PHYSICS

Q.1 Which electromagnetic wave has maximum wavelength ?

(a) X-rays (b) Gamma rays

(c) Radio wave (d) Infrared wave

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

(a) $T_{\frac{1}{2}} = \frac{\lambda}{0.693}$ (b) $T_{\frac{1}{2}} = \frac{0.693}{\lambda}$

(c) $T_{\frac{1}{2}} = \lambda \times 0.693$ (d) $T_{\frac{1}{2}} = \frac{\lambda^2}{0.693}$

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

(a) Tesla (b) Gauss

(c) N/kg-m (d) Weber

Q.4 Excess pressure in a soap bubble of radius r is proportional to :-

(a) $\frac{1}{r}$ (b) $\frac{1}{r^2}$

(c) r (d) r^2

Q.5 When a electomagnetic wave moves from one medium to another medium, then which quantity will not change :-

(a) Wavelength (b) Speed

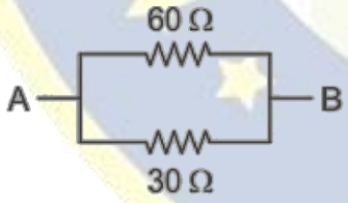
(c) Frequency (d) None of these

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

(a) Four times (b) Double

(c) Halve (d) Same

Q.7 Find the equaivalent resistance of the given circuit :-



(a) 20Ω (b) 30Ω

(c) 40Ω (d) 50Ω

Q.8 What is the dimension of mutual Induction ?

(a) $[ML^2T^{-3}A^{-1}]$ (b) $[ML^2T^{-2}A^{-2}]$

(c) $[ML^3T^{-4}A^{-1}]$ (d) $[ML^3T^{-4}A^{-2}]$

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

(a) Copper (b) Tungsten

(c) Germanium (d) Aluminium

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

(a) is distributed uniformly throughout the sphere

(b) is distributed non-uniformly, but throughout the spehre

(c) is distributed uniformly on the surface of the sphere

(d) is distributed non uniformly on the surface of the sphere

Q.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.

(a) 10 : 3 (b) 1 : 2

(c) 3 : 10 (d) 2 : 1

Q.12 Which one of the following statements is correct.

(a) Rolling friction is greater than sliding friction (b) Rolling friction is less than sliding friction

(c) Rolling friction is equal to sliding friction (d) Rolling frinction and sliding friction are same

Q.13 The ratio of the radii of the two planets are respectively as 1 : 4 and the ratio of their densities are respectively 1 : 2. The find the ratio of the acceleration due to gravity at their surface is :-

(a) 1 : 8 (b) 1 : 4

(c) 4 : 1 (d) 8 : 1

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

(a) Heat waves (b) Target waves

(c) Stationary waves (d) Unstationary waves

Q.15 The ratio of SI unit and CGS unit of force is :-

(a) 10^9 (b) 10^7

(c) 10^5 (d) 10^{11}

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

(a) $H = 4R\cot\theta$ (b) $R = 4H\cot\theta$

(c) $R = \frac{H}{4}\cot\theta$ (d) $R = 2H\cot\theta$

Q.17 If the elastic potential energy density store in a material is $3 \times 10^4 \frac{J}{m^3}$ due to the application of longitudinal stress of $1 \times 10^{11} \frac{N}{m^2}$ then, the strain developed in it would be :-

(a) 6×10^{-7} (b) 3×10^{-7}

(c) 4×10^{-7} (d) None

Q.18 A carnot engine is working between the temperature of 327°C and 127°C. If the heat absorbed by the engine is 9×10^4 J, the work done by the engine is :-

(a) 3×10^4 J (b) 6×10^4 J

(c) 4×10^4 J (d) 5×10^4 J

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

(a) Reflection (b) Refraction

(c) Dispersion (d) All three

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

(a) 39 V (b) 44 V

(c) 36 V (d) 50 V

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

(a) V (b) $\frac{V}{\sqrt{2}}$

(c) $4V$ (d) $2V$

Q.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 :-

(a) 1 : 2 (b) 2 : 1

(c) 1 : 4 (d) 1 : 1

Q.23 Two conductive wires A and B are made of same material. If the length 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 :-

(a) 2 : 1 (b) 1 : 2

(c) 1 : 8 (d) 1 : 4

Q.24 Average power in LCR circuit depends upon :-

(a) current (b) current, emf and phase difference

(c) emf (d) phase difference

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

(a) The center of gravity is the point through which the force of gravity acts on an object or system.

(b) 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.

(c) The Center of Mass of a body will always be inside the body.

(d) All of the above statements are correct regarding center of mass.

MATHEMATICS

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

(a) 2 (b) 7

(c) 8 (d) 33

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

(a) $\frac{2}{5}$ (b) $\frac{1}{6}$

(c) $\frac{3}{4}$ (d) $\frac{1}{2}$

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

(a) 2 (b) 3

(c) 5 (d) 1

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

(a) 2^{15} (b) 2^5

(c) 2^3 (d) None of these

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

(a) 1 (b) 0

(c) 2 (d) 3

Q.31 If $x^a = y^b = z^c$ and x, y and z are in G.P., then a, b and c are in :-

(a) A.P. (b) G.P.

(c) H.P. (d) None of these

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

(a) $y = -2$ (b) $y = 2$

(c) $x = -2$ (d) $x = 2$

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

(a) 0 (b) 1

(c) -1 (d) None of these

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

(a) $3x^2 - 8x + 9 = 0$ (b) $9x^2 - 8x + 3 = 0$

(c) $9x^2 + 8x + 3 = 0$ (d) $3y^2 + 9y + 8 = 0$

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

(a) $\left(\frac{x_1 - x_2}{2}, \frac{y_1 + y_2}{2}\right)$ (b) $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

(c) $(1, 1)$ (d) $\left(\frac{x_1 - x_2}{2}, \frac{y_1 - y_2}{2}\right)$

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

(a) $(\pm\sqrt{7}, 0)$ (b) $(\pm\sqrt{3}, 0)$

(c) $(\pm\sqrt{6}, 0)$ (d) $(\pm\sqrt{11}, 0)$

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

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$

(c) $\frac{3}{4}$ (d) 0

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

(a) $\frac{1}{3}$ (b) $\frac{3}{4}$

(c) $\frac{1}{2}$ (d) $\frac{4}{5}$

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

(a) $\frac{\pi}{4}$ (b) 0

(c) $\frac{\pi}{2}$ (d) $\frac{\pi}{3}$

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

(a) 1 (b) $\frac{\sqrt{3}+1}{2}$

(c) $\frac{\sqrt{3}-1}{2}$ (d) None of these

Q.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 ?

(a) 35.2 (b) 35.9

(c) 36.5 (d) 36.8

Q.42 The equation of the circle passing through $(4, 5)$ having the centre at $(2, 2)$ is :-

(a) $x^2 + y^2 + 4x + 4y - 5 = 0$ (b) $x^2 + y^2 - 4x - 4y - 5 = 0$

(c) $x^2 + y^2 - 4y - 13 = 0$ (d) $x^2 + y^2 - 4x - 4y + 5 = 0$

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

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{2}$

(c) $\frac{\pi}{3}$ (d) $\frac{\pi}{6}$

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

(a) ${}^{10}C_4$ (b) ${}^{10}C_6$

(c) ${}^{10}C_5$ (d) ${}^{10}C_7$

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

(a) 5 (b) 2

(c) 4 (d) None of these

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

(a) 240 (b) 210

(c) 180 (d) 200

Q.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 $\theta = \frac{\pi}{2}$?

(a) -1 (b) 0

(c) 1 (d) 2

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

(a) $c^2 = a^2(1 + m^2)$ (b) $c^2 = -a^2(1 + m^2)$

(c) Both 1 and 2 (d) None of these

Q.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 arranagements is :-

(a) 480 ways (b) 440 ways

(c) 410 ways (d) 240 ways

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

(a) ± 2 (b) ± 3

(c) ± 4 (d) ± 5

ENGLISH

Choose the word which is Synonym with the given word.

Q.51 ABANDON

(a) Neglect (b) Abscond

(c) Discontinue (d) Collect

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

Q.52 CONFESS

(a) Refuse (b) Deny

(c) Contest (d) Contend

Select the correct Antonym for the given word.

Q.53 GLOOMY

(a) Radiant (b) Fragrant

(c) Fabulous (d) Famous

Select the word which is correctly spelt.

Q.54 (a) Satellite (b) Sattelite

(c) Sattellite (d) Satelitte

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

Q.55 The ins and outs

(a) Behave towards someone in a magnanimous manner

(b) Above the comprehension of

(c) Deeply

(d) The full detail

Q. 56 Give a free hand

(a) Without stigma

(b) Give freedom to exercise complete control over something

(c) Maintaining composure

(d) An unexpected triumph

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 f our and indicate it by selecting the appropriate option.

Q.57 He died_____ cancer.

(a) from (b) with

(c) of (d) by

Read the sentence carefully and choose the option that has an error in it :-

Q.58 One of the students were blind.

(a) One of (b) were blind

(c) No error (d) the students

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

Q.59 The number of students (a) / going on the Goa trip (B) / are very high. (c) / No error (d)

(a) The number of students (b) going on the Goa trip

(c) are very high (d) No error

Direction – Fill in the blank with the correct answer :-

Q.60 My brother often_____cinema.

(a) watch (b) watches

(c) will watched (d) have watch

Direction : Noun form of 'Collide' is_____.

Q.61 (a) Collided (b) Collition

(c) Colliding (d) Collision

Direction : Choose the appropriate answer for the given sentence :-

Q.62 Ram is_____ and the most handsome boy in the class.

(a) tallest (b) taller

(c) smaller (d) thinner

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

Q.63 He is blind_____ his own faults.

(a) of (b) to

(c) on (d) for

Direction : Change the Voice :-

Q.64 Did he plan and excursion to mountain ?

(a) Was an excursion to mountains planned by him ?

(b) Were and excursion to mountains planned by him ?

(c) Was an excursion to mountains planned to him ?

(d) Did an excursion to mountains planned by him ?

Direction – Choose the correct spelling of the word among the following :-

Q.65 (a) Cigarett (b) Cigrette
(c) Cigaratte (d) Cigarette

Direction : Change the Narration :-

Q.66 The saga said, "God helps those who helps themselves."
(a) The saga said the God helped those who help themselves.
(b) The saga said that God will help those who help themselves.
(c) The saga said to God helps those who help themselves.
(d) The saga said that God helps those who help themselves.

Direction – Select the option that is opposite in meaning to the given word and mark your response accordingly.

Q.67 Conference
(a) Dispersion (b) Group
(c) Argument (d) Discussion

Q.68 Absolute
(a) Partial (b) Initial
(c) Perfect (d) Definite

Direction – Select the option that is similar in meaning to the given word and mark your response accordingly.

Q.69 Bequeath
(a) Withhold (b) Stop
(c) Retain (d) Leave

Q.70 Exhale
(a) Breathe out (b) Breath in
(c) Blow in (d) Absorb

ANSWER KEY

1.	(c)	2.	(b)	3.	(c)	4.	(a)	5.	(c)
6.	(d)	7.	(a)	8.	(b)	9.	(c)	10.	(d)
11.	(c)	12.	(b)	13.	(a)	14.	(c)	15.	(c)
16.	(b)	17.	(a)	18.	(a)	19.	(d)	20.	(a)
21.	(d)	22.	(d)	23.	(c)	24.	(b)	25.	(c)
26.	(a)	27.	(b)	28.	(d)	29.	(a)	30.	(b)
31.	(c)	32.	(b)	33.	(b)	34.	(c)	35.	(b)
36.	(a)	37.	(c)	38.	(d)	39.	(a)	40.	(b)
41.	(c)	42.	(b)	43.	(c)	44.	(c)	45.	(c)
46.	(b)	47.	(a)	48.	(c)	49.	(a)	50.	(c)
51.	(c)	52.	(b)	53.	(a)	54.	(a)	55.	(d)
56.	(b)	57.	(c)	58.	(b)	59.	(c)	60.	(b)
61.	(d)	62.	(a)	63.	(b)	64.	(a)	65.	(d)
66.	(d)	67.	(a)	68.	(a)	69.	(d)	70.	(a)