

**Airforce
Group X**

Previous Year Paper
MBT 12-Jul-2021 Shift 3

70 Questions

Que. 1 Which electromagnetic wave has maximum wavelength?

1. X-rays
2. Gamma rays
3. Radio wave
4. Infrared wave

Solution Correct Option - 3

Que. 2 Which of the following shows the CORRECT relationship between half time and decay constant?

1. $T_{\frac{1}{2}} = \frac{\lambda}{0.693}$
2. $T_{\frac{1}{2}} = \frac{0.693}{\lambda}$
3. $T_{\frac{1}{2}} = \lambda \times 0.693$
4. $T_{\frac{1}{2}} = \frac{\lambda^2}{0.693}$

Solution Correct Option - 2

Que. 3 Which of the following is not a unit of magnetic field?

1. Tesla
2. Gauss
3. N/kg-m
4. Weber

Solution Correct Option - 3

Que. 4 Excess pressure in a soap bubble of radius r is proportional to

1. $1/r$
2. $\frac{1}{r^2}$
3. r
4. r^2

Solution Correct Option - 1

Que. 5 When a electromagnetic wave moves from one medium to another medium, then which quantity will not change:

1. Wavelength
2. Speed
3. Frequency
4. None of these

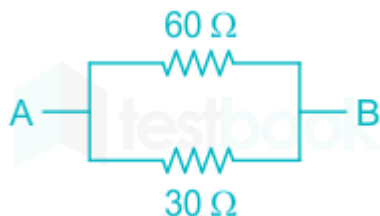
Solution Correct Option - 3

Que. 6 If a wire of uniform area of cross-section is cut into two equal parts, the resistivity of each parts will be?

1. four times
2. double
3. halve
4. same

Solution Correct Option -4

Que. 7 Find the equivalent resistance of the given circuit:



1. $20\ \Omega$
2. $30\ \Omega$
3. $40\ \Omega$
4. $50\ \Omega$

Solution Correct Option -1

Que. 8 What is the dimension of mutual Induction ?

1. $[ML^2T^{-3}A^{-1}]$
2. $[ML^2T^{-2}A^{-2}]$
3. $[ML^3T^{-4}A^{-1}]$
4. $[ML^3T^{-4}A^{-2}]$

Solution Correct Option -2

Que. 9 For which of the following materials, the temperature coefficient will be negative?

1. Copper
2. Tungsten
3. Germanium
4. Aluminium

Solution Correct Option -3

Que. 10 A solid spherical conductor is placed in an external electric field. It is given a charge q . The charge q

1. Is distributed uniformly throughout the sphere
2. is distributed non-uniformly, but throughout the sphere
3. is distributed uniformly on the surface of the sphere
4. is distributed non uniformly on the surface of the sphere

Solution Correct Option -4

Que. 11 Consider a car moving with constant acceleration along a straight road and the distance covered by the car is given by equation $s = 5t^2 + 3t + 9$ meters. Then find the ratio of acceleration and initial velocity

of the car at the start.

1. 10 : 3
2. 1 : 2
3. 3 : 10
4. 2 : 1

Solution Correct Option - 3

Que. 12 Which one of the following statements is correct

1. Rolling friction is greater than sliding friction
2. Rolling friction is less than sliding friction
3. Rolling friction is equal to sliding friction
4. Rolling friction and sliding friction are same

Solution Correct Option - 2

Que. 13 The ratio of the radii of two planets are respectively as 1 : 4 and the ratio of their densities are respectively 1 : 2. The find the ratio of the accelerations due to gravity at their surfaces is –

1. 1 : 8
2. 1 : 4
3. 4 : 1
4. 8 : 1

Solution Correct Option - 1

Que. 14 In which type of wave energy is not transferred?

1. Heat waves
2. Target waves
3. Stationary waves
4. Unstationary waves

Solution Correct Option - 3

Que. 15 The ratio of SI unit and CGS unit of force is

1. 10^9
2. 10^7
3. 10^5
4. 10^{11}

Solution Correct Option - 3

Que. 16 For projectile motion, the correct relation between maximum height H and the range R is (θ is angle of projection):

1. $H = 4 R \cot \theta$
2. $R = 4 H \cot \theta$
3. $R = H/4 \cot \theta$

4. $R = 2 H \cot \theta$

Solution Correct Option - 2

Que. 17 If the elastic potential energy density store in a material is $3 \times 10^4 J/m^3$ due to the application of longitudinal stress of $1 \times 10^{11} N/m^2$

then, the strain developed in it would be

1. 6×10^{-7}
2. 3×10^{-7}
3. 4×10^{-7}
4. None

Solution Correct Option - 1

Que. 18 A carnot engine is working between the temperature range of $327^\circ C$ and $127^\circ C$. If the heat absorbed by the engine is $9 \times 10^4 J$, the the work done by the engine is:

1. $3 \times 10^4 J$
2. $6 \times 10^4 J$
3. $4 \times 10^4 J$
4. $5 \times 10^4 J$

Solution Correct Option - 1

Que. 19 Which of the following phenomenon is/are responsible for formation of a rainbow in the sky?

1. Reflection
2. Refraction
3. Dispersion
4. All three

Solution Correct Option - 4

Que. 20 The magnetic flux linked with a coil in weber is given by the equation $\phi = 6t^2 + 3t + 2$. Then the magnitude of induced emf in the coil at $t = 3$ sec will be:

1. 39 V
2. 44 V
3. 36 V
4. 50 V

Solution Correct Option - 1

Que. 21 A body of mass M moving with a velocity V explodes into two equal parts. If one comes to rest and the other body moves with velocity v, what would be the value of v?

1. V
2. $V/\sqrt{2}$
3. 4V
4. 2V

Solution Correct Option - 4

Que. 22 Same gas is filled in two containers of same volume, same temperature and with pressure of ratio 1 : 2. The ratio of their rms speeds is:

1. 1 : 2
2. 2 : 1
3. 1 : 4
4. 1 : 1

Solution Correct Option -4

Que. 23 Two conducting wires A and B are made of same material. If the length of B is twice that of A and radius of circular cross section of A is twice that of B, then their resistance R_A and R_B are in the ratio

1. 2 : 1
2. 1 : 2
3. 1 : 8
4. 1 : 4

Solution Correct Option -3

Que. 24 Average power in LCR circuit depends upon

1. current
2. current, emf, and phase difference
3. emf
4. phase difference

Solution Correct Option -2

Que. 25 Which of the following statement is incorrect regarding center of mass?

1. The center of gravity is the point through which the force of gravity acts on an object or system.
2. Centre of Mass of a body is a point at which the whole of the mass of the body can be assumed as a point mass.
3. The Center of Mass of a body will always be inside the body.
4. All of the above statements are correct regarding center of mass.

Solution Correct Option -3

Que. 26 The value of $(\log_3 4) (\log_4 5) (\log_5 6) (\log_6 7) (\log_7 8) (\log_8 9)$ is:

1. 2
2. 7
3. 8
4. 33

Solution Correct Option -1

Que. 27 For a simultaneous throw of 2 dice, the probability of getting the sum equal to 7 is

1. $\frac{2}{5}$
2. $\frac{1}{6}$

3. $\frac{3}{4}$
4. $\frac{1}{2}$

Solution Correct Option -2

Que. 28 What is the degree of the differential equation $\left(\frac{d^3y}{dx^3}\right)^{1/2} = \left(\frac{d^2y}{dx^2}\right)^2$?

1. 2
2. 3
3. 5
4. 1

Solution Correct Option -4

Que. 29 If $n(A) = 5$ and $n(B) = 3$. Find the total number of relations that can be defined from A to B?

1. 2^{15}
2. 2^5
3. 2^3
4. None of these

Solution Correct Option -1

Que. 30 Find the value of $\int_{-\pi}^{\pi} \sin x \, dx$

1. 1
2. 0
3. 2
4. 3

Solution Correct Option -2

Que. 31 If $x^a = y^b = z^c$ and x, y and z are in GP, then a, b and c are in

1. A.P.
2. G.P.
3. H.P.
4. None of these

Solution Correct Option -3

Que. 32 Find the equation of the directrix of the parabola $x^2 = -8y$?

1. $y = -2$
2. $y = 2$
3. $x = -2$
4. $x = 2$

Solution Correct Option -2

Que. 33 What is the slope of the tangent to the curve $\sqrt{x} + \sqrt{y} = 1$ at $(\frac{1}{4}, \frac{1}{4})$?

1. 0
2. 1
3. -1
4. None of these

Solution Correct Option -2

Que. 34 The roots of the equation $3x^2 + 8x + 9 = 0$ are α, β , then equation whose roots are $\frac{1}{\alpha}, \frac{1}{\beta}$ is

1. $3x^2 - 8x + 9 = 0$
2. $9x^2 - 8x + 3 = 0$
3. $9x^2 + 8x + 3 = 0$
4. $3y^2 + 9y + 8 = 0$

Solution Correct Option -3

Que. 35 Find the center of the circle $(x - x_1)(x - x_2) + (y - y_1)(y - y_2) = 0$

1. $(\frac{x_1 - x_2}{2}, \frac{y_1 + y_2}{2})$
2. $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$
3. (1, 1)
4. $(\frac{x_1 - x_2}{2}, \frac{y_1 - y_2}{2})$

Solution Correct Option -2

Que. 36 Find the focus of the ellipse if equation of the ellipse is $\frac{x^2}{16} + \frac{y^2}{9} = 1$

1. $(\pm\sqrt{7}, 0)$
2. $(\pm\sqrt{3}, 0)$
3. $(\pm\sqrt{6}, 0)$
4. $(\pm\sqrt{11}, 0)$

Solution Correct Option -1

Que. 37 If $\cos^{-1}x + \cos^{-1}y + \cos^{-1}z = \pi$ find the value of $xy + yz + zx$

1. $\frac{1}{2}$
2. $\frac{1}{4}$
3. $\frac{3}{4}$
4. 0

Solution Correct Option -3

Que. 38 $\sec x + \tan x = 2$, find the value of $\cos x$

1. $\frac{1}{3}$

2. $\frac{3}{4}$
3. $\frac{1}{2}$
4. $\frac{4}{5}$

Solution Correct Option -4

Que. 39 $\int_0^1 \frac{1}{1+x^2} dx =$

1. $\frac{\pi}{4}$
2. 0
3. $\frac{\pi}{2}$
4. $\frac{\pi}{3}$

Solution Correct Option -1

Que. 40 If $\cos 2\theta = \sin \theta$ and θ lies between 0 and 90° , then $\sin \theta + \cos \theta$ will be:

1. 1
2. $\frac{\sqrt{3}+1}{2}$
3. $\frac{\sqrt{3}-1}{2}$
4. None of these

Solution Correct Option -2

Que. 41 The arithmetic mean of 50 observations was found to be 36. Later it came to knowledge that it was incorrect because one observation which was 48, was taken as 23. What is the correct mean?

1. 35.2
2. 35.9
3. 36.5
4. 36.8

Solution Correct Option -3

Que. 42 The equation of the circle passing through (4, 5) having the centre at (2, 2) is

1. $x^2 + y^2 + 4x + 4y - 5 = 0$
2. $x^2 + y^2 - 4x - 4y - 5 = 0$
3. $x^2 + y^2 - 4y - 13 = 0$
4. $x^2 + y^2 - 4x - 4y + 5 = 0$
5. None of these

Solution Correct Option -2

Que. 43 What is the principal value of $\sin^{-1} \left(\sin \frac{2\pi}{3} \right)$?

1. $\pi/4$
2. $\pi/2$

3. $\pi/3$
4. $\pi/6$

Solution Correct Option - 3

Que. 44 Find the middle terms in the expansion of $(x + \frac{1}{x})^{10}$

1. ${}^{10}C_4$
2. ${}^{10}C_6$
3. ${}^{10}C_5$
4. ${}^{10}C_7$

Solution Correct Option - 3

Que. 45 If A and B are two sets such that $n(A) = 19$, $n(B) = 23$ and $n(A \cup B) = 38$ then find $n(A \cap B) = ?$

1. 5
2. 2
3. 4
4. None of these

Solution Correct Option - 3

Que. 46 If ${}^nC_4 = {}^nC_6$, then ${}^nC_4 =$

1. 240
2. 210
3. 180
4. 200

Solution Correct Option - 2

Que. 47 If $x = k(\theta + \sin \theta)$ and $y = k(1 + \cos \theta)$, then what is the derivative of y with respect to x at $\theta = \pi/2$?

1. -1
2. 0
3. 1
4. 2

Solution Correct Option - 1

Que. 48 If the line $y = mx + c$ is a tangent to the circle $x^2 + y^2 = a^2$ then find condition of tangency ?

1. $c^2 = a^2(1 + m^2)$
2. $c^2 = -a^2(1 + m^2)$
3. Both 1 and 2
4. None of these

Solution Correct Option - 3

Que. 49 7 persons are to be arranged at a circular table. If two particular persons among them are not to be side by side then the total number of arrangements is:

1. 480 ways
2. 440 ways
3. 410 ways
4. 240 ways

Solution Correct Option - 1

Que. 50 If $A = \begin{bmatrix} x & 2 \\ 4 & x \end{bmatrix}$ and $\det(A^2) = 64$, then x is equal to

1. ± 2
2. ± 3
3. ± 4
4. ± 5

Solution Correct Option - 3

Que. 51 Choose the word which is synonymous with the given word.

ABANDON

1. Neglect
2. Abscond
3. Discontinue
4. Collect
5. Distribute

Solution Correct Option - 3

Que. 52 Choose the word which is opposite in meaning to the given word.

Confess

1. Refuse
2. Deny
3. Contest
4. Contend

Solution Correct Option - 2

Que. 53 Select the correct antonym for the given word.

GLOOMY

1. Radiant
2. Fragrant
3. Fabulous
4. Famous

Solution Correct Option - 1

Que. 54 Select the word which is correctly spelt.

1. Satellite
2. Sattelite
3. Sattellite
4. Satelitte

Solution Correct Option - 1

Que. 55 In the following question, out of the four alternatives, select the alternative which best expresses the meaning of the Idiom/Phrase.

The ins and outs

1. Behave towards someone in a magnanimous manner
2. Above the comprehension of
3. Deeply
4. The full detail

Solution Correct Option - 4

Que. 56 In the following question, out of the four alternatives, select the alternative which best expresses the meaning of the Idiom/ Phrase.

Give a free hand

1. Without stigma
2. Give freedom to exercise complete control over something
3. Maintaining composure
4. An unexpected triumph

Solution Correct Option - 2

Que. 57 In the following question, the sentence given with blank is to be filled in with an appropriate word. Select the correct alternative out of the four and indicate it by selecting the appropriate option.

He died _____ cancer.

1. From
2. With
3. Of
4. By

Solution Correct Option - 3

Que. 58 Read the sentence carefully and choose the option that has an error in it:

One of the students were blind.

1. One of
2. were blind
3. No error
4. the students

Solution Correct Option - 2

Que. 59 **Direction:** Select the segment of the sentence that contains the grammatical error. If there is no error, mark 'No error' as your answer.

The number of students (A)/ going on the Goa trip (B)/ are very high.(C)/ No error (D)/.

1. The number of students
2. going on the Goa trip
3. are very high
4. No error

Solution Correct Option -3

Que. 60 **Direction:** Fill in the blank with the correct answer:

My brother often _____ cinema.

1. watch
2. watches
3. will watched
4. have watch

Solution Correct Option -2

Que. 61 **Direction:** Noun form of 'Collide' is _____.

1. Collided
2. Collition
3. Colliding
4. Collision

Solution Correct Option -4

Que. 62 **Direction:** Choose the appropriate answer for the given sentence:

Ram is _____ and the most handsome boy in the class.

1. tallest
2. taller
3. smaller
4. thinner

Solution Correct Option -1

Que. 63 **Direction:** Choose the most appropriate answer and fill in the blank.

He is blind _____ his own faults.

1. of
2. to
3. on
4. for

Solution Correct Option -2

Que. 64 **Direction:** Change the Voice -

Did he plan an excursion to mountain?

1. Was an excursion to mountains planned by him?
2. Were an excursion to mountains planned by him?
3. Was an excursion to mountains planned to him?
4. Did an excursion to mountains planned by him?

Solution Correct Option - 1

Que. 65 **Direction:** Choose the correct spelling of the word among the following:

1. Cigarette
2. Cigarette
3. Cigaratte
4. Cigarette

Solution Correct Option - 4

Que. 66 **Direction:** Change the Narration-

The saga said, "God helps those who help themselves."

1. The saga said that God helped those who help themselves.
2. The saga said that God will help those who help themselves.
3. The saga said to God helps those who help themselves.
4. The saga said that God helps those who help themselves.

Solution Correct Option - 4

Que. 67 **Direction:** Select the option that is opposite in meaning to the given word and mark your response accordingly.

Conference

1. Dispersion
2. Group
3. Argument
4. Discussion

Solution Correct Option - 1

Que. 68 **Direction:** Select the option that is opposite in meaning to the given word and mark your response accordingly.

Absolute

1. Partial
2. Initial
3. Perfect
4. Definite

Solution Correct Option - 1

Que. 69 **Direction:** Select the option that is similar in meaning to the given word and mark your response accordingly.

Bequeath

1. Withhold
2. Stop
3. Retain
4. Leave

Solution Correct Option -4

Que. 70 **Direction:** Select the option that is similar in meaning to the given word and mark your response accordingly.

Exhale

1. Breathe out
2. Breath in
3. Blow in
4. Absorb

Solution Correct Option -1