
$$\angle 3 = 2\angle 2 \qquad ..(iii)$$

Similarly, $\quad AE = AD$

$$\angle 5 = \angle 6$$
$$\Rightarrow \qquad \angle 4 = \angle 5 + \angle 6 = 2\angle 5$$
$$\angle 4 = 2\angle 5 \qquad ..(iv)$$

by adding (iii) and (iv) we get

$$\angle 4 + \angle 3 = 2\angle 5 + 2\angle 2$$
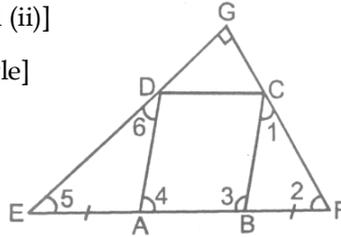
$$\Rightarrow \qquad 80^0 = 2(\angle 5 + \angle 2) \qquad [\because \ \angle 4 \text{ and } \angle 3 \text{ are consecutive interior angles}]$$

$$\therefore \ EG \perp FC \text{ Now in } \Delta EGF$$

$$\angle 5 + \angle 2 + \angle EGF = 180^0$$

$$\Rightarrow \qquad \angle EGF = 90^0 \qquad\qquad\qquad\qquad\qquad\qquad\qquad \textbf{Hence proved.}$$

28. **Given :** A cyclic quadrilateral ABCD.

To Prove : $\angle BAD + \angle BCD = 180^0$ and $\angle ADC + \angle CBA = 180^0$

Construction : Let O be the centre of the circle passing through A, B, C and D.

Join OB and OD.

Proof. $\angle BAD = \dfrac{1}{2}$ reflex $\angle BOD$

$$= \dfrac{1}{2}x, \text{ say [The angle subtended by an arc at the centre is double the angle}$$

subtended by it at any point on the remaining part of the circle]....(i)

and $\angle BCD \qquad = \dfrac{1}{2}\angle BOD = \dfrac{1}{2}y, \text{say} \qquad\qquad\qquad \text{(ab above)....(ii)}$

Adding (i) and (ii), we have

$$\angle BAD + \angle BCD = \dfrac{1}{2}x + \dfrac{1}{2}y$$

$$= \dfrac{1}{2}(x + y) = \dfrac{1}{2} \times 360^0 = 180^0 \, (As\, X + y = 360^0)$$

Again, as the sum of the angels of a quadrilateral is 360^0, therefore,

$\angle ADC + \angle CBA = 60^0 - (\angle BAD + \angle BCD) = 360^0 - 180^0 = 180^0.$

IInd Part :

$\angle ADQ + \angle ADC = 180^0 \qquad\qquad\qquad\qquad\qquad$ **[Linear pair]**

$\Rightarrow \ \angle ADC = 180^0 - 95^0$

$\Rightarrow \ \angle ADC = 85^0$

$\Rightarrow \ \angle ADC + \angle B = 180^0$

[Opp. angles of a cyclic quadrilateral]

$\Rightarrow \ \angle = 180^0 - 85^0$

$\Rightarrow \ \angle B = 95^0$

$\qquad \angle BCP + \angle BCD = 180^0$

$\qquad \angle BCD = 180^0 - 110^0 = 70^0$

Now $\angle BDC + \angle A = 180^0$

$\Rightarrow \ \angle A = 180^0 - 70^0 = 110^0$

29. Let $p(x) = x^3 + mx^2 + nx + 6$ be the given polynomial. Then, (x - 2) is a factor of p(x)

$\Rightarrow \qquad p(2) = 0 \qquad\qquad\qquad [\because \ x - 2 = 0 \Rightarrow x = 2]$

$\Rightarrow \ (2)^3 + m(2)^2 + n(2) + 6 = 0$

$\Rightarrow \ 8 + 4m + 2n + 6 = 0$

$\Rightarrow \qquad 4m + 2n = -14$

$\Rightarrow \qquad 2m + n = -7 \qquad\qquad\qquad .....(i)$
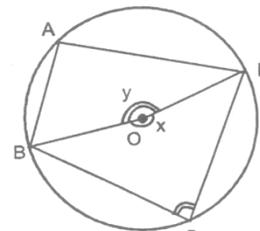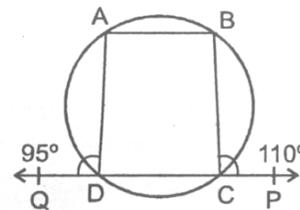
It is given that p(x) leaves the remainder 3 when it is divided by (x - 3). Therefore.

$$p(3) = 3$$

$\Rightarrow$ $(3)^3 + 3(3)^2 + n(3) + 6 = 3$

$\Rightarrow$ $27 + 9m + 3n + 6 = 3$

$\Rightarrow$ $9m + 3n = 3 - 27 - 6$

$\Rightarrow$ $9m + 3n = -24 - 6$

$\Rightarrow$ $9m + 3n = -30$

$\Rightarrow$ $3m + n = -10$ ....(ii)

Subtract equation (ii) from (i), we get

$$m = -3$$

Putting m in (i), we get

$\Rightarrow$ $2m + n = -7$

$\Rightarrow$ $2(-3) + n = -7$

$-6 + n = 7$ $\Rightarrow$ $n = -1$

30.

C.I.	True limits	Frequency	C.F.
0-9	-.5-9.5	5	5
10-19	9.5-19.5	15	20
20-29	19.5-29.5	20	40
30-39	29.5-39.5	23	63
40-49	39.5-49.5	17	80
50-59	49.5-59.5	11	91
60-69	59.5-69.5	9	100
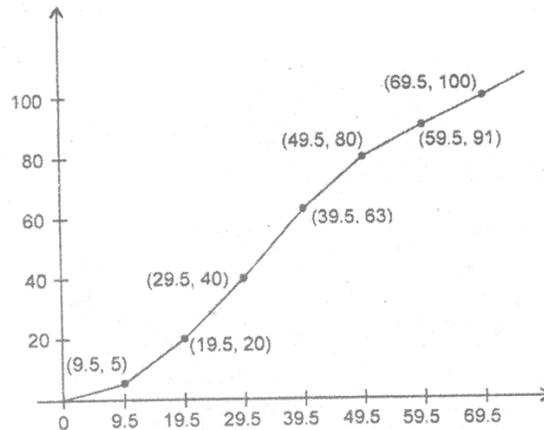
HINTS & SOLUTIONS (SCIENCE AND TECHNOLOGY)
TEST PAPER # 1
SECTION # A

1. $S_n = u + \dfrac{a}{2}(2n-1)$

2. $1^0 = \dfrac{360^0}{2\pi} = \dfrac{180^0}{\pi} = \dfrac{180^0}{3.14} = 57.3^0$

3. Rate of change of momentum or change in momentum per unit time is equal to the applied force.

4. A sponge has minute holes, in which air is trapped. When we press it, the air is expelled out and we are able to compress it. But still it maintain its shape and size as we remove the pressure applied, so it is a solid.

5. 15% solution of Nacl is the solution which contains 15 g of NaCl and 85 g of water.

6. Oxygen, Nitrogen and Argon can be separated by fractional distillation of air.

7. Physical quantities can be divided into two types :

    (i) Scalar quantity : Any physical quantity, which can be completely specified by its magnitude alone, a scalar quantity or a scalar.

    Eg : Charge, distance, area, speed, time, temperature, density, volume, work, power, energy, pressure, potential etc.

    (ii) Vector quantity : Any physical quantity, which required direction in addition to its magnitude it known as a vector quantity.

    Eg.: Displacement, velocity, acceleration, force, momentum, weight and electric field etc.

8. Distance = AB + BA + AC = a + a + $\sqrt{a^2+b^2}$ = $2a + \sqrt{a^2+b^2}$ = $2a + \sqrt{a^2+b^2}$

    Displacement = AC = $\sqrt{a^2+b^2}$

9. 2 KWh = 1000 Wh = 1000 × 60 × 60 Ws = 3600000 J = 3.6 × 10^6 J   (∴ Ws = J)

10. (i) Ultrasonic waves have a very high frequency due to which they can penetrate deep in sea water without being absorbed.

    (ii) Ultrasonic waves cannot be confused with the noises, such as the voice of engines of ship. It is because the ultrasonic waves are not perceived by human ear.

11. (a) Atmospheric gases can be liquefied by decreasing temperature and increasing pressure.

    (b) LPG : Liquefied Petroleum Gas.

       CNG : Compressed Natural Gas.

12. In a neutral atom, number of electrons are equal to the number of proton.

No. of protons = No. of electrons = 29

Mass number = No. of protons + No. of neutrons

So, No. of neutrons (N) = Mass number - No. of protons

$$= 63 - 29$$

Number of neutrons (N) = 34

Electronic configuration : Electronic configuration is written on the basis of total number of electrons. So, the electronic configuration of the element is 2,8,18,1

13. It is clear that the particle must be placed on the line AB, suppose it is at a distance x from A.

Let its mass is m'.

$F_1 = \dfrac{Gmm'}{x^2}$ towards A

and that due to B is,

$F_2 = \dfrac{G(2m)m'}{(d-x)^2}$ towards B.
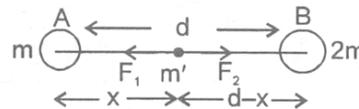
The net force will be zero if $F_1 = F_2$

Thus, $\dfrac{Gmm'}{x^2} = \dfrac{G(2m)m'}{(d-x)^2}$

or $(d - x)^2 = 2x^2$

$d - x = \pm\sqrt{2}\,x$

$d = (1 \pm\sqrt{2})\,x$

$x = \dfrac{d}{\left(1+\sqrt{2}\right)}$ or $\dfrac{d}{\left(1-\sqrt{2}\right)}$

As x cannot be negative

So $x = \dfrac{d}{\left(1+\sqrt{2}\right)}$

14. Mass of bullet, m = 10 g = 0.01 kg

Mass of Gun, M = 5.0 kg

Velocity of bullet, v = 250 m/s

Let the velocity with which Gun recoils is V.

By the law of conservation of momentum,

Initial momentum of the system = Final momentum of the system.

m(0) + M(0) = mv + V

$V = -\dfrac{0.01 \times 250}{5.0} = -0.5\,\text{m/s}$

Recoil velocity of the gun is 0.5 m/s.

15. The reaction between iron and steam occurs as :

$$3Fe + 4H_2O \rightleftharpoons Fe_3O_4 + 4H_2$$

From chemical equation we can write

4 moles of steam (H_2O) are required to convert 3 moles of Fe into its oxide.

$\therefore$ 1 mole of steam (H_2O) will convert $= \dfrac{3}{4}$ mole of Fe into its oxide.

1 mole of steam = 18 g of H_2O

1 mole of Fe = 56 g of Fe

So, 18 g of steam will convert $= \dfrac{3}{4} \times 56$ g of Fe into its oxide = 42 g of FE

18 g of steam will 42g of Fe into its oxide.

16. **(a) Mole :** A mole of a substance is that amount of the substance which contains the same number of particles (atoms, molecules or ions) as there are carbon atoms in 12 g of carbon - 12 element.

(b) 1 mole of carbon = Gram Atomic Mass of carbon = 12 g

So, 1 of carbon $= \dfrac{1}{12}$ mole of carbon

1 mole of an element = 6.023×10^{23} atoms of element

$\dfrac{1}{12}$ mole of carbon = $6.023 \times 10^{23} \times \dfrac{1}{12}$ atoms = x

Now, 1 mole of magnesium= Gram Atomic Mass of magnesium = 24 g

So, 1 g of Magnesium $= \dfrac{1}{24}$ mole of magnesium.

1 mole of magnesium contain = 6.023×10^{23} atoms

$\dfrac{1}{24}$ mole of magnesium contain $= \dfrac{1}{24} \times 0.023 \times 10^{23}$ atoms

According to the questions -

$\dfrac{1}{12} \times 6.023 \times 10^{23}$ carbon atoms = x

$\therefore \dfrac{1}{24} \times 6.023 \times 10^{23}$ magnesium atoms $\dfrac{x}{2}$

1 g of magnesium contains $\dfrac{x}{2}$ atoms.

Thus, if 1 gram of carbon contains x atoms, then 1 gram of magnesium will have $\dfrac{x}{2}$ atoms in it.

17. Let a body of mass **m** is at rest at a height **h** from the earth's surface, when it starts falling, after a distance **x** (point B) its velocity becomes **v** and at earth's surface its velocity is **v'.**
Mechanical energy of the body :

At point A :

E_A= Kinetic energy + Potential energy

$$E_A = \frac{1}{2}m(0)^2 + mgh$$

$E_A = mgh$ .....(i)

At point B :

$$E_B = \frac{1}{2}mv^2 + mg(h-x)$$ .....(ii)

From third equation of motion at points A and B

$v^2 = u^2 + 2gx$ $\therefore u = 0$

On putting the value of v^2 in equation (ii)

$$E_B = \frac{1}{2}m\,m(2gx) + mgh - mgx$$

$E_B = mgx + mgh - mgx$

$E_B = mgh$ ....(iii)

At point C :

$$E_C = \frac{1}{2}m(v')^2 + mg \times 0.$$

$$E_C = \frac{1}{2}m(v')^2$$ ....(iv)

From third equation of motion at points A and C.

$(v')^2 = u^2 + 2gh$ $\therefore u = 0$

So, $(v')^2 = 2gh$

On putting the value of $(v')^2$ in equation (iv)

$$E_C = \frac{1}{2}m(2gh)$$

or $E_C = mgh$ ....(iv)

From equation (i), (iii) and (v)

$E_A = E_B = E_C$

Hence, the mechanical energy of a freely body will be constant.

i.e. Total energy of the body during free fall, remains constant at all positions. The form of energy, however keeps on changing. At point A, energy is entirely potential energy and at point C, it is entirely kinetic energy In between A and C, energy is partially potential and partially kinetic. This variation of energy is shown in figure. Total mechanical energy stays constant (mgh) throughout.

Thus is an isolated system, where only conservative forces cause energy changes, the kinetic energy and potential energy can change, but the mechanical energy of the system (which is sum of kinetic energy and potential energy) cannot change. We can, therefore, equate the sum of kinetic energy and potential energy at one instant to the sum of kinetic energy and potential energy at another instant without considering intermediate states. This law has been found to be valid in every situation. No violation, whatsoever, of this law has ever been observed.

18. **(a)** $2KClO_3 \longrightarrow 2KCl + 3O_2$

   30g   14.9g   9.6g
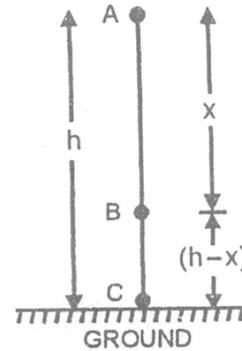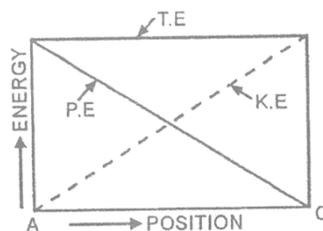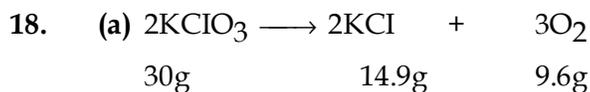
Suppose mass of under composed $KClO_3$ = xg

According to law of conservation of mass the total mass before and after the reaction remains constant. $30.0 = x + 14.9 + 9.6$

x = 5.5 g

(b) (i) Nucleus is present in the centre of atom and it contains protons and neutrons.

(ii) Nucleus is positively charged centre having appreciable mass.

Electron is present in extra nuclear resion of atom. Electron is negatively charged particle with negligible mass.

SECTION – B

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19. Mitochondria, plastid and centrioles have their own DNA molecules so they are called as semi - autonomous cell organelles.

20. Epithelium

21. Diseases which last for short periods and are severe are called **acute diseases.**

Examples of Acute diseases : Cough, cold, cholera, typhoid.

22.
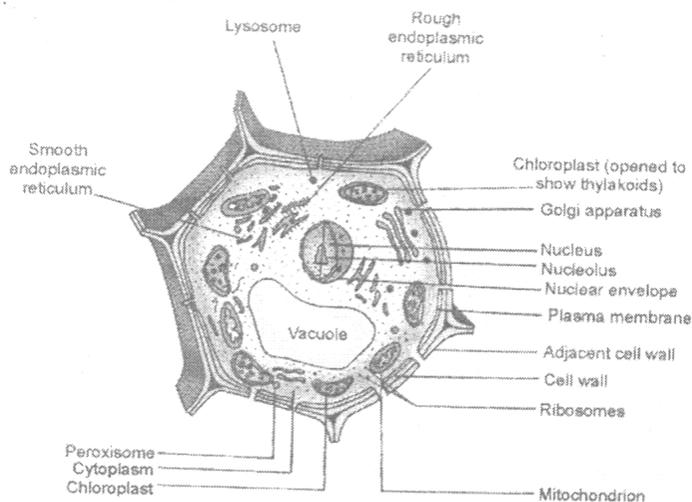
23. **(i) Division Thallophyta :**

• **Thallus :** Undifferentiated plant body i.e. absence of root, stem & leaves.

• Their is no vascular system.

• Reproductive organs are single -celled and there is no embryo formation after fertilization.

• Dominant gametophyte.

Algae and Fungi.

24. **Blood :** It is reddish coloured vascular tissue that flows inside blood vessels by means of pumping activity of heart, pH is 7.4. Colour is bright red in oxygenated form and purple in deoxygenerated form Blood has two parts, fluid plasma (55%) and blood cells (45%). There are three types of blood cells

1. Red blood Cells.

2. White Blood Cell
- Granulocytes
  - Eosinophils
  - Neutrophils
  - Basophils
- Agranulocytes
  - Monocytes
  - Lymphocyt
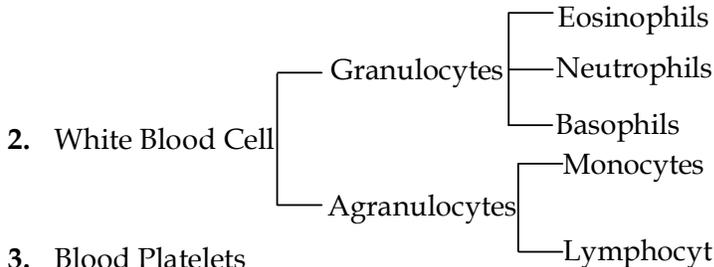
3. Blood Platelets

Lymph : It is light yellow fluid connective tissue which is formed from tissue fluid and filtered out blood. Lymph is devoid of red blood corpuscles and blood platelets. Proteins are fewer, so are white blood corpuscles. However, lymphocytes are most abundant. Lymph flows lymph capillaries and lymph vessels. All places they pass through lymph nodes and lymph organs where lymphocytes multiply and mature. They are also sites for entrapping microbes. Lymph's is ultimately passed into blood. Most of the organs and tissues pour their secretions and excretions into lymph instead of blood. Lymph's is middle man between tissues and blood.

Serum. Serum is plasma from which fibrinogen is removed.

25. Advantages of Fertilizers.

• Fertilizers are nutrient specific, so these supply specific elements to the soil.

• Fertilizers are compact and in concentrated form, So they are easy to store and transport. They are even required in very small amount.

• Fertilizers are readily absorbed by the plants because they are soluble in water.

• Fertilizers are available throughout the year at the places.

• Fertilizers are a factor in higher yields of high cost farming.

Disadvantages of Fertilizers. Fertilizers are non-biodegradable. The excessive use of fertilizer causes.

• Water pollution in lakes and rives due to eutrophication which makes the water unfit for human consumption and even kills the aquatic animals.

• Change in the nature of soil (or soil chemistry) making it either too alkaline or too acidic. For example, when we use ammonium sulphate fertilizer in the same soil again and again, the soil becomes acidic whereas when we use sodium fertilizer in the same soil again and again, the soil becomes alkaline.

• Fertilizers are quite expensive. They push the cost of crop production.

• Fertilizers give only short term benefits.

• They harm soil microorganisms.

• Nonreplenishment of organic matter destroys the crumb structure of soil affecting both hydration.

26.

Characters	Prokaryotic Cells	Eukaryotic Cells
1. Nuclear body	Incipient nucleus, No nuclear membrane Nucleolus absent No mitosis Single closed loop, (histones absent)	True nucleus, Nuclear membrane, present Nucleolus present Mitosis found Multiple chromosomes, (histones present in chromosome)
2. Photosynthetic apparatus	In internal membranes, (chloroplasts absent)	In chloroplasts
3. Golgi bodies, Chloroplast, Endoplasmic reticulum, Mitochondria, Lysosomes	Absent	Present
4. Ribosomes	70 S type	80 S type

27. **(i) Striated muscles :** They are also called as voluntary muscles because these are under the control of one's will. Muscle fibers or cells are multinucleated and unbranched. Each fiber enclosed by thin membrane which is called as **sarcolemma.** Cytoplasm is called as sarcoplasm. These muscles get tired and need rest.
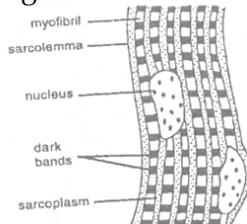
(ii) Non striated muscles : They are involuntary muscles also called as smooth muscles. These muscle fibers are uninucleated & spindle shaped. They are not enclosed by membrane but many fibers are joined together in bundles. Such muscles are found in the walls of stomach, intestine, urinary bladder, bronchi, iris of eye etc. peristaltic movements i n alimentary canal are brought about by smooth muscles.
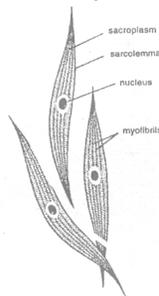
(iii) Cardiac muscle fibers : They are also involuntary muscles. Only found in the walls of heart. Their structure is in between the striated & non-striated muscles. They are uninucleated & branched. Branches are united by intercalated disc. In these muscles **rhythmic contraction & relaxation** occurs throughout the life.

HINTS & SLUTIONS (SCIENCE AND TECHNOLOGY)

TEST PAPER # 2
SECTION

1. No   **2.** Steel   **3.** Zero

4. The characteristics of matter which can be demonstrated by diffusion and Brownian motion are

(i) matter is made up of tiny particles.

(ii) the particles of matter are constantly moving.

5. The outer most shell of an atom is known at the valence shell.

6. Fourth and fifth states of matter are Plasma state and Bose-Einstein condensate respectively.

7. Given : Power = 100 watt

Time 6 hours = 21600 s

Energy consumed = Power × Time = $100 \times 21600 = 216 \times 10^4$ J

8. s_1 = 10 km, v_1 = 50 km/h, s_2 = 10 km, v_2 = 40 km/h

Average speed = $\dfrac{\text{Total distnce}}{\text{Total time taken}}$

$t_1 = \dfrac{s_1}{v_1} = \dfrac{10}{50} = \dfrac{1}{5} h,$ $t_2 = \dfrac{s_2}{v_2} = \dfrac{10}{40} = \dfrac{1}{4} h$

Average speed = $\dfrac{s_1 + s_2}{t_1 + t_2} = \dfrac{10 + 10}{\dfrac{1}{5} + \dfrac{1}{4}} = 44.4 \, km/h$

9. Let the distance of dog from the building be d.

Here, v = 340 m/s, t = 2.5 s

We know, $d = \dfrac{vt}{2} = \dfrac{340 \times 2.5}{2} = 425 \, m$

10. Given : Mass, m = 50 kg

Force, F = 200 N

Acceleration, $a = \dfrac{F}{m} = \dfrac{200}{50} = 4 \, ms^{-2}$

The acceleration of the box will be 4 m/s^2

Now, if the mass is halved, the acceleration would be doubled, it would be 8 ,/s^2.

11. Defects of Rutherford' model :

(1) Rutherford did not specify the number of electrons in each orbit.

(2) According to electromagnetic theory, if a charged particle (electron) is accelerated around another charged particle (nucleus) then there would be continuous irradiation of energy. This loss of energy would slow down the speed of electron and eventually the electron would fall into the nucleus. But such a collapse does not occur. Rutherford's model could not explain this theory.

12.

State	Rigidity	Compressibility
Solid	Solids are rigid. They have definite shape and definite volume.	Solids are almost incompressible.
Liquid	Liquids have fixed volume but no fixed shape.	Liquids are relatively more compressile than solid.
Gas	Gas has neither fixed volume nor fixed shape.	Gas has high compressibility.

13. Here, $u = 0$, $s = 19.6$ m, $a = g = 9.8$ m/s^2

Using equation, $v^2 = u^2 + 2as$

$\Rightarrow v^2 = 0 + 2 \times 9.8 \times 19.6 \qquad \Rightarrow \qquad v = 19.6$ m/s

Momentum of the dumb-bell just before touching the ground is given by,

$P_1 = mv = 15 \times 19.6 = 294$ m/s

Finally, the dumb-bell comes to rest, i.e. its final momentum is zero.

$\therefore$ Momentum transferred to the floor $= 294 - 0 = 294$ kg m/s

14. **1st Equation of Motion :**

Consider a body having initial velocity u. Suppose it is subjected to a uniform acceleration 'a' so that after time 't' its final velocity becomes v. Now we known,

$\text{Acceleration} = \dfrac{\text{change in velocity}}{\text{Time}}$

$a = \dfrac{v - u}{t} \qquad\qquad \text{or} \qquad v = u + at \text{ or } v = at + u \qquad\qquad \dots\dots(i)$

2nd Equation of Motion :

Suppose a body has an initial velocity 'u' and uniform acceleration 'a' for time 't' so that its final velocity becomes 'v'. The distance traveled by moving body in time t is s, then the average velocity $= (u + v)/2$. Distance traveled = Average velocity × time

$s = \left(\dfrac{u + v}{2}\right)t \Rightarrow s = \left(\dfrac{u + u + at}{2}\right)t \qquad\qquad (As, v = u + at)$

$s = \left(\dfrac{2u + at}{2}\right)t \Rightarrow s = \left(\dfrac{2ut + at^2}{2}\right)$

$s = ut + \dfrac{1}{2}at^2 \qquad\qquad\qquad\qquad \dots\dots(ii)$

15. Gun powder is a mixture of potassium nitrate, sulphur and charcoal.

The mixture of gun powder can be separated by using suitable solvent in following steps

(a) When water is added to the mixture then potassium nitrate is dissolved in water while charcoal and sulphur remain insoluble. Insoluble sulphur and charcoal are then separated by filtrating.

(b) This residue is dissolved in carbon disulphide. Sulhpur is soluble in CS_2 while charcoal is insoluble in it. These two constituents can then be separated by filtration.

16. To separate a mixture of two or more miscible liquids for which the difference in boiling points is less than 25K, fractional distillation process is used. Alcohol (b.p. 78^0C) and water (b.p. 100^0C) are miscible liquids having boiling point difference 22^0C or 22K. So, mixture of alcohol and water can be separated by fractional distillation. Apparatus used in separation of mixture of alcohol and water is given below-
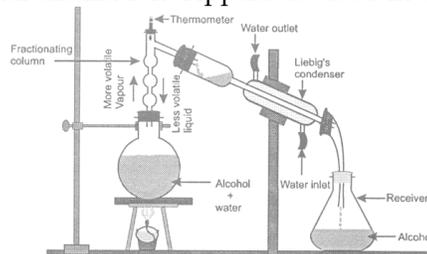
17. The sound waves (coming from a sound producing body) are collected by the pinna of outer ear. These sound waves pass through the ear canal and fall on the ear-drum. Sound waves consist of compression (high pressure regions) and rarefactions (low pressure regions). When the compression of sound wave strikes the ear-drum, the pressure on the outside of ear-drum increases and pushes the ear-drum inwards and when the rarefaction of sound wave falls on the ear-drum, the pressure on the outside of ear-drum decreases and it moves outward. Thus, when the sound waves fall on the ear-drum the ear-drum starts vibrating back and forth rapidly.

The vibrating ear-drum causes a small bone hammer to vibrate. From hammer, vibrations are passed on to the second bone anvil and finally to the third bone stirrup. The vibrating stirrup strikes on the membrane of the oval windows and passes its vibrations to the liquid in the cochlea. Due to this, the liquid in the cochlea beings to vibrate. The vibrating liquid of cochlea sets up electrical impulses in the nerve cells present in it. These electrical impulses are carried by auditory nerve to the brain. The brain interprets these electrical impulses as sound and we get the sensation of hearing.
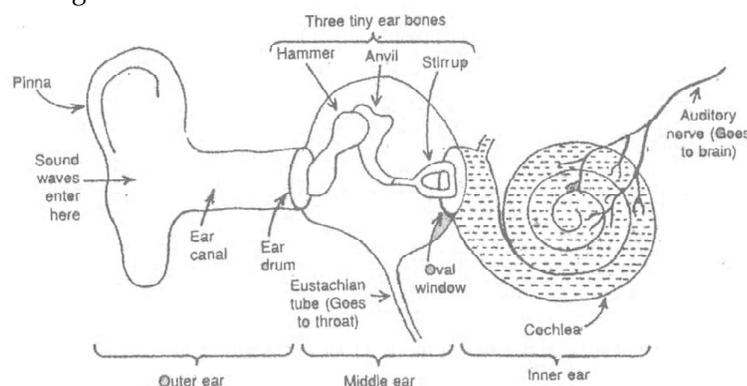
18. **(a)** Let the percentage of $_8^{16}X$ be (a) then percentage of will be(100 - a)

Average atomic mass $= \dfrac{16 \times a + 18(100 - a)}{100} = 16.2$

$\qquad$ a = 90

Thus, percentage of $_8^{16}X = 90$

Percentage of $_8^{18}X = (100 - 90) = 10$

(b) Hydrogen $\left(_1^1H\right)$ does not contain any neutron. It has only 1 electron and 1 proton.

(c) Three isotope of hydrogen $_1H^1$, $_1H^2$ and $_1H^3$ have one proton but number of neutrons are different in different isotopes. Chemical properties depend on number of electrons and number of electrons are similar in all three isotopes. So, these three isotopes have identical chemical properties.
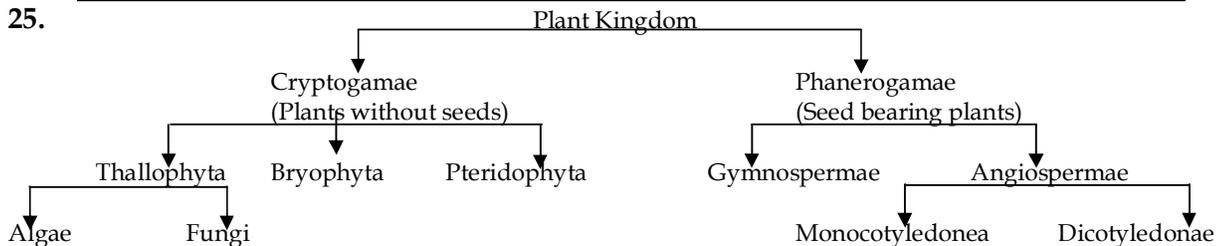

SECTION # B

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19. The diseases which are long lasting are called chronic diseases. Chronic diseases have drastic long term effects on people's health.

Examples of Chronic diseases :

Tuberculosis, arthritis, diabetes, cancer, cardiovascular diseases, elephantiasis.

20. Maristematic tissue.

21. Chlorofluorocarbons (CFC)

22. Single body contains both male and female sex organs is called Hermaphrodite - Earthworm, Taenia solium.

23. **Green-house effect :** Usually carbon dioxide is not considered as pollutant, but its higher concentration forms the thick layer above the earth surface which checks the radiation of the heat from the earth surface. Because of this the temperature of the earth surface increases. This is called as **"Green house effect".**

The various green house gases are CO_2 (Warming effect 60%), CH_4 (warming effect 20%), chlorofluoro carbon or CFCs (14%) and nitrous oxide/N_2O (6%.)

24.

Mixed cropping	Intercropping
1. Seeds. Seeds of different crops are mixed before sowing.	Seeds of different crops are not mixed. They are sown separately.
2. Pattern. There is no pattern of sowing.	The different crops are sown in separate rows or strips.
3. Target. It minises the rist of crop failuare.	It increases crop productivity per unit area.
4. Fertilizers. Only a common type of fertilizer can be added.	Specific fertilizers can be provided to each crop.
5. Pesticides. Crop specific pesticides cannto be sprayed.	Crop specific pesticides can be sprayed without difficulty.
6. Harvesting. Hervesting of early maturing crop provides a lot of difficulty.	There is little difficulty in harvesting individual crops.
7. Produce. Thre is some mixing of the produce of different crops.	There is no mixing of produce of different crops.

25.

```
                          Plant Kingdom
              ┌─────────────────┴─────────────────┐
        Cryptogamae                          Phanerogamae
    (Plants without seeds)               (Seed bearing plants)
    ┌──────┼──────────┐              ┌──────────┴──────────┐
Thallophyta  Bryophyta  Pteridophyta  Gymnospermae      Angiospermae
 ┌────┴────┐                                          ┌──────┴──────┐
Algae    Fungi                              Monocotyledonea   Dicotyledonae
```

Characters :
- Bryophytes are called terrestrial amphibians (amphibians of plant kingdom) because they require moist soil surface for swimming of their sperm & supply of water to all parts.
- They are the first amongst land plants which occur in damp & shady habitat
- Plant body is of primitive form **i.e. differentiated only in stem & leaves.**
- Vascular tissues & mechanical tissues are absent in them.
- Male gamete is flagellated.

26.

Plant cell	Animal cell
1. Cell wall, It is present	Cell wll is absent.
2. Plastids. They are present	Plastids are absent.
3. Centrosomes. Centrosomes and centrioles are absent.	Centrosome with one or two centrioles are present.

27. *Five kingdom system :* It was given by **Robert Whittaker.** According to him organisms were divided into five kingdoms.
(A) Kingdom Monera : Unicellular, prokaryotic, microscopic, most ancient, can live in deep oceans, hot springs, deserts, high salt concentrations etc. They include bacteria, filamentous and photosynthetic blue green algae etc.
(B) Kingdom Protista : Unicellular, colonial, eukaryotic. They include photosynthetic algae, decomposers (slime moulds) and protozoa (predators) etc.
(C) Kingdom Fungi : Unicellular or multicellular eukaryotic organisms, they are heterotrophic, parasitic or saprotrophic.
(D) Kingdom Planate : They are multicellular, eukaryotic, autotrophic (photosynthetic), some are heterotrophic and parasitic. They include photosynthetic algae, green plants etc.
(E) Kingdom Animalia : Multicellular, eukaryotic, heterotrophic.

ANSWER (SOCIAL SCIENCE)

TEST PAPER # 1

1. The Calcutta cricket cluc was the first Indian club to be organised. It was established in 1792.

OR

A Gandhian Cap is made out of a cheap white cotton khadi. Gandhian cap became part of the nationalist uniform and even a symbol of defiance.

2. India extends from latitudes $8^04'$ & $37^06'$N and longitudes $68^07'$ and $97^025'$E

3. When monsoon winds arrive with moisture in them, violent thunder and lightening announce their arrival. This is referred to as 'breaking of monsoon'/

4. Perennial rivers are those which never run dry and Himalayan rivers never run dry as they are snowfed and rainfed.

5. The right to vote granted universally to all adults men or women, rich or poor, white or black.

6. It is electronic voting machine which is used to record votes. The machine shows the names of the candidate and the symbols.

7. (i) Cabinet Ministers
(ii) Ministers of State, some of whom are given independent charge
(iii) Deputy minister.

8. (i) FCI purchases wheat and rice from the farmers in states where there is surplus production.
(ii) It also builds buffer stock.

9. Food security means availability, accessibility and affordability of food to all people at all times.

10. Poverty is a situation in which a person is unable to get minimum bias necessities of life i.e. food, clothing and shelter for this or her substance.

GROUP - A

11. (i) Need for Sleepers : Sleepers were the basis input required for constructing a railway line. Each mile of railway track required between 1700 to 2,000 sleepers. To meet this demand large number of trees were felled.
(ii) Fuel : To run locomotives wood was needed as fuel. As railway was being spread throughout India more and more, wood was requires which could be used as fuel.
(iii) Expansion of railway tracks : From the 1860s, the railway network expanded rapidly By 1890, about 25,500 km of track had been laid. In 1946, the length of the tracks had increased to over 765,000 km. At the railway tracks spread through India, a larger and larger number of trees were felled. As early at the 1850s, in the Madras Presidency alone, 35,000 trees were being cut annually for sleepers.
(vi) Contract to private individuals : The government gave out contracts to individuals gae out contracts to individuals to supply the required quantities. These contractors began cutting trees indiscriminately. Forests around the railway tracks fast started disappearing.

12. (i) It was tribal community of Java.
(ii) They were skilled forest cutters and practiced shifting cultivation.
(iii) They had a great skill in buildings palaces.
(vi) Most of them also worked under the Dutch.

GROUP - B

11. (i) Main occupation : Nomad people depend primarily on animal rearing. Goats, sheep, camels and buffaloes are the main animals reared by the nomads. Some of the nomads also cultivate crops.

    (ii) Movements : Nomads do not move randomly across the landscape but have a strong sense of territoriality. They are aware of physical and cultural characteristics of the region of their movement.

    (iii) Food : Pastoral nomads consume mostly grain rather than meat. They consume wheat, rice, bajra and maize. Some of the food grains are grown by themselves and some are arranged from the path of their movement.

12. (i) Climatic Factor : They had to judge the climatic conditions of the regions where they wanted to move. They had to judge how long the herds could stay in one areas and where they could find water and pasture.

    (ii) Timing : They needed to calculate the timing of their movements and ensure that they could move through different territories.

    (iii) Relationships : They had to set up a relationship with farmers so that herds could graze in harvested fields and manure the soil.

GROUP - C

11. Captain Swing was no person but a mythic name used by poor laborers who were deprived of their common land, of their livelihood and even of their jobs. They could not openly face the influential landlords so they adopted this new method of threatening them. At night, they would attack the farmhouse of the landowners, burn their barn and haystacks and sometimes their entire farm house. Sometimes they would destroy the threshing machines which had completely ruined their lives and deprived them of their livelihood, Because the landlords had taken their common land which was essential for their survival so the poor laborers threatened them of dire consequences under the symbolic name of Captain Swing. This was their novice scheme to same themselves from the operation of the law. This name became so common in about 1830 that the riots started by the poor labourers began to be called Swing Riots.

12. (i) More enclosure: Due to the introduction of threshing machines rich farmers were enclosing more and more open fiefls. This was having an adverse impact on the poor class. Now the area under open fields was decreasing.

    (ii) Loss of Job : Earlier, it was common for labourers to live with the landowners. They used to help their master throughout the year but with the introduction of machines work became insecure, employment uncertain and income unstable

13.1 The Tagore family of Bengal experimented in 1870s with designs for a national dress for both men and women in India. Rabindranath Tagore suggested that instead of combining Indian and European dress, India's national dress should combine elements of Hindu and Muslim dress. Thus the chapkan (a long buttoned coat) was considered the most suitable dress for men.

OR

13.2 (i) Whey there was a quarrel between the Bombay Gymkhana and Parsi cricketers over the use of public park the Britishers favaoured the Bombay Gymkhana.

    (ii) The regarded religious communities as separate nationalities that is why they used to approve applications for clubs on the bias of community.

    (iii) The encouraged pentangular tournament at it was based on communities.

    (vi) The first class cricket was also organised on communal and racial lines. The teams that played colonial India's greatest and most famous first-class cricket tournament did not represent regions, but religious communities.

14. (i) Evergreen forests (or Tropical Rain Forests) are found on the rainy parts of the Western Ghasts and the island groups of Lakshadweep and the Andaman and Nicobar Islands. On the other hand, deciduous forests are found mostly in the eastern parts of the country - north eastern states along the foothills of the Himalays, Jharkhand, West Orissa and Chhattisgarh and the eastern slopes of the Western Ghasts.

    (ii) Ebony, mahogany and rosewood are the most (Important) trees of the Evergreen Forests. While on the other hand, teak is the most dominant species of the deciduous forests. Other found here are bamboos, sal, shisham sandalwood and khair.

    (iii) Trees of the Evergreen Forests don't shed their leaves at one and the same time, so these forests remain evergreen. On the other hand the trees of the deciduous Forests shed their leaves for about six to eight weeks in summer.

15. There are in all six Fundamental Rights :
   (i) Right to Equality.
   (ii) Right to Freedom.
   (iii) Right against Exploitation.
   (iv) Right to Freedom of Religion.
   (v) Right to Education and Culture.
   (vi) Right to Constitutional Remedies.
   Right to Free and Compulsory Education for the 6 to 14 age group has been incorporated by 96th Amendment.

16. Economic activities can be divided into primary, secondary and tertiary activities. Now let us examine these from India's employment point of view:
   (i) Primary sector : More than 60% of the population is already working in the primary sector. This sector is already facing the problem of disguised unemployment. So there is not scope for further employment.
   (ii) Secondary sector : This sector absorbs only 10% of the working population. There is much scope in this sector as new manufacturing units are being set up. This sector bas the maximum capacity to absorb surplus workers of the primary sector.
   (iii) Tertiary sector : Tertiary sector provides service. As the need for the service sector is increasing this sector has the ability to absorb some working population.

17. (i) The Yozana was launched in 1993.
   (ii) The aim of the programme is to create self-employment opportunities for educated unemployed youth in rural areas and small towns.
   (iii) Under this unemployed are helped in seating up small business and industries.

18. Although both Houses discuss bills, Lok Sabha is more powerful than the Rajya Sabha because of the following reasons:
   (i) Money bills can be only be introduced in Lok Sabha.
   (ii) Rajya Sabha cannot change money bills. It can only give its suggestions for consideration by Lok Sabha.
   (iii) No-condidence motion against the government can be passed only in Lok Sabha.
   (vi) In a joint session of the two Houses, the Speaker of Lok Sabha presides over the House.

19. He was the Commissioner – in - Chief of the French Forces. The political instability of the Directory paved the way for his rise as a dictator. In 1804, he crowned himself Emperor of France.
   Steps taken by him :
   (i) He introduced many laws such as the protection of private property.
   (ii) He introduced a uniform system of weights and measures provided by decimal system.

<div align="center">**OR**</div>

   (i) Nazis wanted to establish an exclusive racial community of pure Germans by eliminating all other races.
   (ii) They wanted only a society of 'Pure and healthy Nordic Arynas'.
   (iii) Under his racial policy Hitler even ordered to eliminate unhealthy or abnormal Arynans.
   (iv) Many 'inferior' races like Gypsies, blacks and Jewish were killed and deputed.

20. There is no denying the fact that advances in technology, especially in television technology, affected the development of contemporary cricket. This becomes quite clear from the following account :
   (i) Television coverage made the game of cricket quite popular even among the millions of people residing is small towns and villages.
   (ii) The television coverage made cricket quite popular among the children and they became great fans of the different cricket players, both bowlers and batsmen. they watched carefully the techniques of the various players and themselves used them in their own trained only due to the great advancement in the field of technology.

(iii) As a result of the television converge, the different cricket boards became quite rich by selling television rights to different televisions companies.

(iv) Continuous deletions coverage made cricket create celebrities who began to earn a lot of money by commercial advertisements.

OR

To Gandhi, khadi, white and coarse, was a sign (i) of purity (ii) of simplicity and (ii) of poverty.

Wearing khadi became a symbol of nationalism, a rejection of western mill-made cloth.

Gandhi's dream was to cloth whole nation if khadi. Khadi would be a means of erasing differences between religions, classes, etc.

But Gandhi's ideas could not find universal acceptance even in India.

(i) The aristocratic Indian adopted Indian dhoti and kurta as their dresses; but these were made of fine fibers rather than the coarse khadi.

(ii) Those who had been deprived by caste norms for centuries were attracted to western dress styles. For them these were symbols of liberation.

(iii) Many poor women simply would not allowed to purchase khadi, which is relatively much expensive then the mill-made saris.

(iv) Many woman wore coloured saris with designs. White was seen as symbolic of renunciation.

21. The year can be divided into the following four seasons on basis of the monsoon variations :
    (a) The Cold Weather Season - December to February.
    (b) The Hot Weather Season - March to May.
    (c) Advancing Monsoon Season - June to September.
    (d) The Retreating Monsoon - September, October and November.

    (a) The Cold Weather Season - December to February : The cold weather persists from December to February throughout India. January is the coldest month. Temperature varies from 10^0 C to 25^0 C. Temperature is between 10^0 C to 15^0 C in northern plains and 25^0 C in southern parts of the country. There is high pressure in northern plains due to the cold climatic conditions. The cold dry winds blow from the high pressure towards the low pressure equatorial regions. These winds are north-westerly in the Ganga Plains and north-west part of India which receives rainfall from the Mediterranean cyclones. Second is the coast of Tamil Nadu which gets rainfall in winter because of the north-east winds which blow over the Bay of Bengal. But in other parts of country, the weather is pleasant with clear skies and bright sunshine.

22. The Himalayas were formed earth's movements which affected the relief of the earth is the last phase of its physical history.
    (i) The area where the Himalays stand today was occupied by a shallow elongated sea called Tethys which was sandwiched between two land masses - the Angara land in the north and Gondwana land in the south.
    (ii) The sea covered a large area from Indo-Myanmar border in the east, covering western Asia, northern and central parts of Africa to the Gulf of Guinea in the South Atalantica Ocean.
    (iii) For millions of years denudation of these two land masses resulted in deposition of silts into the sea.
    (iv) These giant land masses slowly moved towards each other, and this made the sea shrink.
    (v) If buckled up the sediments into mighty fold mountains. These mountains are called Himalays.

23. Elections are rightly said to be the barometer of democracy.
    (i) It is through elections that the people give expression to their opinion.
    (ii) It is through elections that the persons who have to work as representative of the people are identified.
    (iii) Any unpopular government can be unseated in an election.
    (iv) Elections are the time when it is possible to debate publicly on various socio-economic issues. Different issues and subjects of concern come to the fore.
    (v) The true character of social and political workers comes out during the lection campaign. The real worth of individuals can easily be adjudged.
    In short, a fair and free election is indicative of the healthy and robust democracy.

24. First State : This is also called the First Reading of the Bill.
   (i)   The bill is introduced in either House.
   (ii) The bill can be introduced either by a Minister of the government or by a private member of the House.
   (iii) Introduction of the bill is accompanied by a statement of objects and reasons by the person who has introduced it.
   (iv) This bill and the statement are circulated among the members. If the House is in favour of the introduction of the Bill, it goes to the next stage.
   Second State : This is also called the Second Reading of the Bill.
   (i)   A detailed clause by clause discussion on the bill takes place in the House.
   (ii) Some changes may be introduced in the bill.
   (iii) The bill may be referred to a small committee for more careful study.
   (iv) Further discussion on the bill may take place at this stage.
   Third Stage : This is also known as the Third Reading of the Bill.
   (i)   At this state, the bill is put to vote in the House.
   (ii) If it gets the approval of the simple majority of members present in the House, it is considered as passed.
   Fourth Stage : Now the passed bill is sent to the other House for its approval. The other House may pass bill by a simple majority.
   Fifth Stage : When the bill is passed by both the Houses, it is inset to the Present gives his assent   to the bill it becomes a law.

25. The nature of Fundamental Rights is an under :
   (i)   The Government cannot make a law which violates the Fundamental Rights.
   (ii) Some rights are available to all, while some other rights are available only to citizens.
   (iii) These rights are not absolute. These are subject to certain restrictions imposed in the interest of public order, decency or morality.
   (iv) These rights are justifiable.
   (v)   Some of these rights can be suspended in times of emergency.

26. (i)   Poverty : Even after more than 50 years of independence more than 26% of the population still lives below poverty line, and this section remains food insecure.
   (ii) Natural calamity : Food security is also required because during any year the country can face a national disaster or calamity like earthquake, drought, flood tsunami etc.
   (iii) Price control : Food security is also required to check the rising prices of essential goods. Whenever the prices of food grains rise more than normal, government can release food grains from its stores.
   (iv) Uninterrupted supply of food grains : Food security is also required to ensure food at all times.

27. The major impact of the spread of electricity in Palampur was to transform the system of irrigation. Electricity helped the farmers to shift from the traditional Persian wheels to electricity - run tube wells. The irritation capacity of electricity - run tube wells in much more than that of the Persian wheels. More important, spread of electricity leads, literally. The whole society from darkness to light. It transforms all social - economic norms of life. It is like a whole new world.

28. (i)   Lack of industrialiation : India is very backward from industrial point of view. Hardly 3% of the total working population is engaged in large-scale industry.
   (ii) Over dependence of agriculture :
         Even after 50 years of independence more than 60% of our total populations still depends on agriculture for its livelihood. Due to shortage of inputs, our agriculture is backward.
   (iii) Inflationary pressure : Opward trend in prices adversely affects the poor section of the society.
   (iv) Unemployment : Due to lack of job opportunities more than 90 lakh of our total working force is unemployed.

29.1
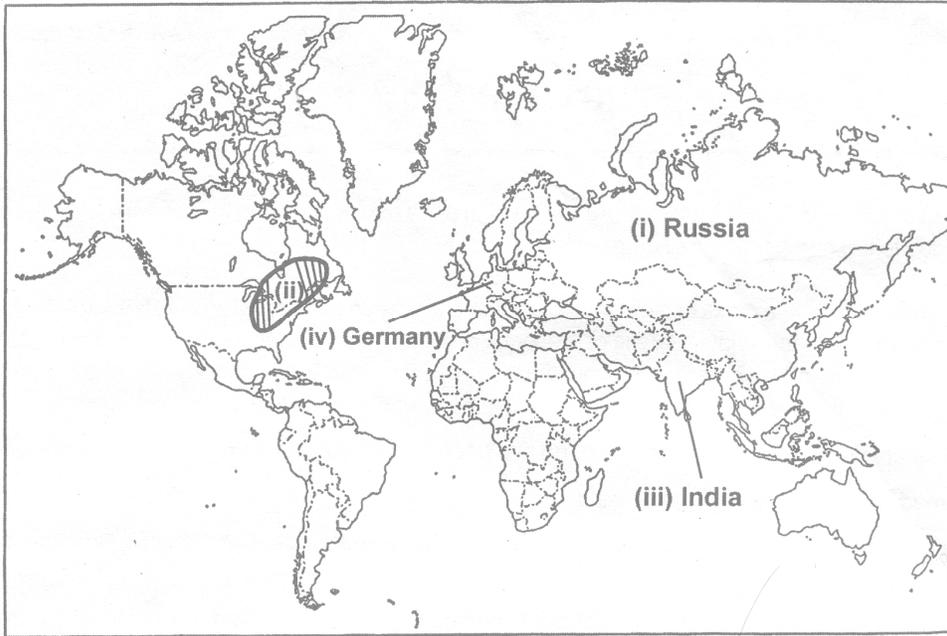
29.2

ANSWERS (SOCIAL SCIENCE)

TEST PAPER # 2

1. Hyperinflation is a situation when there is very high price rise. It occurred in Germany after the first world war due to too much printing of currency.

OR

On January 9, 1905, a mass of peaceful workers with their wives and children was fired at in St. Petersburg while on its way to the Winter Palace of present a petition to the Czar. More than a thousand of them were killed and thousands of others were wounded. The events of the Black Sunday provoked unprecedented disturbances throughout Russia. Sections of the army and the navy also revolted.

2. The theory states that the crust of the earth has bee formed out of seven major and some minor plates.

3. Narmada and Tapi flow through troughs.

4. The windward side i.e. that side of a mountain which faces the winds. The side of a mountain away from the winds is called the leeward side.

5. Universal adult franchise implies that all adult members should have an equal right to vote in an election. There should be no discrimination on the basis of sex, caste, religion, race, or any other factor. This is what political equality demands.

6. For elections the entire country is divided into fixed electoral areas with a body of registered voters. These areas are called constituencies.

7. It is the supreme law making body of India law making body of India. It has two houses.
(i) Lok Sabha (ii) Rajya Saha

8. Green revolution means large increase in agricultural production due to use of high yielding verities of seeds and other inputs.

9. (i) Literacy rate
(ii) Health
(iii) Life expectancy
(iv) Skill

10. Tools machines, buildings can be used in production over many years. These factors of production are called fixed capital.

GROUP - A

11. The Kalangs were a community of Java. They were skilled forests cutters and shifting cultivators. They were so valuable that teak could not be harvested without them nor could kings build their palaces. When the Mataram Kingdom to Java split, the families of the Kalang community were divided equally between the two kingdoms. When the Dutch colonised Java they forced the Kalangs to work under them. The Kalangs reacted by attacking the Dutch fort are Joana.

12. (i) The nineteenth century was a turning point in forest management and the forms of state control over the teak and nonteak forests of Java.
(ii) If was the time when the bureaucrats of colonial Forest Service drew boundaries between forest and agricultural land on maps and in the field and established police to restrict people's access to trees and other forest products.
(iii) The ideology of "scientific" forestry was being imposed by the colonial state and its foresters, on the local people who were the real owners of these forests.

GROUP - B

11. Gujjar Bakarwals migrated to Jammu and Kashmir in the 19th century in search of pastures for their animals.

Winter : When the high mountains were covered with snow and there was lack of pastures at the high altitude they moved to low hills of the Shiwalik. The dry scrub forests here provided pastures for their herds. By the end of April they began their northern march of their summer grazing grounds.

Summer : With the onset of summer, the snow melted and the mountainsides became lush green. By the end of September the Bakarwals started their backward journey.

12. Before arrival of the colonial rulers, the Massailand spread over a vast area from north Kenya to the steppes to northern Tanzania. This gradually shrank due to the following reasons.

(i) The colonial powers were hungry for colonial possessions in Africa. Once they reached Africa, they began to cut it down in different colonies. Maasailand was cut into half with an international boundary between British Kenya and German Tanganyika.

(ii) The best grazing lands were gradually taken over for white settlement. Maasai were pushed into a small area in south Kenya and north Tanzania.

(iii) The colonial governments promoted cultivation. Local peasant communities began to take control over the pastoral land. Pastoral lands further fell.

(iv) Large areas of land were also turned into game reserves. Very often these reserves were in areas that had traditionally been regular grazing grounds for Maasais.

GROUP -C

11. As said above, due to a variety of reasons, the Indian cultivators were unwilling to grow opium.

(i) First, the poppy plants from the juice of which the opium is made, required the best lands which should be well manured, On these lands the cultivators used to grow pulses and earn much money. If they grew opium on their bet lands, the pulses could note be grown they there. It meant a great financial loss to them.

(ii) Secondly, many cultivators did not have their own lands. If they took land on lease or rent they had to pay high rents to the landlords for their best land and that too near the village.

(iii) Thirdly, the cultivation of opium plant (or the poppy plant) was a difficult process. The plant being delicate required long hours in nurturing it. They were left with no time to care for other crops.

(iv) Fourthly, the price paid to the cultivators for producing opium was very low. It was quite unprofitable for the cultivators to grow opium at such a price.

12. (i) The expansion of wheat agriculture and overgrazing of the Prairies were responsible for Dust Bowl tragedy.

(ii) These dust storms had a great impact on the economic and social life of the people.

(iii) These dust storms had a great impact on the economic and social life of the people.

(iv) The black blizzards were responsible for natural disaster in which people were blinded, cattle were suffocated to death, and machinery was damaged beyond repair.

(v) It was a natural as well as man-made disaster because farmer themselves were responsible for the tragedy.

(vi) The farmers had recklessly uprooted all vegetation, and tractor had turned the soil over and broken the sod into dust.

13. (i) Amateurs were the rich cricket players who played the game of cricket for pleasure whereas professionals were poor people who played the game for living.

(ii) Amateurs were called Gentlemen while professionals as Players.

OR

Before the British came to India, and before the Industrial Revolution, Indian textiles were in great demand throughout the world.

The British rule changed India's status in the world economy.

(i) Mill-made manufactures swept the Indian markets. Mill-made fabrics were more durable and smooth with a better finish. These were cheaply priced also.

(ii) Indian Peasants were forced to cultivate these crops that were required by British manufacturers.

14.   (i) It is the largest delta of the world.
      (ii) It is the most fertile delta of the world.
      (iii) It is formed by the Ganga and the Brahmaputra river.
      (iv) The lower part of the delta is marshy.

15.   (i) In a democracy, rulers elected by the people take and the main decisions and there is none above them to direct or guide.
      (ii) In a democracy, elections are held regularly on the basis of universal adult franchise. These elections offer a fair opportunity to the people to change their present rulers.
      (iii) In a democracy, all the people, without any distinction of caste, creed, colour or ser, are given this choice and opportunity on an equal basis.
      (iv) In a democracy, the exercise of their choice of electing their rulers leads to a government limited by the rulers of the Constitution and citizen's rights.

16. Education has vital role to play in human capital formation or in human development.
      (i) It helps a man to make all round development.
      (ii) It enables him to become a skilled worker and to get a higher pay than any illiterate worker.
      (iii) Education enables a man to be away from bad habits like drinking, gambling etc. which ruin his physical as well as mental health.
      (iv) Education is essential because it enables a man to follow the welfare family norms and not to enlarge his family and to lead the life of an animal.
      (v) Education helps a man to acquire good habits and to be a good citizen of his country.
      (vi) Educated parents are found to invest more on the education of their children. They are also conscious of proper nutrition and hygiene.
      (vii) Education opens new horizon for a child, provides new aspiration and develops values of a life in a far better way.

17. **Disguised unemployment :**
      (i) It is a type of unemployment under which people appear to be employed by actually they are not.
      (ii) It is mostly found in agriculture.
      (iii) It is mainly found in rural areas.
    Seasonal unemployment :
      (i) It is a type of unemployment under which works are employed only for a particular season.
      (ii) It is mostly found in agro based industry.
      (iii) It is found both in rural as well as urban areas.

18. A nominal democracy, as we normally use the term, refers to a system of governance which is run by the people's elected representatives.
An ideal democracy is a broader concept. An ideal democracy is a system in which every citizen must be able to play equal role in decision making. For this one does not need just an equal right to vote. Every citizen needs to have equal information, basic education, equal resources and a lot of commitment. There may not be any country in the world which passes this test of democracy. Yet an understanding of democracy as an ideal reminds us of why we value democracy.

19.   (i) They had been stereotyped as killers of Christ and usurers.
      (ii) Hitler's hatred of Jews was based on pseudo scientific theories of race, which held that conversion was no solution to the Jewish problem. It could be solved only through their total elimination.

<p align="center">Or</p>

While the National Assembly was busy at Versailles drafting a constitution, the rest of France was seething with turmoil. A severe winter had meant a bad harvest, the price of bread rose. Often bakers exploited the situation and hoarded supplies. After spending hours in long queues at the bakery, crowds of angry women stormed into the shops. At the same time, the King ordered troops to move into Paris. On 14 July, the agitated crowd stormed and destroyed Bastille.

20. On the eve of the French Revolution, i.e. in 1789 A.D. France presented a dismal look.

Following were the conditions on the eve of the French Revolution. In other words, we van say that following were the chief causes of the French Revolution:

(i) Social Causes or Social Conditions. On the eve of the revolution, the French society

was ridden with several inequalities. The clergy and the nobles led a life of luxury and enjoyed numerous privileges. On the other hand, the peasants and workers lived a wretched life. They grounded under heavy taxed and forced labour. The middle class comprising of lawyers, doctors and teachers, etc. also suffered humiliation at the hand of the clergy and the nobles. This state of social inequality was the chief cause of the French Revolution.

(ii) Political Causes or' Political Conditions. Emperor Louis XVI of. France was an empty headed despot. He and his queen, Marie Antoinette, squandered money on their luxurious living and wasteful festivities. The high posts were often auctioned, so inefficiency reigned supreme. The whole administration was corrupt and each department had its own laws. In the absence of any uniform system there was confusion all around. The people were tired of such a rotten system of administration and wanted a change.

(iii) Economic Causes or Economic Conditions. France had been continually involved in wars which had broken her economy. The luxurious life led by the French King Louis XVI and his queen had made the mater still worse. The people groaned under heavy taxes. The system was so faulty that only a fraction of the taxes could be realized as the people were too poor to pay them while nobles and the clergy, who could pay, were completely exempted from all the taxes. The economy became so bad that the French Government had almost reached a state of bankruptcy. Thus the shattered economy of France proved a major cause of the Revolution/

(iv) Immediate Cause. Forced by financial bankruptcy; Emperor Louis XVI was compelled to call a meeting of the Estates General in 1789 A.D. After a lapse of 175 years. It generated much excitement as the members of the Third. Estate were determined to put forth their problems. But when the first two Estates i.e., the Clergy and the Nobility refused to have a common meeting with the Third Estate, the people lost their temper. They had already suffered a much in the severe famine in 1788-89. In this way, the calling of the Estates General in 1789 A.D. proved the immediate cause of the French Revolution.

OR

The first World War was a war that was fought outside Europe as well as in Europe. In Russia, the war was initially popular and people rallied around Tsar Nicholas II. As the war continued, the star refused to consult the main parties in the Duma. Support from all sides became thin. Anti-German sentiments became high and St. Petersburg (Which was a German name) was renamed as Petrograd. The Tsarina Alexandra's German origins and poor advisors, especially a monk called Rasputin, made the autocracy unpopular. The defeats in the war ware shocking and demoralising. Russian armies lost badly. There were about 7 million casualties by 1917 and almost 3 million refugees. The situation discredited the government and the Tsar. The war also had a severe impact on industry and contributed to the food shortage in the country. The people were rioting as bread and flour became scarce. There was resentment all over the country. The Imperial Russian army was the largest armed force in the world. It came to be known as the 'Russian steam roller'. When this army shifted it loyalty and began supporting the revolutionaries. Tsarist power collapsed.

21. Monsoons are experienced in the tropical areas. June-September is the season for monsoon rains. The rainy season is relatively longer in the eastern regions. The quantity of rainfall keeps on decreasing as the monsoon winds move west. The north-east trade winds that blow during the winter months get replaced as the summer seasons sets in. There is continued low pressure over the north-west region. This attracts trade winds from the Southern Hemisphere. Coming form the Indian ocean, these winds cross over the Bay of Bengal and the Arabian Sea. They are then trapped by air circulation taking place over India. These winds are loaded with moisture and blow at a very fast speed. The rain caused by south-west monsoon in not uniform. The rain of Western Ghasts situated in the direction of the winds get more rainfall than the other side. Similarly, the hilly regions of the north-east get heavy rainfall. From east to west there is a constant decline in the amount of rainfall.

The cyclonic depression of formed at the head of the Bay of Bengal cause uneven and uncertain distribution of rainfall. These depressions move towards the low pressure monsoon trough which is not steadily

placed. For a variety of reason, if moves northwards or southwards. When the axis of the trough move close to the Himalayas, there are heavy rains in the Himalayan regions. The plains get dry spells. With the approach of winter, the monsoon trough becomes weaker. There is reversal in the direction of surface winds with the approach of winter. The monsoons now withdraw from the Northern Plains. The shift in the low pressure conditions from north-western plains to the Bay of Bengal causes cyclones and rains in the Coromandel Coast.

22. An ecosystem comprises physical environment. This system is an interdependent and inter linked with plants and animals living therein.
Ecosystems have evolved over a period to thousands of years. Humans have changed and adapted the ecosystem to their requirements.
For example
(i)   We have selected our crops from a biodeverse environment, i.e., from the reserve of edible plants.
(ii) We have identified and nurtured many herbal plants.
(iii) The animals have been selected from large stock provided by nature and milch animal.
(iv) Cattle also provide us draught power, transportations, meet eggs etc.
(v)   Fish provide nutritive foods.
(vi) Insects help in pollination of crops and fruit trees. Some insects also exerts biological control on harmful insects.

23. (i)   Responsible government Democratic government is a responsible government. The
representatives elected by the people on the basis of universal adult franchise remain responsible to the people and in case they do not remain responsible before the people, the people can change them during the next elections.
(ii) Possibility of good laws: In democratic government the representatives have direct relation which the people, therefore, they properly understand their problems and interests. They properly represent the interest of the people in assemblies and parliament and always try to get the good laws passed.
(iii) Political education : The greatest merit of democracy is its educative value.
Participation in elections and other political activities, make the people intelligent and politically conscious. They become enlightened citizens.
(iv) Based on liberty and fraternity : In democracy, the rights and the liberty of the people are well safeguarded. People ware given freedom to express their views without any fear. They can criticise the wrong policies of the government.
(v)   Respect of the principle of equality : In democracy, all are equal in the eyes of law and no discrimination ins done on the basis of birth, race, caste, colour, sex, religion etc. All citizens get equal opportunities to participate in the affairs of the state.
(vi) Government based on the will of the people : Democracy is based on the will of the people and it functions according to their consent. The Government cannot ignore the interest of the people.

24. Fundamental Rights are those rights which are very essential for the development,
happiness and welfare of the people as such all the Fundamental, Rights are very significant. The Indian Constitution has given the following six rights to its citizens.
(i)   Right to Equality. This right is very significant. In India, the Right of Equality is guaranteed to every citizen irrespective of his caste, creed, colour, or sex. This right to equality is very essential in our society, ridden by social and economic inequalities of all kinds.
(ii) Right to Freedom. Every Indian citizen has the right to freedom of speed, association, movement and residence.
(iii) Cultural and Educational Rights. In India every community has been given educational and cultural rights to preserve its culture. This is very necessary in a society like ours which has so many diversities.
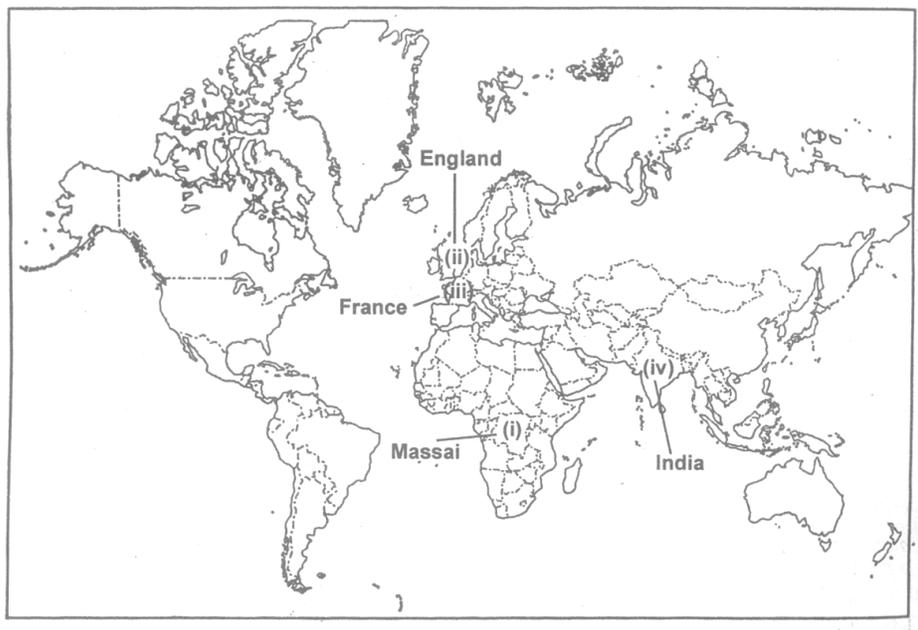(vi) Right to Religious Freedom. Since India is a secular state, every citizen is at full liberty to profess any religion of his own choice. This is quite necessary in a country with so many religions.
(v)   Right against Exploitation. The Constitution puts a firm end to such exploitation as bonded labour, beggary, traffic in women and children, underpayment and employment of children below 14.
(vi) Right to Constitutional Remedies. This implies that if any of the Fundamental Rights is encroached upon by the Government, the citizens can move any court. This is a right to secure other rights. Had this right not been there, the other rights would be have been quite meaningless.

25. Different Measures taken to ensure Free and Fair Elections.

The following are the different measures taken to ensure free and fair elections in India :

(i) Every step is being taken so that the voters are able to cast their votes according to their preferences.

(ii) Every effort is being made for the security and safety of the voters at the Election Booths. Sufficient policemen are posted near the Election Booths so that no illegal person could disrupt the election process.

(iii) Every attempt is made to see that no inducement is given to voter to cast their votes in a particular way.

(iv) It is also seen that no coercion is used in any way to force voters to vote for a particular candidate.

(v) During the election campaigning, it is to be seen that the Ruling Party does not use the government machinery in its favour whatsoever.

(vi) Rigging or using unfair means in elections should not be allowed in any way. Rigging is to elections what cheating is to examination.

(vii) All efforts are made to see that nobody tries to use his muscle or money power.

(viii) Over and above these measures, an institution of Election Commission has been created in India which is quite independent of the government control. It tries to conduct the elections in a free and fair manner.

26. Buffer stock is the stock of food grains, particularly wheat and rice, which the government procures through the Food Corporation of India (FCI). The Food Corporation of India purchases these cereals (what and rice) directly from the farmers of those states where they are in surplus. The price of these commodities is fixed much before the actual sowing season of the crops. This price is known as the Minimum Support Price which is announced to give incentive to the farmers for raising the production of food crops. The food grains thus purchased by the FCI are kept in big granaries.

This is called a buffer stock.

Why is this Buffer Stock created by the Government ? Now a question arises as to why this buffer stock is created by the government ? Some of the main reasons for the same are the following :

(i) The first region for this is that to revolve the problem of shortage of food arising due to adverse weather conditions like drought or too much of rains.

(ii) This is done to face the shortage of food in any part of the country which si affected by any calamity such as tsunamis, earthquakes, cyclone, storms or famine etc.

(iii) This stock is also used to help the poor strata of the society at a price lower than the market price.

(iv) This stock helps a lot in distributing food grains in different areas.

27. (i) More Industrialisation. In order to remove poverty and unemployment, especially in cities, more and more industries are to be installed.

(ii) Improvement in the Field of Agriculture. While latest methods should be adopted in improving agriculture, steps should also be taken so that land is provided to the tiller and it is not concentrated in the hands of a few rich fanners and landlords.

(iii) Education. Education is a must for removing any evil; including poverty and unemployment. It must be made cheaper so that each person could get it easily.

28. Activities can be classified under the following three sectors on the basis of their nature of their products or materials used :

(i) Primary Sector. Activities concerned with collecting or making available materials provided by nature are included in the primary sector. Some such activities are (a) Agriculture; (b) forestry; (c) animal husbandry; (d) poultry farming; (e) finishing and (f) mining.

(ii) Secondary Sector. Such act ivies which transform raw materials or primary products into commodities more useful man are included in the secondary sector. Some such activities are (a) manufacturing and (b) quarrying.

(iii) Tertiary Sector. This sector included those activities which are a must for running modern industries in a big way. Some such activities are (a) trade; (b) transport; (c) communication; (d) banking; (e) health; (f) education; (g) insurance; (h) tourism and (i) various other services .

29.1

29.2