

PHYSICS

PART-I (Multiple Choice Questions)

- Statement - 1 :** The centre of mass of a proton and an electron, released from their respective positions remains at rest.

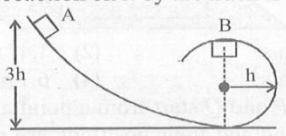
Statement - 2 : The centre of mass remains at rest, if no external force is applied.

(1) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement - 1
 (2) Statement-1 is True, Statement - 2 is True; Statement-2 is NOT a correct explanation for Statement - 1
 (3) Statement-1 is True, Statement- 2 is False
 (4) Both statements are false
- Two identical sinusoidal waves each of amplitude 5 mm with a phase difference of $\frac{\pi}{2}$ are traveling in the same direction in a string. The amplitude of the resultant wave (in mm) is

(1) zero (2) $5\sqrt{2}$ (3) $\frac{5}{\sqrt{2}}$ (4) 2.5
- Match Column - I and Column - II and choose the correct match from the given choices.

Column - I	Column - II
(A) Root mean square speed of gas molecules	(i) $\frac{1}{3}nmv^{-2}$
(B) Pressure exerted by ideal gas	(ii) $\sqrt{\frac{3RT}{M}}$
(C) Average kinetic energy of a molecule	(iii) $\frac{5}{2}RT$
(D) Total internal energy of 1 mole of a diatomic gas	(iv) $\frac{3}{2}k_B T$

(1) A - (iii), B - (ii), C - (i), D - (iv)
 (2) A - (iii), B - (i), C - (iv), D - (ii)
 (3) A - (ii), B - (iii), C - (iv), D - (i)
 (4) A - (ii), B - (i), C - (iv), D - (iii)
- In the figure shown, a particle of mass m is released from the position A on a smooth track. When the particle reaches at B, then normal reaction on it by the track is



(1) mg (2) $2mg$ (3) $\frac{2}{3}mg$ (4) $\frac{m^2g}{h}$
- The density ρ of water of bulk modulus B at a depth y in the ocean is related to the density at surface ρ_0 by the relation

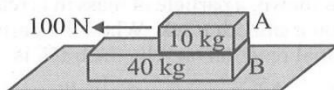
(1) $\rho = \rho_0 \left[1 - \frac{\rho_0 g y}{B} \right]$ (2) $\rho = \rho_0 \left[1 + \frac{\rho_0 g y}{B} \right]$
 (3) $\rho = \rho_0 \left[1 + \frac{B}{\rho_0 h g y} \right]$ (4) $\rho = \rho_0 \left[1 - \frac{B}{\rho_0 h g y} \right]$
- The electric field in a certain region is given by $\vec{E} = (5\hat{i} - 3\hat{j})kV/m$. The potential difference $V_B - V_A$ between points A and B, having coordinates (4, 0, 3)m and (10, 3, 0)m respectively, is equal to

(1) 21 kV (2) -21 kV (3) 39 kV (4) -39 kV
- Two electric bulbs marked 25W - 220 V and 100W - 220V are connected in series to a 440 V supply. Which of the bulbs will fuse?

(1) Both (2) 100 W (3) 25 W (4) Neither
- Two long parallel wires P and Q are held perpendicular to the plane of the paper at a separation of 5 m. If P and Q carry currents of 2.5 A and 5 A respectively in the same direction, then the magnetic field at a point midway between P and Q is

(1) $\frac{\mu_0}{\pi}$ (2) $\sqrt{3}\frac{\mu_0}{\pi}$ (3) $\frac{\mu_0}{2\pi}$ (4) $\frac{3\mu_0}{2\pi}$
- Two seconds after projection a projectile is travelling in a direction inclined at 30° to the horizontal. After one more second, it is travelling horizontally. The magnitude and direction of its initial velocity are-

(1) $2\sqrt{20}$ m/s 60° (2) $20\sqrt{3}$ m/s 60°
 (3) $6\sqrt{40}$ m/s 30° (4) $40\sqrt{6}$ m/s 30°
- A 40 kg slab rests on a frictionless floor as shown in the figure. A 10 kg block rests on the top of the slab. The static coefficient of friction between the block and slab is 0.60 while the coefficient of kinetic friction is 0.40. The 10 kg block is acted upon by a horizontal force 100 N. If $g = 9.8 \text{ m/s}^2$, the resulting acceleration of the slab will be



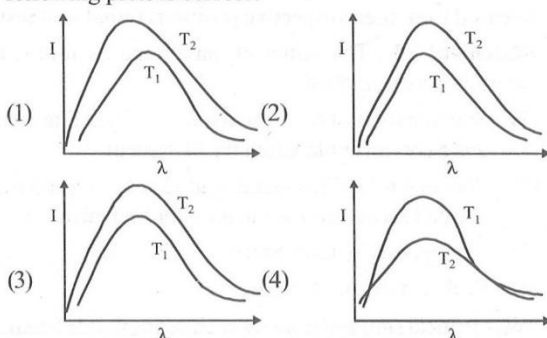
(1) 0.98 m/s^2 (2) 1.47 m/s^2
 (3) 1.52 m/s^2 (4) 6.1 m/s^2
- Two cars P and Q start from a point at the same time in a straight line and their positions are represented by $x_P(t) = at + bt^2$ and $x_Q(t) = ft - t^2$. At what time do the cars have the same velocity

(1) $\frac{f-a}{2(1+b)}$ (2) $\frac{a-1}{1+b}$
 (3) $\frac{a+1}{2(b-1)}$ (4) $\frac{a+f}{2(1+b)}$
- Ultraviolet light of wavelength 300 nm and intensity 1.0 watt/m^2 falls on the surface of a photosensitive material. If 1% of the incident photons produce photoelectrons, then find the number of photoelectrons emitted from an area of 1.0 cm^2 of the surface.

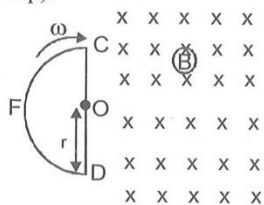
(1) 9.61×10^{14} per sec (2) 4.12×10^{13} per sec
 (3) 1.51×10^{12} per sec (4) 2.13×10^{11} per sec

13. If the wavelength of the first line of the Balmer series of hydrogen is $6561 \text{ \AA}$, find the wavelength of the second line of the series.
(1) $13122 \text{ \AA}$ (2) $3280 \text{ \AA}$ (3) $4860 \text{ \AA}$ (4) $2187 \text{ \AA}$
14. The concentration of hole - electron pairs in pure silicon at $T = 300 \text{ K}$ is 7×10^{15} per cubic meter. Antimony is doped into silicon in a proportion of 1 atom in 10^7 Si atoms. Assuming that half of the impurity atoms contribute electron in the conduction band, calculate the factor by which the number of charge carriers increases due to doping. The number of silicon atoms per cubic meter is 5×10^{28}
(1) 2.8×10^5 (2) 3.1×10^2 (3) 4.2×10^5 (4) 1.8×10^5

15. Shown below are the black body radiation curves at temperatures T_1 and T_2 ($T_2 > T_1$). Which one of the following plots is correct?



16. Three closed vessels A, B and C are at the same temperature T and contain gases which obey the Maxwellian distribution of velocities. Vessel A contains only O_2 , B only N_2 and C a mixture of equal quantities of O_2 and N_2 . If the average speed of the O_2 molecules in vessel A is V_1 , that of the N_2 molecules in vessel B is V_2 , the average speed of the O_2 molecules in vessel C is
(1) $(V_1 + V_2)/2$ (2) V_1
(3) $(V_1 V_2)^{1/2}$ (4) $\sqrt{3kT/M}$
17. In fig, CODF is a semicircular loop of a conducting wire of resistance R and radius r. It is placed in a uniform magnetic field B, which is directed into the page (perpendicular to the plane of the loop).



The loop is rotated with a constant angular speed ω about an axis passing through the centre O, and perpendicular to the page. Then the induced current in the wire loop is
(1) zero (2) $B r^2 \omega / R$ (3) $B r^2 \omega / 2R$ (4) $B \pi r^2 \omega / R$

18. If $E = 100 \sin(100t)$ volt and $I = 100 \sin\left(100t + \frac{\pi}{3}\right) \text{ mA}$ are the instantaneous values of voltage and current, then the r.m.s. values of voltage and current are respectively
(1) 70.7 V , 70.7 mA (2) 70.7 V , 70.7 A
(3) 141.4 V , 141.4 mA (4) 141.4 V , 141.4 A

19. A plane electromagnetic wave is incident on a plane surface of area A, normally and is perfectly reflected. If energy E strikes the surface in time t then average pressure exerted on the surface is (c = speed of light)
(1) zero (2) E/Atc (3) $2E/Atc$ (4) E/c
20. A 2.0 cm tall object is placed 15 cm in front of a concave mirror of focal length 10 cm . What is the size and nature of the image
(1) 4 cm , real (2) 4 cm , virtual
(3) 1.0 cm , real (4) None of these

PART-II (Numerical Answer Questions)

21. Two full turns of the circular scale of a screw gauge cover a distance of 1 mm on its main scale. The total number of divisions on the circular scale is 50. Further, it is found that the screw gauge has a zero error of $(-0.03) \text{ mm}$. While measuring the diameter of a thin wire, a student notes the main scale reading of 3 mm and the number of circular scale divisions in line with the main scale as 35. The diameter of the wire is _____ mm.
22. A capacitor with capacitance $5 \mu\text{F}$ is charged to $5 \mu\text{C}$. If the plates are pulled apart to reduce the capacitance to $2 \mu\text{F}$, how much work (in J) is done?
23. When a ball is released from rest in a very long column of viscous liquid, its downward acceleration is 'a' (just after release). Its acceleration when it has acquired two third of the maximum velocity is a/X . Find the value of X.
24. The root mean square speed of smoke particles each of mass $5 \times 10^{-17} \text{ kg}$ in their Brownian motion in air at N.T.P is _____ $\times 10^{-2} \text{ m s}^{-1}$.
25. Three sound waves of equal amplitudes have frequencies ($f - 1$), f , ($f + 1$). They superpose to give beats. The number of beafs produced per second will be _____.

CHEMISTRY

PART-I (Multiple Choice Questions)

1. N_2 is estimated in organic compound by
(1) Duma's method (2) Carius method
(3) Lassaigne's method (4) None of these
2. **Statement I:** S_N2 reaction proceeds with racemisation while S_N1 reaction proceeds with complete stereochemical inversion.
Statement II: S_N2 is two steps reaction while S_N1 is one step reaction.
(1) Both statement I and II are correct.
(2) Both statement I and II are incorrect.
(3) Statement I is correct but statement II is incorrect.
(4) Statement II is correct but statement I is incorrect.
3. Which of the following substances has the greatest ionic character?
(1) Cl_2O (2) NCl_3 (3) PbCl_2 (4) BaCl_2

4. **Assertion:** Decomposition of potassium chlorate is an example of redox reaction.

Reason: There is no change in the oxidation number of potassium in decomposition of potassium chlorate.

- (1) If both Assertion and Reason are correct and the Reason is a correct explanation of the Assertion.
- (2) If both Assertion and Reason are correct but Reason is not a correct explanation of the Assertion.
- (3) If the Assertion is correct but Reason is incorrect.
- (4) If the Assertion is incorrect and Reason is correct.

5. Which of the following factors may be regarded as the main cause of lanthanoid contraction?

- (1) Greater shielding of 5d electrons by 4f electrons.
- (2) Poorer shielding of 5d electrons by 4f electrons.
- (3) Effective shielding of one of 4f electrons by another in the subshell.
- (4) Poor shielding of one of 4f electron by another in the subshell.

6. Match the following

Column-I	Column-II
(A) Ionisation potential	(p) $N > O > F$
(B) Electronegativity	(q) $N < O < F$
(C) Z_{eff}	(r) $O < N < F$
(D) Atomic size	(s) $O > C > N$
(1) A – (r), B – (q), C – (s), D – (p)	
(2) A – (q), B – (r), C – (s), D – (p)	
(3) A – (q), B – (s), C – (r), D – (p)	
(4) A – (s), B – (r), C – (q), D – (p)	

7. The reason for almost doubling the rate of reaction on increasing the temperature of the reaction system by 10 °C is

- (1) The value of threshold energy increases
- (2) Collision frequency increases
- (3) The fraction of the molecule having energy equal to threshold energy or more increases
- (4) Activation energy decreases

8. Isobutyl magnesium bromide with dry ether and ethyl alcohol gives :

- (1) $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{OH}$ & $\text{CH}_3\text{CH}_2\text{MgBr}$
- (2) $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_3$ & $\text{MgBr}(\text{OC}_2\text{H}_5)$
- (3) $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}=\text{CH}_2$ & $\text{Mg}(\text{OH})\text{Br}$
- (4) $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_3$ & $\text{CH}_3\text{CH}_2\text{OMgBr}$

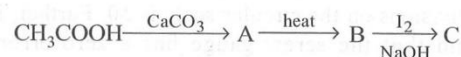
9. The K_p/K_c ratio will be highest in case of

- (1) $\text{CO}(g) + \frac{1}{2} \text{O}_2(g) \rightleftharpoons \text{CO}_2(g)$
- (2) $\text{H}_2(g) + \text{I}_2(g) \rightleftharpoons 2\text{HI}(g)$
- (3) $\text{PCl}_5(g) \rightleftharpoons \text{PCl}_3(g) + \text{Cl}_2(g)$
- (4) $7\text{H}_2(g) + 2\text{NO}_2(g) \rightleftharpoons 2\text{NH}_3(g) + 4\text{H}_2\text{O}(g)$

10. An organic compound contains 49.3% carbon, 6.84% hydrogen and its vapour density is 73. Molecular formula of the compound is :

- (1) $\text{C}_3\text{H}_5\text{O}_2$
- (2) $\text{C}_4\text{H}_{10}\text{O}_2$
- (3) $\text{C}_6\text{H}_{10}\text{O}_4$
- (4) $\text{C}_3\text{H}_{10}\text{O}_2$

11. Consider the following transformations :



The molecular formula of C is

- (1) $\text{CH}_3-\overset{\text{OH}}{\underset{\text{I}}{\text{C}}}-\text{CH}_3$
- (2) $\text{ICH}_2-\text{COCH}_3$
- (3) CHI_3
- (4) CH_3I

12. The values of ΔH and ΔS for the reaction,

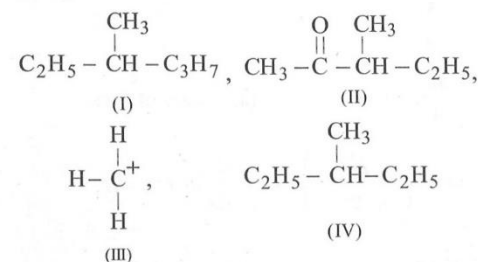
$\text{C}(\text{graphite}) + \text{CO}_2(g) \rightarrow 2\text{CO}(g)$ are 170 kJ and 170 JK⁻¹, respectively. This reaction will be spontaneous at

- (1) 910K
- (2) 1110K
- (3) 510K
- (4) 710K

13. The stability of +1 oxidation state among Al, Ga, In and Tl increases in the sequence :

- (1) $\text{Ga} < \text{In} < \text{Al} < \text{Tl}$
- (2) $\text{Al} < \text{Ga} < \text{In} < \text{Tl}$
- (3) $\text{Tl} < \text{In} < \text{Ga} < \text{Al}$
- (4) $\text{In} < \text{Tl} < \text{Ga} < \text{Al}$

14. Among the following four structures I to IV,



it is true that

- (1) only I and II are chiral compounds
- (2) only III is a chiral compound
- (3) only II and IV are chiral compounds
- (4) all four are chiral compounds

15. Of the four isomeric hexanes, the isomer which can give two monochlorinated compounds is

(1) 2-methylpentane (2) 2, 2-dimethylbutane
(3) 2, 3-dimethylbutane (4) n-hexane

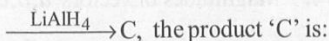
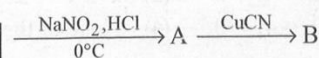
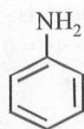
16. The solubility product of PbCl_2 is 1.7×10^{-5} . The solubility in moles per litre would be :

(1) 1.62×10^{-4} (2) 1.62×10^{-8}
(3) 1.62×10^{-2} (4) 1.62×10^{-6}

17. Crystal field stabilization energy for high spin d^4 octahedral complex is:

(1) $-1.8 \Delta_0$ (2) $-1.6 \Delta_0 + P$
(3) $-1.2 \Delta_0$ (4) $-0.6 \Delta_0$

18. In the reaction sequence



(1) benzonitrile (2) benzaldehyde
(3) benzoic acid (4) benzylamine

19. In the reaction of oxalate with permanganate in acidic medium, the number of electrons involved in producing one molecule of CO_2 is:

(1) 1 (2) 10 (3) 2 (4) 5

20. Momentum of radiations of wavelength 0.33 nm is :

(1) $2.01 \times 10^{-21} \text{ kg m sec}^{-1}$
(2) $2.01 \times 10^{-24} \text{ g m sec}^{-1}$
(3) $2.01 \times 10^{-21} \text{ g m sec}^{-1}$
(4) $2.01 \times 10^{-24} \text{ kg m sec}^{-1}$

PART-II (Numerical Answer Questions)

21. The number of precipitable halide ions in the sample $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2\text{Br}]\text{Cl}$ will be
22. How many structures are possible for C_5H_8 with one triple bond?
23. What is the molarity of 0.2N Na_2CO_3 solution?
24. If N_A is Avogadro's number then number of valence electrons in 4.2g of nitride ions (N^{3-}) is $x \times N_A$. What will be the value of x .
25. The frequency of radiation emitted when the electron falls from $n = 4$ to $n = 1$ in a hydrogen atom in terms of $x \times 10^{15} \text{ s}^{-1} - 10$ will be _____.
(Given : ionization energy of $\text{H} = 2.18 \times 10^{-18} \text{ J atom}^{-1}$ and $h = 6.625 \times 10^{-34} \text{ J s}$)

MATHEMATICS

PART-I (Multiple Choice Questions)

1. If $(7 - 4\sqrt{3})^{x^2 - 4x + 3} + (7 + 4\sqrt{3})^{x^2 - 4x + 3} = 14$, then the value of x is given by
- (1) $2, 2 \pm \sqrt{2}$ (2) $2 \pm \sqrt{3}, 3$
(3) $3 \pm \sqrt{2}, 2$ (4) None of these
2. The minimum value of the function $f(x) = x^{3/2} + x^{-3/2} - 4\left(x + \frac{1}{x}\right)$ for all permissible real x , is
- (1) -10 (2) -6 (3) -7 (4) -8
3. In the expansion of $\left(\frac{x}{2} - \frac{3}{x^2}\right)^{10}$, the coefficient of x^4 is
- (1) $\frac{405}{256}$ (2) $\frac{504}{259}$
(3) $\frac{450}{263}$ (4) None of these
4. The points (4, 7, 8), (2, 3, 4), (-1, -2, 1) and (1, 2, 5) are the vertices of a
- (1) parallelogram (2) rhombus
(3) rectangle (4) square
5. The domain of definition of the function $f(x) = \sqrt{1 + \log_e(1 - x)}$ is
- (1) $-\infty < x \leq 0$ (2) $-\infty < x \leq \frac{e-1}{e}$
(3) $-\infty < x \leq 1$ (4) $x \geq 1 - e$
6. The function $f(x) = [x]^2 - [x^2]$ (where $[y]$ is the greatest integer less than or equal to y), is discontinuous at
- (1) All integers
(2) All integers except 0 and 1
(3) All integers except 0
(4) All integers except 1
7. The line $y = mx$ bisects the area enclosed by lines $x = 0$, $y = 0$ and $x = 3/2$ and the curve $y = 1 + 4x - x^2$. Then the value of m is
- (1) $\frac{13}{6}$ (2) $\frac{13}{2}$ (3) $\frac{13}{5}$ (4) $\frac{13}{7}$
8. The sum of the series $3 + 33 + 333 + \dots + n$ terms is
- (1) $\frac{1}{27}(10^{n+1} + 9n - 28)$ (2) $\frac{1}{27}(10^{n+1} - 9n - 10)$
(3) $\frac{1}{27}(10^{n+1} + 10n - 9)$ (4) None of these

9. If $\int \frac{1}{1+\sin x} dx = \tan\left(\frac{x}{2} + a\right) + b$ then
- (1) $a = -\frac{\pi}{4}, b \in \mathbb{R}$ (2) $a = \frac{\pi}{4}, b \in \mathbb{R}$
(3) $a = \frac{5\pi}{4}, b \in \mathbb{R}$ (4) None of these
10. If $y = \tan^{-1}\left(\frac{2^x}{1+2^{2x+1}}\right)$, then $\frac{dy}{dx}$ at $x=0$ is
- (1) $\frac{3}{5} \log 2$ (2) $\frac{2}{5} \log 2$
(3) $-\frac{3}{2} \log 2$ (4) None of these
11. The value of $\cos \frac{2\pi}{7} + \cos \frac{4\pi}{7} + \cos \frac{6\pi}{7}$ is
- (1) 0 (2) 1
(3) $\frac{1}{2}$ (4) $-\frac{1}{2}$
12. The solution of the differential equation $x \frac{dy}{dx} = y(\log y - \log x + 1)$ is
- (1) $y = xe^{cx}$ (2) $y + xe^{cx} = 0$
(3) $y + e^x = 0$ (4) None of these
13. If $y = 2x$ is a chord of the circle $x^2 + y^2 = 10x$, then the equation of the circle whose diameter is this chord, is -
- (1) $x^2 + y^2 + 2x + 4y = 0$ (2) $x^2 + y^2 + 2x - 4y = 0$
(3) $x^2 + y^2 - 2x - 4y = 0$ (4) None of these
14. Magnitudes of vectors $\vec{a}, \vec{b}, \vec{c}$ are 3, 4, 5 respectively. If $\vec{a}$ and $\vec{b} + \vec{c}$, $\vec{b}$ and $\vec{c} + \vec{a}$, $\vec{c}$ and $\vec{a} + \vec{b}$ are mutually perpendicular, then magnitude of $\vec{a} + \vec{b} + \vec{c}$ is
- (1) $4\sqrt{2}$ (2) $3\sqrt{2}$ (3) $5\sqrt{2}$ (4) $3\sqrt{3}$
15. If $A^{-1} = \begin{bmatrix} 1 & 0 & -2 \\ -2 & 1 & 0 \\ -1 & 1 & 0 \end{bmatrix}$, then
- (1) $|A| = 2$ (2) $\text{adj } A = \begin{bmatrix} \frac{1}{2} & 0 & -1 \\ -1 & \frac{1}{2} & 0 \\ -\frac{1}{2} & \frac{1}{2} & 0 \end{bmatrix}$
(3) $|\text{adj } A| = 4$ (4) $|A| = -\frac{1}{2}$
16. $\int_0^{2\pi} \log\left(\frac{a+b\sec x}{a-b\sec x}\right) dx =$
- (1) 0 (2) $\pi/2$
(3) $\frac{\pi(a+b)}{a-b}$ (4) $\frac{\pi}{2}(a^2 - b^2)$
17. If $f: \mathbb{R} \rightarrow \mathbb{R}$ and $g: \mathbb{R} \rightarrow \mathbb{R}$ are defined by $f(x) = |x|$ and $g(x) = [x-3]$ for $x \in \mathbb{R}$, then $\left\{g(f(x)) : -\frac{8}{5} < x < \frac{8}{5}\right\}$ is equal to
- (1) $\{0, 1\}$ (2) $\{1, 2\}$
(3) $\{-3, -2\}$ (4) $\{2, 3\}$
18. If A and B are two events such that $P(I) = \frac{1}{2}$ and $P(2) = \frac{2}{3}$, then
- (1) $P(A \cup B) \geq \frac{2}{3}$ (2) $\frac{1}{6} \leq P(A \cap B) \leq \frac{1}{2}$
(3) $\frac{1}{6} \leq P(A' \cap B) \leq \frac{1}{2}$ (4) All of these
19. If $P \equiv (x, y)$, $F_1 \equiv (3, 0)$, $F_2 \equiv (-3, 0)$ and $16x^2 + 25y^2 = 400$, then $PF_1 + PF_2$ equals
- (1) 8 (2) 6 (3) 10 (4) 12
20. The line $x + y = 4$ divides the line joining the points $(-1, 1)$ and $(5, 7)$ in the ratio
- (1) 2:1 (2) 1:2
(3) 1:2 externally (4) None of these
- PART-II (Numerical Answer Questions)**
21. The number of pairs (x, y) satisfying the equations $\sin x + \sin y = \sin(x+y)$ and $|x| + |y| = 1$ is _____.
22. The value of $\lim_{x \rightarrow 0} \left\{ \frac{\sin x - x + \frac{x^3}{6}}{x^5} \right\}$ is $\frac{1}{k}$, then k is _____.
23. An edge of a variable cube is increasing at the rate cm/sec. Then, the state of increase in volume of the cube when the edge is 5 cm long, is _____.
24. If α and β are the roots of the equation $x^2 - x + 1 = 0$, then $|\alpha^2 + \beta^2| =$ _____.
25. The matrix $\begin{pmatrix} 1 & a & 2 \\ 1 & 2 & 5 \\ 2 & 1 & 1 \end{pmatrix}$ is not invertible, if 'a' has the value _____.



ANSWER

PHYSICS

1	A	2	B	3	D	4	A	5	B	6	B	7	C	8	C	9	B	10	A
11	A	12	C	13	C	14	D	15	A	16	B	17	C	18	A	19	C	20	A
21	3.38	22		23	3	24		25	2										

22. (3.75×10^{-6}) 24. (1.5×10^{-2})

CHEMISTRY

1	A	2	B	3	D	4	B	5	B	6	A	7	B	8	BD	9	C	10	C
11	C	12	B	13	B	14	A	15	C	16	C	17	D	18	D	19	A	20	D
21	1	22	3	23	0.1	24	2.4	25	3.08										

MATHS

1	A	2	A	3	A	4	A	5	B	6	D	7	A	8	B	9	A	10	D
11	D	12	A	13	C	14	C	15	B	16	A	17	C	18	D	19	C	20	B
21	6	22	120	23	*	24	1	25	1										