

GATE 2025**General Aptitude (GA)****Q.1 – Q.5 Carry ONE mark each**

1. Is there any good show _____ television tonight?
Select the most appropriate option to complete the above sentence.

- (A) in
- (B) at
- (C) within
- (D) on

2. As the police officer was found guilty of embezzlement, he was _____ dismissed from the service in accordance with the Service Rules.
Select the most appropriate option to complete the above sentence.

- (A) sumptuously
- (B) brazenly
- (C) unintentionally
- (D) summarily

3. The sum of the following infinite series is

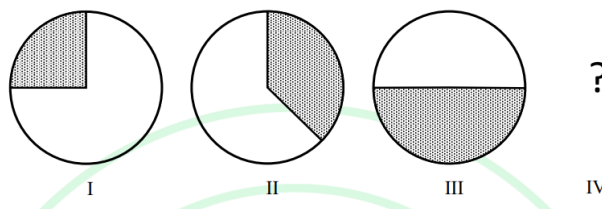
$$\frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} + \frac{1}{4!} + \frac{1}{5!} + \dots$$

- (A) π
- (B) $1 + e$
- (C) $e - 1$
- (D) e

4. A thin wire is used to construct all the edges of a cube of side 1 m by bending, cutting and soldering the wire. If the wire is 12 m long, what is the minimum number of cuts required to construct the wire frame to form the cube?

- (A) 3
- (B) 4
- (C) 6
- (D) 12

5. The figures I, II and III are parts of a sequence. Which one of the following options comes next in the sequence at IV?



(A)

(B)

(C)

(D)

Q.6 – Q.10 Carry TWO marks each

6. “Why do they pull down and do away with crooked streets, I wonder, which are my delight, and hurt no man living? Every day the wealthier nations are pulling down one or another in their capitals and their great towns: they do not know why they do it; neither do I. It ought to be enough, surely, to drive the great broad ways which commerce needs and which are the life-channels of a modern city, without destroying all history and all the humanity in between: the islands of the past.”

(From Hilaire Belloc's "The Crooked Streets")

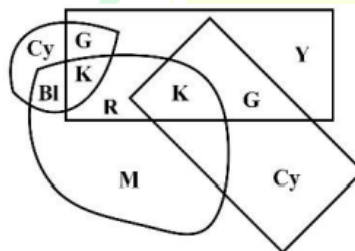
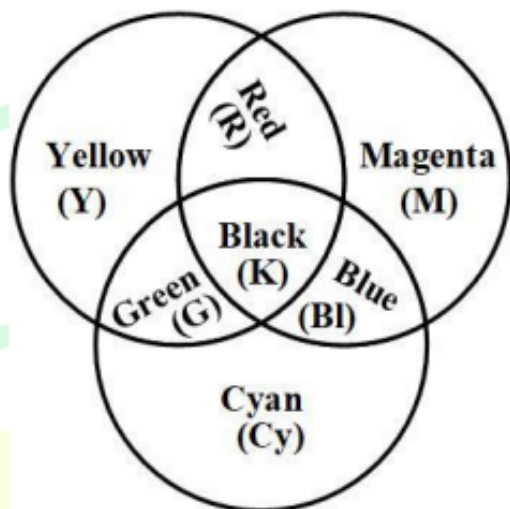
Based only on the information provided in the above passage, which one of the following statements is true?

- (A) The author of the passage takes delight in wondering.
- (B) The wealthier nations are pulling down the crooked streets in their capitals.
- (C) In the past, crooked streets were only built on islands.
- (D) Great broad ways are needed to protect commerce and history.

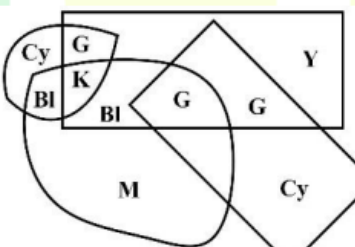
7. Rohit goes to a restaurant for lunch at about 1 PM. When he enters the restaurant, he notices that the hour and minute hands on the wall clock are exactly coinciding. After about an hour, when he leaves the restaurant, he notices that the clock hands are again exactly coinciding. How much time (in minutes) did Rohit spend at the restaurant?

- (A) $64\frac{6}{11}$
- (B) $66\frac{5}{13}$
- (C) $65\frac{5}{11}$
- (D) $66\frac{6}{13}$

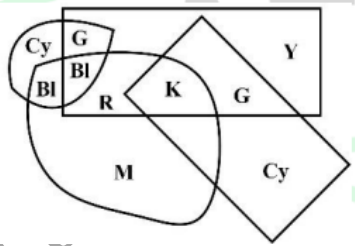
8. A color model is shown in the figure with color codes: Yellow (Y), Magenta (M), Cyan (Cy), Red (R), Blue (Bl), Green (G), and Black (K). Which one of the following options displays the color codes that are consistent with the color model?



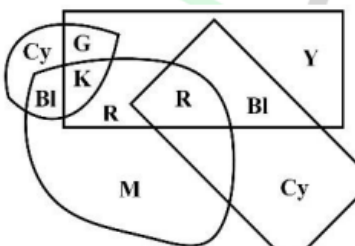
(A)



(B)



(C)



(D)

9. A circle with center at $(x, y) = (0.5, 0)$ and radius 0.5 intersects with another circle with center at $(x, y) = (1, 1)$ and radius 1 at two points. One of the points of intersection (x, y) is:

- (A) (0, 0)
- (B) (0.2, 0.4)
- (C) (0.5, 0.5)
- (D) (1, 2)

10. An object is said to have an n -fold rotational symmetry if the object, rotated by an angle $\frac{2\pi}{n}$, is identical to the original. Which one of the following objects exhibits 4-fold rotational symmetry about an

axis perpendicular to the plane of the screen? (Figures representative.)

Physics (PH)**Q.11 – Q.35 Carry ONE mark each**

11. For a two-dimensional hexagonal lattice with lattice constant a , the atomic density is

(A) $\frac{1}{\sqrt{3}a^2}$

(B) $\frac{1}{\sqrt{6}a^2}$

(C) $\frac{4}{3\sqrt{3}a^2}$

(D) $\frac{1}{3\sqrt{3}a^2}$

12. Consider a crystal that has a basis of one atom. Its primitive vectors are $\vec{a}_1 = a\hat{i}$, $\vec{a}_2 = a\hat{j}$, $\vec{a}_3 = \frac{a}{2}(\hat{i} + \hat{j} + \hat{k})$. Which one of the following is correct regarding the Bravais lattice type?

(A) BCC; volume of primitive cell = $\frac{a^3}{2}$

(B) FCC; volume of primitive cell = $\frac{a^3}{4}$

(C) BCC; volume of primitive cell = $\frac{a^3}{8}$

(D) FCC; volume of primitive cell = a^3

13. A particle of mass m is in a potential $V(x) = \frac{1}{2}m\omega^2x^2$ for $x > 0$ and $V(x) = \infty$ for $x \leq 0$. The ratio of the energies corresponding to the lowest energy level to the next higher level is

(A) $\frac{3}{7}$

(B) $\frac{1}{2}$

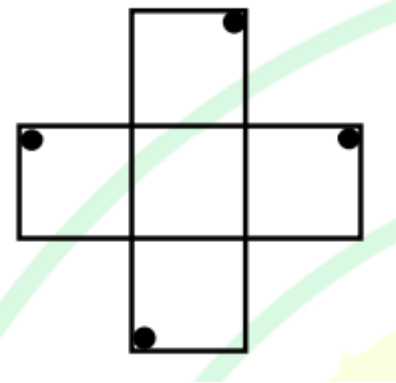
(C) $\frac{1}{3}$

(D) $\frac{3}{5}$

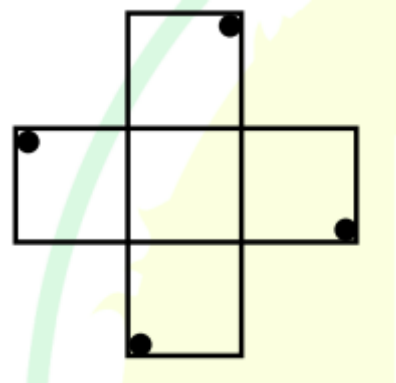
14. A particle is scattered from a potential $V(\mathbf{r}) = g\delta^3(\mathbf{r})$, where $g > 0$. Using the first Born approximation, the angular (θ, ϕ) dependence of the differential cross section $\frac{d\sigma}{d\Omega}$ is

(A) Independent of θ but dependent on ϕ

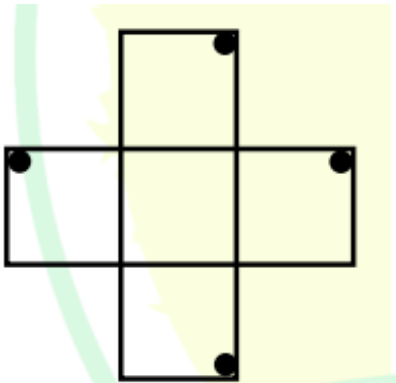
(B) Dependent on θ but independent of ϕ



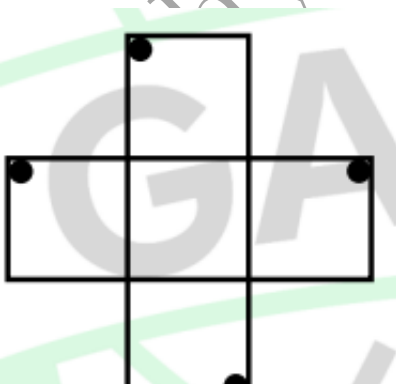
(A)



(B)



(C)



(D)

(C) Dependent on both θ and ϕ

(A) (0, 0)

(D) Independent of both θ and ϕ

(B) (0, 1)

15. The Joule–Thomson expansion of a gas is

(C) (1, 1)

(A) Isentropic

(D) (1, 0)

(B) Isenthalpic

(C) Isobaric

(D) Isochoric

16. Which one of the following is correct for the phase velocity v_p and group velocity v_g ? (c is the speed of light in vacuum.)

(A) Mass

(B) Spin

(C) Charge

(D) Parity

(A) For matter waves in the relativistic case, $v_p v_g > c^2$

(B) For electromagnetic waves in a medium, v_p represents the speed with which energy propagates

(C) For electromagnetic waves in a medium, both v_p and v_g can be more than c

(D) For matter waves in free space, $v_p \neq v_g$

17. As per the Drude model of metals, the electrical resistance of a metallic wire of length L and cross-section area A is (with τ = relaxation time, m =electron mass, n =carrier concentration, e =electron charge)

(A) $\frac{mL}{ne^2 A \tau}$

(B) $\frac{2mL}{ne^2 A \tau}$

(C) $\frac{mL}{2ne^2 A \tau}$

(D) $\frac{mL}{4ne^2 A \tau}$

18. Which baryon has strangeness quantum number $S = -1$?

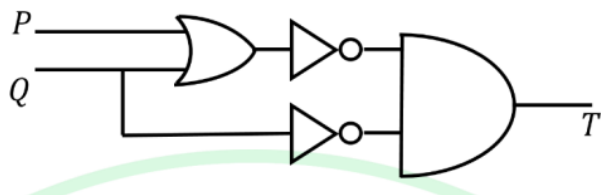
(A) Σ^{*0}

(B) n

(C) Ξ^{*0}

(D) Δ^0

19. A logic gate circuit is shown. The correct input combination (P, Q) for which the output $T = 1$ is



20. The nuclear energy levels of mirror nuclei are similar. Using this empirical fact alone, the nuclear force can be said to be independent of which property of the nucleons?

21. Consider $f(z) = \frac{1}{z^2(z-2)^3}$. The residues at $z = 0$ and $z = 2$, respectively, are

(A) $-\frac{3}{8}$ and $\frac{3}{8}$

(B) $\frac{3}{8}$ and $-\frac{3}{16}$

(C) $-\frac{3}{16}$ and $\frac{3}{16}$

(D) $-\frac{3}{8}$ and $\frac{3}{16}$

22. One mole of a monovalent metal at $T = 0$ obeys the free electron model with Fermi energy E_F . The energy corresponding to filling $N_A/2$ electrons is $2nE_F$. The value of n is

(A) $-\frac{2}{3}$

(B) $+\frac{2}{3}$

(C) $-\frac{1}{3}$

(D) -1

23. A paramagnetic material containing ions with total angular momentum $J = \frac{1}{2}$ is at absolute temperature T . The ratio of the magnetic field required for 80% of the ions to be in the lowest energy state to that required for 60% in the lowest state (same T) is

(A) $\frac{2 \ln 2}{\ln(3/2)}$

(B) $\frac{\ln 2}{\ln(3/2)}$

(C) $\frac{3 \ln 2}{\ln(3/2)}$

(D) $\frac{\ln 3}{\ln(3/2)}$

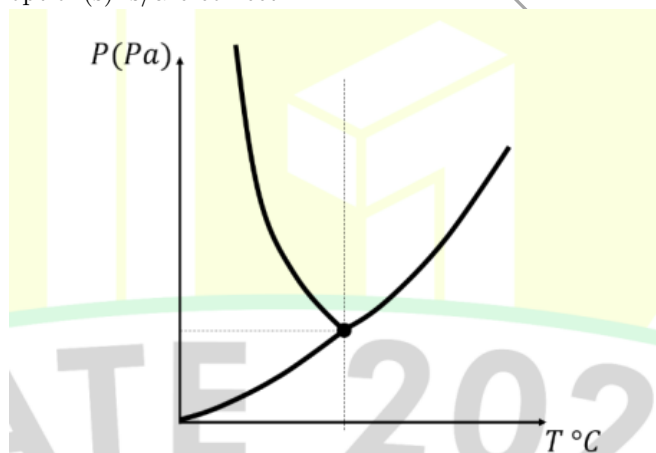
24. Which option(s) is/are correct for the ground state of a hydrogen atom?

- (A) Linear Stark effect is zero
- (B) It has definite parity
- (C) Spin-orbit coupling is zero
- (D) Hyperfine splitting is zero

25. Which option(s) is/are correct for photons?

- (A) Rest mass is zero but energy non-zero
- (B) Carries non-zero linear momentum
- (C) Carries zero spin angular momentum
- (D) Has two linearly independent polarization states

26. A schematic P - T diagram of water is shown. Which option(s) is/are correct?

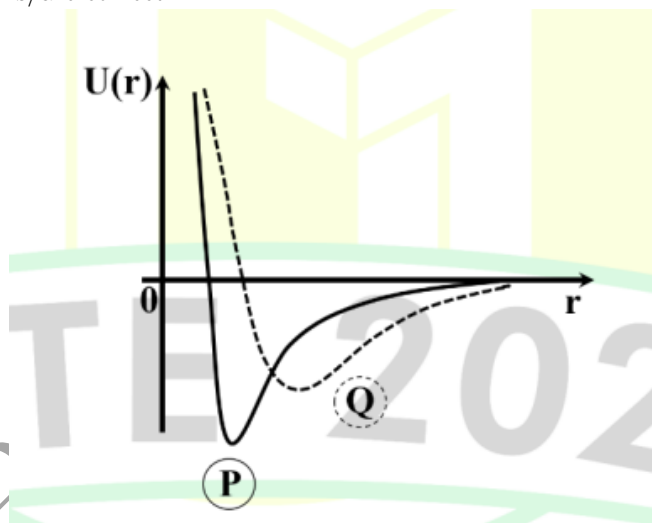


- (A) Clausius-Clapeyron equation is valid across melting and vaporization curves
- (B) Melting curve has the highest slope
- (C) The critical point exists only for the vaporization curve
- (D) Clausius-Clapeyron is not valid across melting and vaporization curves

27. Which consideration(s) show that nuclear beta decay $n \rightarrow p + e^- + \bar{\nu}_e$ has to be a three-body decay?

- (A) Continuous distribution of electron energy
- (B) Spin of the final state
- (C) Mass of the electron
- (D) Mass of the proton

28. Potential energy of two diatomic molecules P and Q of the same reduced mass is shown. Which option(s) is/are correct?



- (A) Equilibrium inter-nuclear distance of Q is more than that of P
- (B) Total energy $E = 0$ separates bound and unbound states
- (C) Lowest vibrational frequency of P is larger than that of Q
- (D) Dissociation energy of Q is more than that of P

29. Radiation from a ^{60}Co source is detected by a PMT coupled to a scintillator. Which option(s) is/are correct?

- (A) γ from ^{60}Co directly hits the photocathode without interacting with the scintillator and produces a signal
- (B) β from ^{60}Co interacts with the scintillator producing γ which hits the photocathode and produces a signal
- (C) A mu-metal shield is used to nullify external electric fields
- (D) A mu-metal shield is used to nullify external magnetic fields

30. One mole of an ideal monatomic gas at temperature T undergoes free expansion to double its volume; entropy

change is ΔS_1 . Identical gas at temperature $2T$ undergoes isothermal expansion to double its volume; entropy change is ΔS_2 . Compute $\frac{\Delta S_1}{\Delta S_2}$ (integer) is ----

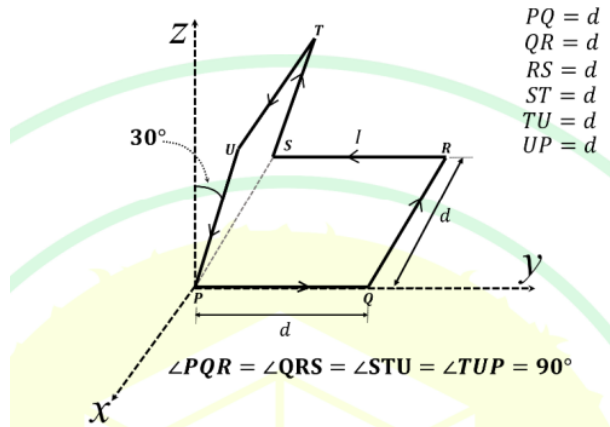
31. A linear dielectric sphere of radius R has uniform frozen-in polarization along z . Its center initially at the origin gives dipole moment p_1 about the origin. When shifted to $(2R, 0, 0)$, the dipole moment about the origin is p_2 . Find $\left| \frac{p_1}{p_2} \right|$ (integer) is ----

32. The effective magnetic moment (in Bohr magneton) for the ground state of an isolated $4f$ ion with 6 unpaired electrons (Hund's rules) is (integer) is ----

33. Powder XRD of a cubic solid with lattice constant a has (111) at $\theta = 30^\circ$. If lattice expands to $1.25a$, the angle for (111) becomes $\sin^{-1}(1/n)$. Find n (one decimal place) is ----

Q.34 Consider a monatomic chain of length 30 cm. The phonon density of states is 1.2×10^{-4} s. Assuming Debye model, the velocity of sound in m/s (one decimal place) is ----

35. The Δ^+ baryon with spin $3/2$, at rest, decays to $p + \pi^0$. Δ^+ has positive intrinsic parity; π^0 has negative parity. The orbital angular momentum of the $p-\pi$ system (integer) is ----



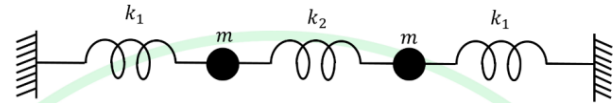
(A) $\sqrt{2} Id^2$

(B) $2 Id^2$

(C) $\sqrt{3} Id^2$

(D) Id^2

38. Two equal masses m with three massless springs k_1, k_2, k_1 in 1D (no gravity, no dissipation). For $m = 1$, $k_1 = 2$, $k_2 = 3$, the normal mode frequencies are



(A) $\sqrt{2}, \sqrt{8}$

(B) $\sqrt{2}, \sqrt{6}$

(C) $\sqrt{3}, \sqrt{10}$

(D) $\sqrt{3}, \sqrt{8}$

Q.36 – Q.65 Carry TWO marks each

36. Screened nuclear charge of He is $1.7e$. Using Bohr model $E_n = -\frac{Z^2}{2n^2}$ a.u., the first ionization potential of He (a.u.) is

(A) 0.89

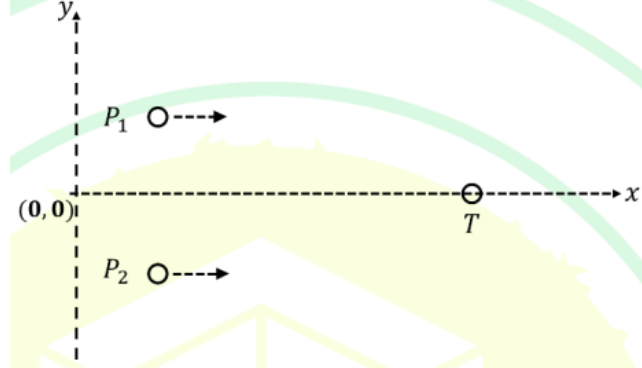
(B) 1.78

(C) 0.94

(D) 3.16

37. The wire loop shown carries steady current I . Each straight section has length d . Part lies in xy plane and the other part is tilted at 30° with respect to xz plane. The magnitude of the magnetic dipole moment is

39. Two projectile protons P_1, P_2 (spin up along $+\hat{z}$) scatter from a target proton T (spin up at rest) in the xy plane. Interaction $V = \lambda \mathbf{L} \cdot \mathbf{S}$ with $\lambda < 0$. Which is correct?

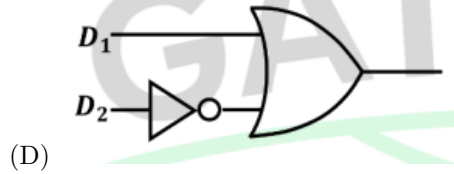


(A) P_1 scatters to $+y$ (up), P_2 to $-y$ (down)

(B) P_1 to $+y$ (up), P_2 to $+y$ (up)

(C) P_1 to $-y$ (down), P_2 to $+y$ (up)

(D) P_1 to $-y$ (down), P_2 to $-y$ (down)



40. A thin circular ring of radius R in the xy -plane with uniform line charge λ . The quadrupole contribution to the potential at $(0, 0, d)$, $d \gg R$, is

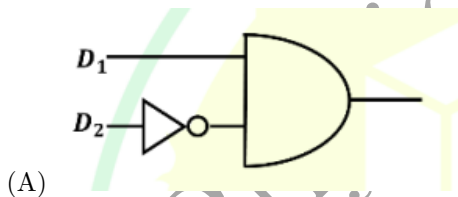
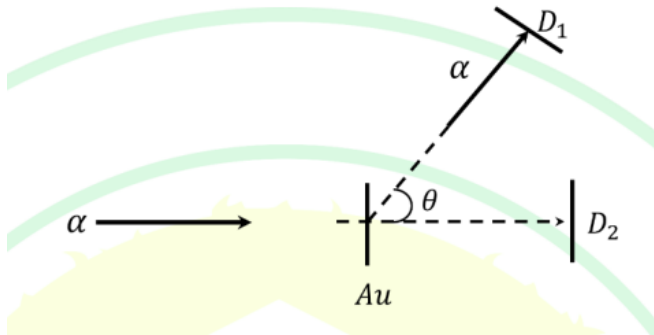
(A) $-\frac{\lambda R^3}{4\epsilon_0 d^3}$

(B) 0

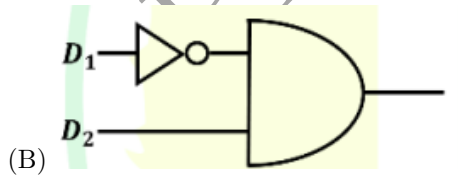
(C) $\frac{\lambda R^3}{4\epsilon_0 d^3}$

(D) $-\frac{\lambda R^3}{2\epsilon_0 d^3}$

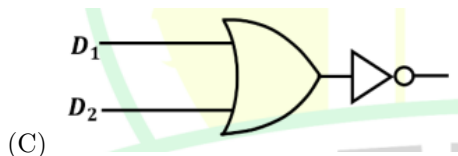
41. An α -particle is scattered from an Au target. Detectors D_1 at angle θ and D_2 along beam direction. Logic outputs go to gates. Which circuit detects the particle scattered at angle θ only?



(A)



(B)



(C)

42. Two-level system with energies $\pm\epsilon$. Populations N_+ and N_- . Total energy E and $N = N_+ + N_-$. In the thermodynamic limit (given $\ln N! \simeq N \ln N - N$), the inverse absolute temperature is

(A) $\frac{k_B}{2\epsilon} \ln \left[\frac{N_- \epsilon / E}{N_+ \epsilon / E} \right]$

(B) $\frac{k_B}{\epsilon} \ln N$

(C) $\frac{k_B}{2\epsilon} \ln N$

(D) $\frac{k_B}{\epsilon} \ln \left[\frac{N_- \epsilon / E}{N_+ \epsilon / E} \right]$

43. For 1D SHO eigenstates $|m\rangle, |n\rangle$ with operators $\hat{x}, \hat{p}$, the matrix element $\langle m | \hat{x} \hat{p} | n \rangle$ is non-zero when

(A) $m = n \pm 2$ only

(B) $m = n$ or $m = n \pm 2$

(C) $m = n \pm 3$ only

(D) $m = n \pm 1$ only

44. Two-level system eigenvalues E_1, E_2 . Perturbation $H' = \lambda \Delta \sigma_x$ (Δ energy, λ small). Magnitudes of first and second-order corrections to E_1 are

(A) 0 and $\frac{\lambda^2 \Delta^2}{|E_1 - E_2|}$

(B) $\frac{|\lambda \Delta|}{2}$ and $\frac{\lambda^2 \Delta^2}{|E_1 - E_2|}$

(C) $|\lambda \Delta|$ and $\frac{\lambda^2 \Delta^2}{|E_1 - E_2|}$

(D) 0 and $\frac{1}{2} \frac{\lambda^2 \Delta^2}{|E_1 - E_2|}$

45. An electron (mass m , charge q) is in spin-up state $\begin{pmatrix} 1 \\ 0 \end{pmatrix}$ at $t = 0$. A constant magnetic field along y : $B = B_0 \hat{y}$. Hamiltonian $H = -\hbar \omega \sigma_y$, $\omega = \frac{q B_0}{2m} > 0$. Minimum time after which the electron will be in spin-down along x , i.e., $\frac{1}{\sqrt{2}} \begin{pmatrix} 1 \\ -1 \end{pmatrix}$, is

- (A) $\frac{\pi}{8\omega}$
 (B) $\frac{\pi}{4\omega}$
 (C) $\frac{\pi}{2\omega}$
 (D) $\frac{\pi}{\omega}$

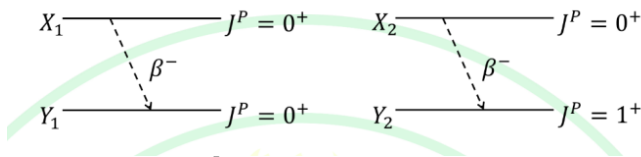
46. Three non-identical spin- $\frac{1}{2}$ particles with $H = \frac{A}{\hbar^2}(\mathbf{S}_1 + \mathbf{S}_2) \cdot \mathbf{S}_3$. Possible energy eigenvalues are

- (A) $0, \frac{A}{2}, -A$
 (B) $0, \frac{A}{2}, -\frac{A}{2}$
 (C) $0, \frac{3A}{2}, -\frac{A}{2}$
 (D) $0, -\frac{3A}{2}, \frac{A}{2}$

47. Which option(s) is/are correct for a Type I superconductor?

- (A) Transition to normal state at $B = 0$ is second order
 (B) With increase in T , the critical field decreases linearly to zero
 (C) Below T_c , entropy in the superconducting state is less than in the normal state
 (D) Transition to normal state in presence of B is first order

48. Two hypothetical nuclei X_1 and X_2 undergo β^- decay to Y_1 and Y_2 with given J^P values. Which option(s) is/are correct?



- (A) $X_1 \rightarrow Y_1$ is Fermi; $X_2 \rightarrow Y_2$ is Fermi
 (B) $X_1 \rightarrow Y_1$ is Fermi; $X_2 \rightarrow Y_2$ is Gamow-Teller
 (C) $X_1 \rightarrow Y_1$ is Gamow-Teller; $X_2 \rightarrow Y_2$ is Fermi
 (D) $X_1 \rightarrow Y_1$ is Gamow-Teller; $X_2 \rightarrow Y_2$ is Gamow-Teller

49. A point charge q is at distance d above an infinite grounded conducting plate at $z = 0$. Potential in $z > 0$ is $\phi = \phi_1 + \phi_2$, with $\phi_1 = \frac{1}{4\pi\epsilon_0} \frac{q}{\sqrt{x^2 + y^2 + (z-d)^2}}$ and $\phi_2 = -\frac{1}{4\pi\epsilon_0} \frac{q}{\sqrt{x^2 + y^2 + (z+d)^2}}$. Which option(s) is/are correct?

- (A) Magnitude of force on q is $\frac{1}{16\pi\epsilon_0} \frac{q^2}{d^2}$
 (B) Electrostatic energy of the system is $\frac{1}{8\pi\epsilon_0} \frac{q^2}{d}$
 (C) Induced surface charge density on the plate is $\propto \frac{1}{\sqrt{x^2 + y^2 + d^2}}$
 (D) ϕ_1 satisfies Poisson's equation for $z > 0$

50. In (t, x) coordinates, a contravariant tensor A has diagonal components $A^{tt} = P$, $A^{xx} = Q$, others zero. Under Lorentz boost v in $+x$, $(t, x) \rightarrow (t', x')$, with $c = 1$, $\gamma = 1/\sqrt{1-v^2}$. If A'_{tt} and A'_{xx} are diagonal components in the new frame, which option(s) is/are correct?

- (A) $A'_{tt} = \gamma^2 P + \gamma^2 v^2 Q$
 (B) $A'_{tt} = \gamma^2 v^2 P + v^2 Q$
 (C) $A'_{xx} = \gamma^2 v^2 P + \gamma^2 Q$
 (D) $A'_{xx} = v^2 P + \gamma^2 Q$

51. A particle of mass m , charge q in uniform magnetic field of magnitude $2B$ along z has Lagrangian $L = \frac{m}{2}v^2 + qB(xv_y - yv_x)$. With conjugate momenta p_x, p_y, p_z and Hamiltonian H , which option(s) is/are correct?

- (A) $\frac{dx}{dt} = \frac{1}{m}(p_x - qBy)$
 (B) $\frac{dp_x}{dt} = \frac{qB}{m}(p_y - qBx)$
 (C) $\frac{dp_y}{dt} = -\frac{qB}{m}(p_x + qBy)$
 (D) $H = \frac{1}{2m}[(p_x + qBy)^2 + (p_y - qBx)^2 + p_z^2]$

52. A bead moves along a long, massless, frictionless horizontal rod parallel to x . The rod itself moves upward along z at constant speed, starting from $z = 0$ at $t = 0$, and remains horizontal. With conjugate momenta p_x, p_y, p_z and Hamiltonian H , which option(s) is/are correct?

- (A) H is the total energy and is conserved

- (B) H is the total energy and is not conserved
 (C) H is not the total energy, but it is conserved
 (D) H is not the total energy and is not conserved

(A) Induced surface charge density is $\propto \sin \theta$

(B) As $r \rightarrow \infty$, $\vec{E} = E_0 \cos \theta \hat{r}$

53. In a 1D Hamiltonian system with $(q, p) \rightarrow (Q = 1/p, P = qp^2)$, which statements about a generating function F are correct?

- (A) $F = F_1(q, Q) = \frac{q}{Q}$
 (B) $F = F_2(q, P) = \sqrt{Pq}$
 (C) $F = F_3(p, Q) = \frac{2p}{Q}$
 (D) $F = F_4(p, P) = \frac{P}{p}$

(C) The electric field at any point is curl-free for $r > R$

(D) The electric field at any point is divergence-free for $r > R$

54. A free relativistic particle of rest mass m moving along x has energy T . With potential $V(x)$, $H = T + V(x)$. In presence of V , speed v , momentum p , Lagrangian L . Which option(s) is/are correct?

- (A) $H = c^2 \sqrt{m^2 + \frac{p^2}{c^2}} + V(x)$
 (B) $v = \frac{pc}{\sqrt{p^2 + m^2 c^2}}$
 (C) $L = mc^2 \sqrt{1 - \frac{v^2}{c^2}} - V(x)$
 (D) $L = -mc^2 \sqrt{1 - \frac{v^2}{c^2}} - V(x)$

57. A point charge q at the origin inside an infinite linear dielectric of relative permittivity ϵ_r . Which option(s) is/are correct?

(A) $|\mathbf{P}| \propto \frac{1}{r^2}$

(B) $|\mathbf{P}| \propto \frac{1}{r^3}$

(C) Magnitude of the screened charge due to the dielectric is less than $|q|$ for $\epsilon_r > 1$

(D) Magnitude of the screened charge due to the dielectric is more than $|q|$ for $\epsilon_r = 1$

55. Consider

$$I = \frac{1}{2\pi i} \oint \frac{z^4 - 1}{(z - \frac{a}{b})(z - \frac{b}{a})} dz,$$

over the unit circle, where $a, b > 0$. Which option(s) is/are correct?

- (A) $I = \frac{5}{8}$ when $a = 1, b = 2$
 (B) $I = \frac{10}{3}$ when $a = 1, b = 3$
 (C) $I = \frac{5}{8}$ when $a = 2, b = 1$
 (D) $I = \frac{5}{8}$ when $a = 3, b = 2$

(A) Magnetic field at any point outside can be expressed as gradient of a scalar

(B) Bound volume current density is zero

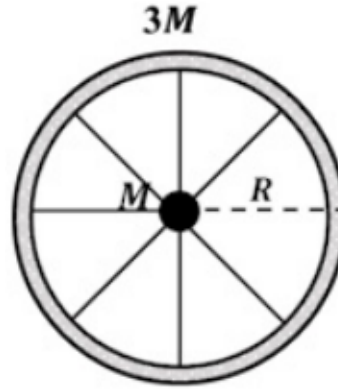
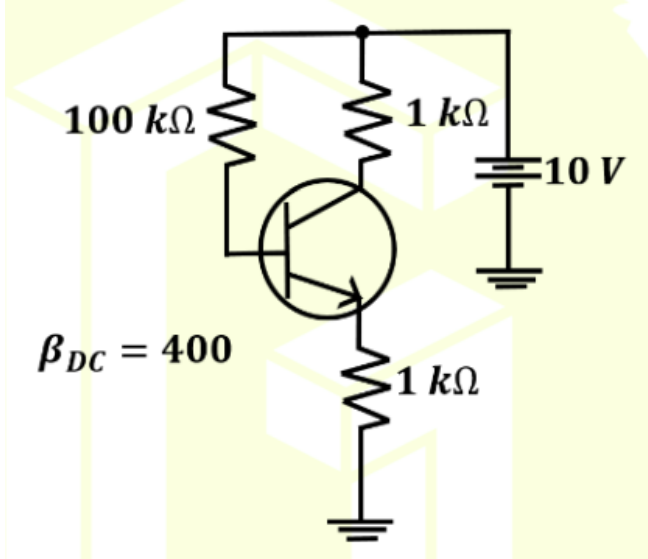
(C) Surface current density on curved surface is non-zero

(D) Surface current densities on flat surfaces (top and bottom) are non-zero

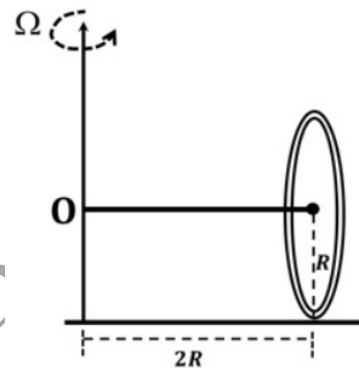
56. A neutral conducting sphere of radius R in a uniform field E_0 along z has potential $V(r, \theta) = V_0 - E_0 r \left(1 - \frac{R^3}{r^3}\right) \cos \theta$ for $r > R$. Which option(s) is/are correct?

59. Cyclotrons accelerate deuterons (d) and α particles with same B . They are extracted with energies 10 MeV (d) and 20 MeV (α) with extraction radii r_d and r_α . Taking $M_d = 2000 \text{ MeV}/c^2$, $M_\alpha = 4000 \text{ MeV}/c^2$, compute r_α/r_d (integer) is ----

60. In the transistor circuit shown, $V_{BE} = 0.7 \text{ V}$ and $\beta_{DC} = 400$. Base current in μA (one decimal place) is ----



Front view



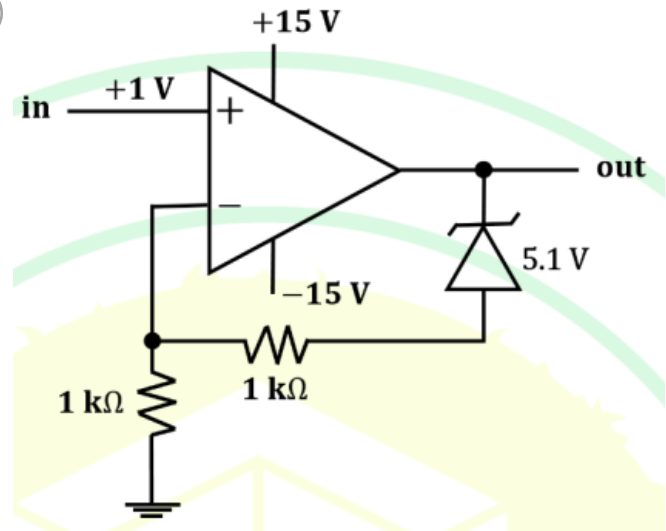
61. The set $\{1, x, x^2\}$ is orthonormalized in $x \in [-1, 1]$ with normalization $\int_{-1}^1 x^2 [f(x)]^2 dx = 1$. If the orthonormal basis is $\left(\sqrt{\frac{3}{2}}, \sqrt{\frac{5}{2}}x, \frac{1}{2}\sqrt{\frac{21}{N}}(5x^2 - 3)\right)$, find N (integer) is ____

62. The Hamiltonian $H(p, q) = \frac{p^2}{2m} + q^2 A(q)$, with real $A(q)$. If $m \frac{d^2 q}{dt^2} = -5qA(q)$, then $\frac{dA(q)}{dq} = n \frac{A(q)}{q}$. Find n (integer) is ____

63. Five identical, non-interacting particles of mass m and spin $3/2$ in a 1D infinite well of length L . If the lowest energy of the system is $\frac{N\pi^2\hbar^2}{2mL^2}$, find N (integer) is ____

64. A wheel of mass $4M$ and radius R is made of a thin uniform distribution of mass $3M$ at the rim and a point mass M at the center (spokes massless). The center of mass is connected to a horizontal massless rod of length $2R$, with one end fixed at O . The wheel rolls without slipping on horizontal ground with angular speed Ω . If $\vec{N}$ is total angular momentum of the wheel about O , then $\left|\frac{d\vec{N}}{dt}\right| = N(MR^2\Omega^2)$. Find N (integer) is ____

65. The figure shows an op-amp circuit with a 5.1 V Zener diode in the feedback loop. The op-amp runs from ± 15 V supplies. For a +1 V input, the output voltage (one decimal place) ____



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Q. No.	Session	Q. Type	Section	Key/Range	Marks
1	7	MCQ	GA	D	1
2	7	MCQ	GA	D	1
3	7	MCQ	GA	C	1
4	7	MCQ	GA	A	1
5	7	MCQ	GA	B	1
6	7	MCQ	GA	B	2
7	7	MCQ	GA	C	2
8	7	MCQ	GA	A	2
9	7	MCQ	GA	B	2
10	7	MCQ	GA	B	2
11	7	MCQ	PH	C	1
12	7	MCQ	PH	A	1
13	7	MCQ	PH	A	1
14	7	MCQ	PH	D	1
15	7	MCQ	PH	B	1
16	7	MCQ	PH	D	1
17	7	MCQ	PH	A	1
18	7	MCQ	PH	A	1
19	7	MCQ	PH	A	1
20	7	MCQ	PH	C	1
21	7	MCQ	PH	C	1
22	7	MCQ	PH	A	1
23	7	MCQ	PH	A	1
24	7	MSQ	PH	A;B;C	1
25	7	MSQ	PH	A;B;D	1
26	7	MSQ	PH	A;B;C	1
27	7	MSQ	PH	A;B	1
28	7	MSQ	PH	A;B;C	1
29	7	MSQ	PH	B;D	1
30	7	NAT	PH	1 to 1	1

31	7	NAT	PH	1 to 1	1
32	7	NAT	PH	0 to 0	1
33	7	NAT	PH	2.5 to 2.5	1
34	7	NAT	PH	794.0 to 797.0	1
35	7	NAT	PH	1 to 1	1
36	7	MCQ	PH	A	2
37	7	MCQ	PH	D	2
38	7	MCQ	PH	A	2
39	7	MCQ	PH	B	2
40	7	MCQ	PH	A	2
41	7	MCQ	PH	A	2
42	7	MCQ	PH	A	2
43	7	MCQ	PH	B	2
44	7	MCQ	PH	A	2
45	7	MCQ	PH	B	2
46	7	MCQ	PH	A	2
47	7	MSQ	PH	A;C;D	2
48	7	MSQ	PH	B	2
49	7	MSQ	PH	D	2
50	7	MSQ	PH	A;C	2
51	7	MSQ	PH	B;C;D	2
52	7	MSQ	PH	D	2
53	7	MSQ	PH	A;D	2
54	7	MSQ	PH	A;B;D	2
55	7	MSQ	PH	A;C	2
56	7	MSQ	PH	C;D	2
57	7	MSQ	PH	A;C	2
58	7	MSQ	PH	A;B;C	2
59	7	NAT	PH	1 to 1	2
60	7	NAT	PH	18 to 19	2
61	7	NAT	PH	6 to 6	2
62	7	NAT	PH	3 to 3	2
63	7	NAT	PH	8 to 8	2
64	7	NAT	PH	6 to 6	2
65	7	NAT	PH	7.0 to 7.2	2

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