WBJEE 2025 Physics and Chemistry Question Paper

| Time Allowed :3 Hour | Maximum Marks :100 | Total Questions :80 |

General Instructions

Read the following instructions very carefully and strictly follow them:

- All questions are of objective type having four answer options for each.

- Category-1: Carries 1 mark each and only one option is correct. In case of incorrect answer or any combination of more than one answer, 4 mark will be deducted.

- Category-2: Carries 2 marks each and only one option is correct. In case of incorrect answer or any combination of more than one answer, $\frac{1}{2}$ mark will be deducted.

- Category-3: (a) One or more option(s) is/are correct; (b) Marking all correct option(s) only will yield 2 (two) marks; (e) For any combination of answers containing one or more incorrect options, the said answer will be treated as wrong, yielding a zero mark even if one or more of the chosen option(s) is/are correct; (d) For partially correct answers, i.e., when all right options are not marked and also no incorrect options are marked, marks awarded 2 x (no of correct options marked) + total no of the correct option(s); (e) Not attempting the question will fetch zero mark.

- Questions must be answered on OMR sheet by darkening the appropriate bubble marked A, B, C or D.

- Use only Black/Blue ink ball point pen to mark the answer by filling up of the respective bubbles completely.

- Do not put any mark other than where required in specified places on the OMR Sheet.

- Write question booklet number and your Roll Number carefully in the specified locations of the OMR Sheet. Also fill appropriate bubbles.

- Write your name (in block letter), name of the examination center and put your signature (as it appeared in the Admit Card) in appropriate boxes in the OMR Sheet.

- The OMR Sheet is liable to become invalid if there is any mistake in filling the correct bubbles for Question Booklet number/Roll Number or if there is any discrepancy in the name /signature of the candidate, name of the examination center. The OMR Sheet may also become invalid due to folding or putting stray marks on it or any damage made to it. The consequence of such invalidation due to incorrect marking or careless handling by the candidate will be the sole responsibility of the candidate.

1. For a domestic AC supply of **220 V** at **50 cycles per sec**, the potential difference between the terminals of a two-pin electric outlet in a room is given by
(A) $V(t) = 220\sqrt{2}\cos(100\pi t)$
(B) $V(t) = 220\sin(50t)$
(C) $V(t) = 220\cos(100\pi t)$
(D) $V(t) = 220\sqrt{2}\cos(50t)$

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2. A force $\vec{F} = ai + bj + ck$ is acting on a body of mass m. The body was initially at rest at the origin. The coordinates of the body after time t will be
(A) $\left(\frac{at^2}{2m}, \frac{bt^2}{2m}, \frac{ct^2}{2m}\right)$
(B) $\left(\frac{at^2}{2m}, \frac{bt^2}{m}, \frac{ct^2}{2m}\right)$
(C) $\left(\frac{at^2}{m}, \frac{bt^2}{2m}, \frac{ct^2}{2m}\right)$
(D) $\left(\frac{at^2}{2m}, \frac{bt^2}{2m}, \frac{ct^2}{m}\right)$

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3. Consider a particle of mass 1 gm and charge 1.0 Coulomb at rest. Now the particle is subjected to an electric field $E(t) = E_0\sin\omega t$ in the x-direction, where $E_0 = 2$ N/C and $\omega = 1000$ rad/sec. The maximum speed attained by the particle is
(A) 2 m/s
(B) 4 m/s
(C) 6 m/s
(D) 8 m/s

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4. The number of undecayed nuclei N in a sample of radioactive material as a function of time t is shown in the figure. Which of the following graphs correctly shows the relationship between N and the activity A?
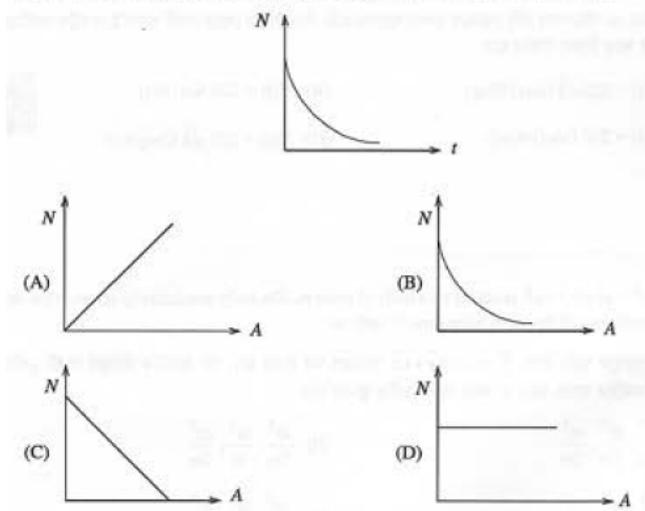
(A) Option a
(B) Option b

(C) Option c
(D) Option d

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5. Ruma reached the metro station and found that the escalator was not working. She walked up the stationary escalator with velocity v_1 in time t_1. On another day if she remains stationary on the escalator moving with velocity v_2, then the escalator takes her up in time t_2. The time taken by her to walk up with velocity v_1 on the moving escalator will be

(A) $\frac{t_1 t_2}{t_2 - t_1}$
(B) $\frac{t_1 t_2}{t_1 + t_2}$
(C) $\frac{t_1 - t_2}{t_1 + t_2}$
(D) $\frac{t_1 + t_2}{2(t_1 - t_2)}$

---

6. A single slit diffraction pattern is obtained using a beam of red light. If red light is replaced by blue light then

(A) the diffraction pattern will disappear.
(B) fringes will become narrower and crowded together.
(C) fringes will become broader and will be further apart.
(D) there is no change in the diffraction pattern.

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7. A quantity X is given by

$$X = \varepsilon_0 L \frac{\Delta V}{\Delta t},$$

where ε_0 is permittivity of free space, L is length, ΔV is potential difference and Δt is time interval. The dimension of X is same as that of

(A) Resistance
(B) Charge
(C) Voltage
(D) Current

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8. One end of a steel wire is fixed to the ceiling of an elevator moving up with an acceleration $2 \, \text{m/s}^2$ and a load of $10 \, \text{kg}$ hangs from the other end. If the cross-section of the wire is $2 \, \text{cm}^2$, then the longitudinal strain in the wire is given. (Take $g = 10 \, \text{m/s}^2$ and $Y = 2.0 \times 10^{11} \, \text{N/m}^2$).
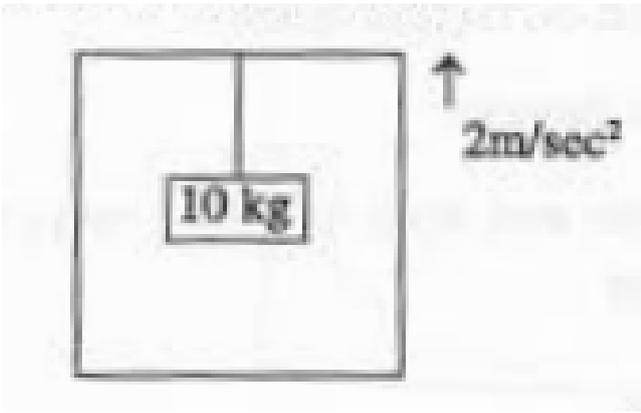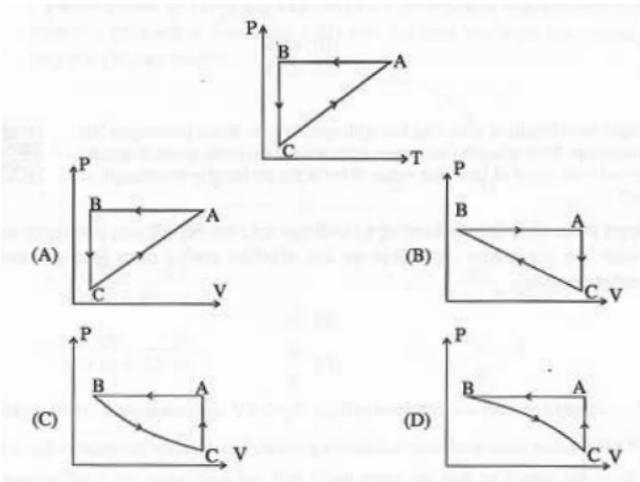
(A) 4×10^{-6}
(B) 3×10^{-6}
(C) 8×10^{-6}
(D) 2×10^{-6}

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9. A diode is connected in parallel with a resistance as shown in the figure. The most probable current (I)–voltage (V) characteristic is
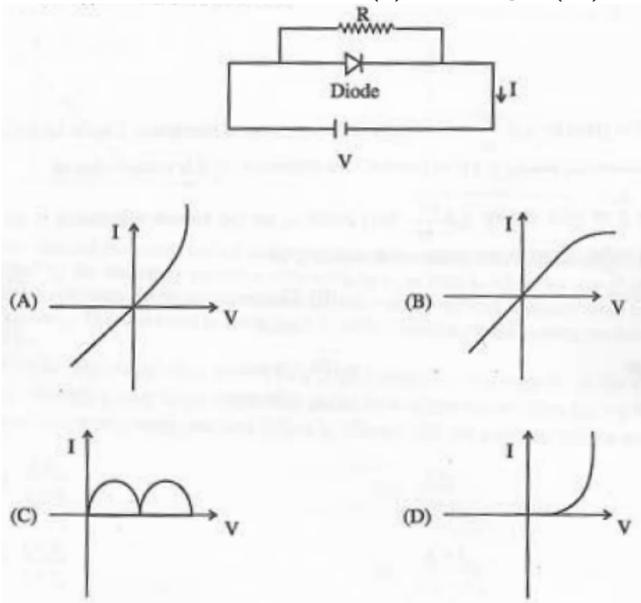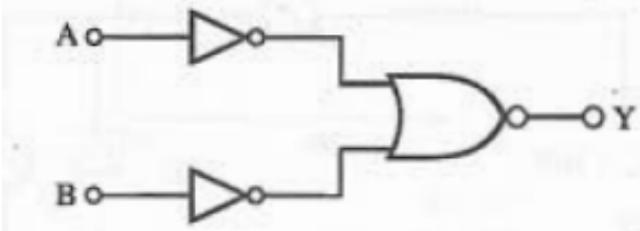

(A) Option a
(B) Option b
(C) Option c
(D) Option d

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10. For an ideal gas, a cyclic process ABCA as shown in the P–T diagram. When represented in P–V plot, it would be

(A) Option a
(B) Option b
(C) Option c
(D) Option d

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11. Which logic gate is represented by the following combinations of logic gates?

(A) NAND
(B) AND
(C) NOR
(D) OR

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12. The resistance $R = \frac{V}{I}$ where $V = (25 \pm 0.4)$ V and $I = (200 \pm 3)$ A. The percentage error in R is
(A) 1.55%
(B) 1.6%
(C) 3.1%
(D) 0.1%

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13. The de-Broglie wavelength of a moving bus with speed v is λ. Some passengers left the bus at a stoppage. Now when the bus moves with twice of its initial speed, its kinetic energy is found to be twice its initial value. What is the de-Broglie wavelength of the bus now?
(A) λ
(B) 2λ

5

(C) $\frac{\lambda}{2}$

(D) $\frac{\lambda}{4}$

---

14. Manufacturers supply a zener diode with zener voltage $V_z = 5.6\,\text{V}$ and maximum power dissipation $P_{\max} = \frac{1}{4}\,\text{W}$. This zener diode is used in the circuit shown. Calculate the minimum value of the resistance R_s so that the zener diode will not burn when the input voltage is $V_{in} = 10\,\text{V}$.
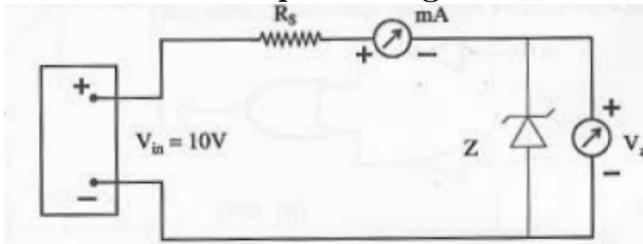

(A) $98.56\,\Omega$

(B) $170.52\,\Omega$

(C) $306.21\,\Omega$

(D) $412.37\,\Omega$

---

15. Two charges $+q$ and $-q$ are placed at points A and B respectively which are at a distance $2L$ apart. C is the midpoint of AB. The work done in moving a charge $+Q$ along the semicircle CSD (W_1) and along the line CBD (W_2) are
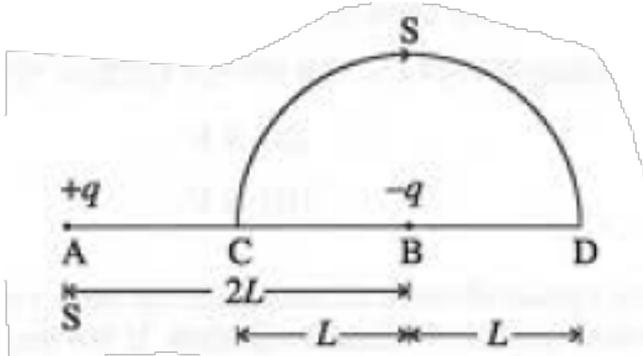
(A) $-\frac{qQ}{6\pi\varepsilon_0 L}$, $\frac{qQ}{6\pi\varepsilon_0 L}$

(B) $\frac{qQ}{4\pi\varepsilon_0 L}$, $-\frac{qQ}{4\pi\varepsilon_0 L}$

(C) $-\frac{qQ}{6\pi\varepsilon_0 L}$, $-\frac{qQ}{12\pi\varepsilon_0 L}$

(D) $\frac{qQ}{4\pi\varepsilon_0 L}$, 0

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16. Figure shows the graph of angle of deviation δ versus angle of incidence i for a light ray striking a prism. The prism angle is
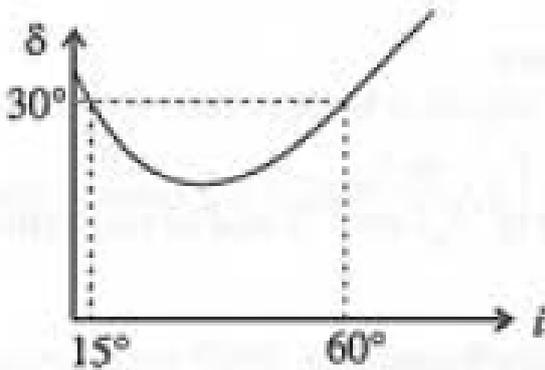
(A) 30°
(B) 45°
(C) 60°
(D) 75°

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17. An electron in Hydrogen atom jumps from the second Bohr orbit to the ground state and emits a photon. This photon strikes a material. If the work function of the material is 4.2 eV, then the stopping potential is
(A) 2 V
(B) 4 V
(C) 6 V
(D) 8 V

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18. A simple pendulum is taken at a place where its distance from the earth's surface is equal to the radius of the earth. Calculate the time period of small oscillations if the length is 4.0 m. (Take $g = \pi^2 \, \text{m/s}^2$ at surface.)
(A) 4 s
(B) 6 s
(C) 8 s
(D) 2 s

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19. The minimum wavelength of Lyman series lines is P, then the maximum wavelength of these lines is
(A) $\frac{4P}{3}$
(B) $2P$
(C) $\frac{2P}{3}$
(D) ∞

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20. A radioactive nucleus decays as follows:

$$X \xrightarrow{\alpha} X_1 \xrightarrow{\beta^-} X_2 \xrightarrow{\alpha} X_3 \xrightarrow{\gamma} X_4$$
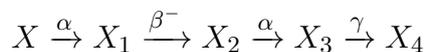
If the mass number and atomic number of X_4 are **172** and **69** respectively, then the atomic number and mass number of X are

(A) 72, 180
(B) 69, 170
(C) 68, 172
(D) 70, 172

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21. A particle of charge q and mass m moves in a circular orbit of radius r with angular speed ω. The ratio of the magnitude of its magnetic moment to that of its angular momentum depends on

(A) ω and q
(B) ω, q and m
(C) q and m
(D) ω and m

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22. Six vectors $\vec{a}, \vec{b}, \vec{c}, \vec{d}, \vec{e}, \vec{f}$ have magnitudes and directions shown. Which statement is true?
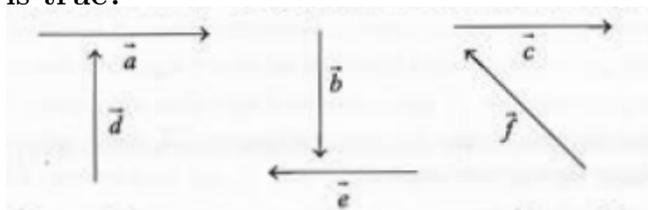
(A) $\vec{b} + \vec{e} = \vec{f}$
(B) $\vec{b} + \vec{c} = \vec{f}$
(C) $\vec{d} + \vec{c} = \vec{f}$
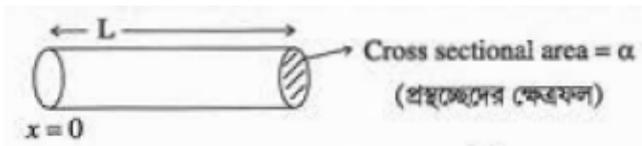(D) $\vec{d} + \vec{e} = \vec{f}$

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23. The variation of displacement with time of a simple harmonic motion is

$$y = 2\sin\left(\frac{\pi t}{2} + \phi\right) \text{ cm.}$$

**The maximum acceleration of the particle is**

(A) $\frac{\pi}{2}$ cm/s^2
(B) $\frac{\pi}{2m}$ cm/s^2
(C) $\frac{\pi^2}{2m}$ cm/s^2
(D) $\frac{\pi^2}{2}$ cm/s^2

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24. The variation of density of a solid cylindrical rod of cross-sectional area a and length L is $\rho = \rho_0 \frac{x^2}{L^2}$, where x is the distance from one end. The position of its centre of mass from $x = 0$ is
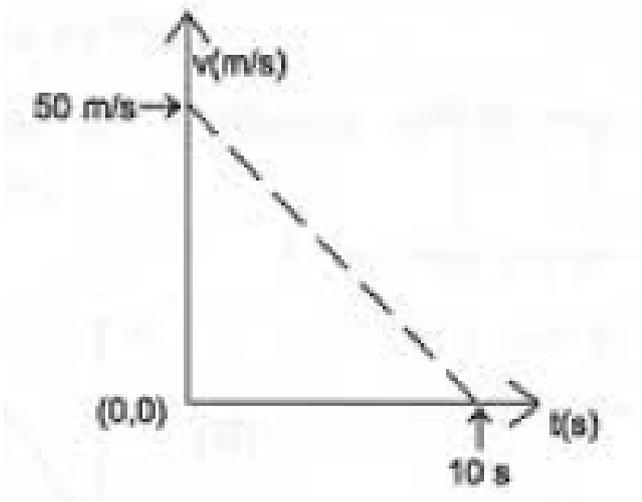
(A) $\frac{2L}{3}$

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

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

(D) $\frac{3L}{4}$

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25. Three different liquids are filled in a U-tube as shown. Their densities are ρ_1, ρ_2, ρ_3 respectively. From the figure we may conclude that
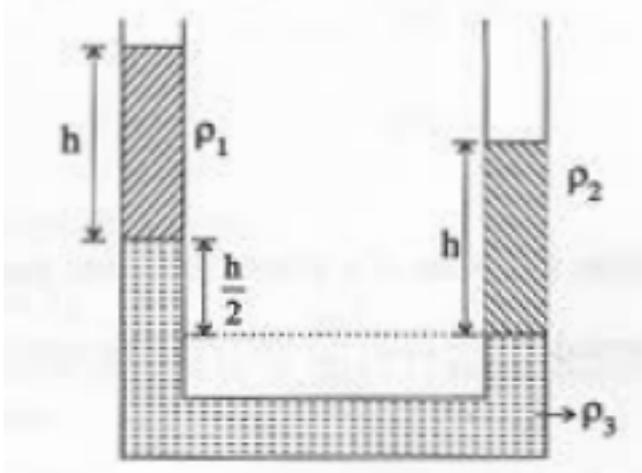
(A) $\rho_3 = 4(\rho_2 - \rho_1)$

(B) $\rho_3 = 4(\rho_1 - \rho_2)$

(C) $\rho_3 = 2(\rho_2 - \rho_1)$

(D) $\rho_3 = \frac{\rho_1 + \rho_2}{2}$

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26. The velocity-time graph for a body of mass $10\,\text{kg}$ is shown. Work done on the body in the first two seconds of motion is
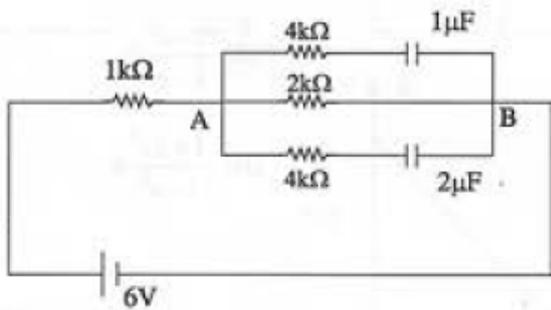
(A) -9300 J
(B) 12000 J
(C) -4500 J
(D) -12000 J

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27. The minimum force required to start pushing a body up a rough plane is F_1 while the minimum force needed to prevent it from sliding down is F_2. The plane makes an angle θ with horizontal such that $\tan\theta = 2\mu$. The ratio F_1/F_2 is
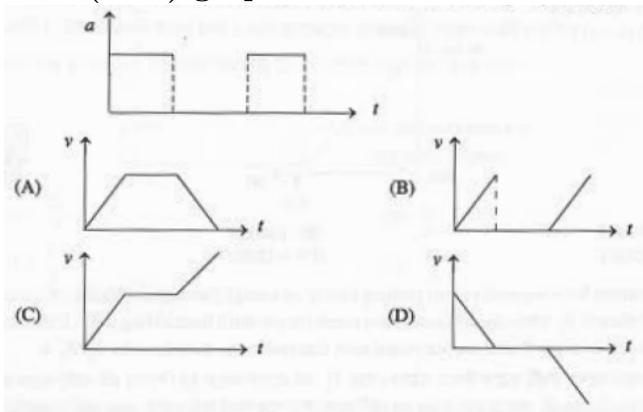
(A) 4
(B) 1
(C) 2
(D) 3

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28. What are the charges stored in the $1\,\mu$F and $2\,\mu$F capacitors in the circuit once current becomes steady?

(A) $8\,\mu C$ and $4\,\mu C$
(B) $4\,\mu C$ and $8\,\mu C$
(C) $3\,\mu C$ and $6\,\mu C$
(D) $6\,\mu C$ and $3\,\mu C$

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29. Acceleration-time $(a-t)$ graph of a body is shown. The corresponding velocity-time $(v-t)$ graph is

(A) Option a
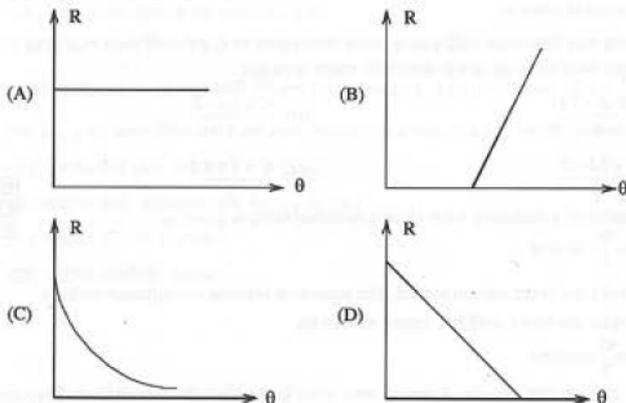(B) Option b

(C) Option c
(D) Option d

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30. A ball falls from a height h upon a fixed horizontal floor. The coefficient of restitution is e. The total distance covered by the ball before coming to rest (neglect air resistance) is

(A) $\frac{1-e^2}{1+e^2}h$

(B) $\frac{1+e^2}{1-e^2}h$

(C) $\frac{1-2e^2}{1+e^2}h$

(D) $\frac{1+2e^2}{1-e^2}h$

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31. 10^{20} photons of wavelength $660\,\text{nm}$ are emitted per second from a lamp. The wattage of the lamp is (Planck's constant $h = 6.6 \times 10^{-34}\,\text{Js}$)

(A) 30 W

(B) 60 W

(C) 100 W

(D) 500 W

---

32. Temperature of a body θ is slightly more than the temperature of the surroundings θ_0. Its rate of cooling R versus temperature θ graph should be

(A) Option a
(B) Option b
(C) Option c
(D) Option d

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33. A piece of granite floats at the interface of mercury and water. If the densities of granite, water and mercury are ρ, ρ_1, ρ_2 respectively, the ratio of volume of granite in water to that in mercury is

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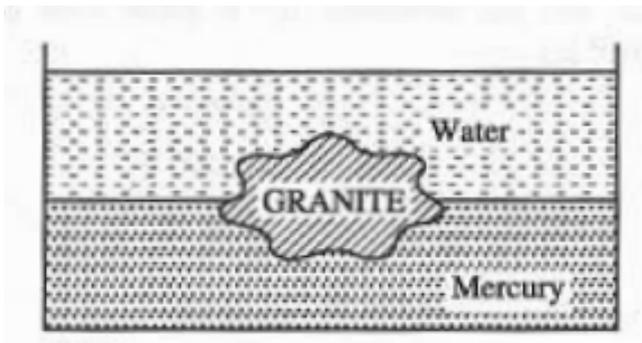
(A) $\frac{\rho_2 - \rho}{\rho - \rho_1}$

(B) $\frac{\rho_2 + \rho}{\rho_1 + \rho}$

(C) $\frac{\rho_1 \rho_2}{\rho}$

(D) $\frac{\rho_1}{\rho_2}$

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34. The apparent coefficient of expansion of a liquid when heated in a copper vessel is C and in a silver vessel is S. If A is the linear coefficient of expansion of copper, then the linear coefficient of expansion of silver is

(A) $\frac{C - S - 3A}{3}$

(B) $\frac{C + 3A - S}{3}$

(C) $\frac{S + 3A - C}{3}$

(D) $\frac{C + S + 3A}{3}$

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35. The equation of a stationary wave along a stretched string is

$$y = 5 \sin\left(\frac{\pi x}{3}\right) \cos(40\pi t),$$

where x, y are in cm and t in seconds. The separation between two adjacent nodes is

(A) 1.5 cm

(B) 3 cm

(C) 6 cm

(D) 14 cm

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36. Let the binding energy per nucleon of nucleus be denoted by E_{bn} and radius of the nucleus by r. If mass numbers of nuclei A and B are 64 and 125 respectively, then

(A) $r_A < r_B$

(B) $r_A > r_B$

(C) $E_{bnA} > E_{bnB}$

(D) $E_{bnA} < E_{bnB}$

37. A wave disturbance in a medium is described by

$$y(x,t) = 0.02 \cos\left(50\pi t + \frac{\pi}{2}\right)\cos(10\pi x),$$

where x, y are in meters and t in seconds. Which statements are correct?
(A) A node occurs at $x = 0.15\,\text{m}$
(B) An antinode occurs at $x = 0.3\,\text{m}$
(C) The speed of the wave is $4\,\text{m/s}$
(D) The wavelength of the wave is $0.2\,\text{m}$

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38. If the dimensions of length are expressed as $G^x c^y \hbar^z$, where G, c and $\hbar$ are gravitational constant, speed of light and Planck's constant respectively, then
(A) $x = \frac{1}{2}$, $y = \frac{1}{2}$
(B) $x = \frac{1}{2}$, $z = \frac{1}{2}$
(C) $y = \frac{1}{2}$, $z = \frac{3}{2}$
(D) $y = \frac{3}{2}$, $z = \frac{1}{2}$

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39. Let $\bar{v}, v_{rms}, v_p$ denote the mean speed, root mean square speed and most probable speed of molecules of mass m in an ideal monoatomic gas at temperature T. Which statements are correct?
(A) No molecules can have speed greater than $\sqrt{2}v_{rms}$
(B) No molecules can have speed less than $\frac{v_p}{\sqrt{2}}$
(C) $v_p < \bar{v} < v_{rms}$
(D) Average kinetic energy of a molecule is $\frac{3}{4}mv_p^2$

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40. Two spheres S_1 and S_2 of masses m_1 and m_2 collide. Initially S_1 is at rest and S_2 moves with velocity v along x-axis. After collision S_2 has velocity $\frac{v}{2}$ in a direction perpendicular to the original direction. The motion of S_1 after collision is
(A) velocity magnitude $\frac{m_2 v}{m_1}\frac{\sqrt{5}}{2}$
(B) direction $\theta = \tan^{-1}\left(-\frac{1}{3}\right)$
(C) direction makes angle θ such that $\theta = \tan^{-1}\left(\frac{1}{2}\right)$ or $\tan^{-1}\left(-\frac{1}{2}\right)$
(D) velocity magnitude $\frac{m_1}{2m_2}v\sqrt{5}$

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41. Equal volumes of two solutions A and B of a strong acid having pH $= 6.0$ and pH $= 4.0$ respectively are mixed together. The pH of the new solution will be in the range
(A) between 5 and 6
(B) between 6 and 7
(C) between 4 and 5
(D) between 3 and 4

42. P and Q combine to form two compounds PQ_2 and PQ_3. If 1 g PQ_2 in 51 g benzene gives depression of freezing point $0.8°C$ and 1 g PQ_3 gives $0.625°C$. ($K_f = 5.1$). Find atomic masses of P and Q.
(A) 35, 55
(B) 45, 45
(C) 55, 45
(D) 55, 35

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43. Identify the major product (G) in the following reaction (Bromination with $Br_2/FeBr_3$).
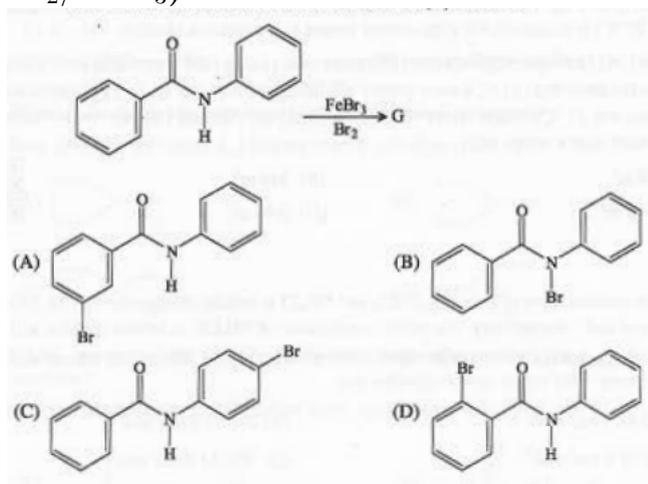
(A) Option a
(B) Option b
(C) Option c
(D) Option d

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44. The number of terminal and bridging hydrogens in B_2H_6 are respectively
(A) 4 and 2
(B) 2 and 4
(C) 2 and 2
(D) 4 and 4

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45. If three elements A, B, C crystallise in a cubic lattice with B at cube centres, C at edge centres and A at corners, the formula of the compound is
(A) A_3BC
(B) A_3B_3C
(C) ABC_3
(D) ABC

(A), (B), (C), (D)

46. An LPG (Liquefied Petroleum Gas) cylinder weighs 15.0 kg when empty. When full, it weighs 30.0 kg and shows a pressure of 3.0 atm. In the course of usage at $27°C$, the mass of the full cylinder is reduced to 24.2 kg. The volume of the used gas in the normal usage condition (1 atm and $27°C$) is (assume LPG to be normal butane and it behaves ideally):
(A) 24.6 m^3
(B) 246 m^3
(C) 0.246 m^3
(D) 2.46 m^3

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47. The molar conductances of $Ba(OH)_2$, $BaCl_2$ and NH_4Cl at infinite dilution are 523.28, 280.0 and 129.8 S cm^2 mol^{-1} respectively. The molar conductance of NH_4OH at infinite dilution will be:
(A) 125.72 S cm^2 mol^{-1}
(B) 251.44 S cm^2 mol^{-1}
(C) 502.88 S cm^2 mol^{-1}
(D) 754.32 S cm^2 mol^{-1}

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48. Arrange the following compounds in order of their increasing acid strength.

$HO_2C(CH_2)_4COOH$ I CH_2 with COOH and COOH   II   COOH / COOH   III $CO_2H(CH_2)_2CO_2H$ IV
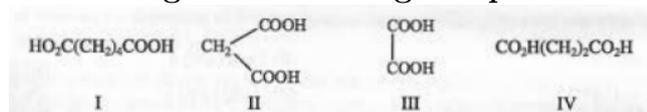
(A) I < II < III < IV
(B) IV < III < II < I
(C) I < IV < II < III
(D) II < I < III < IV

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49. Adiabatic free expansion of ideal gas must be
(A) Isobaric
(B) Isochoric
(C) Isothermal
(D) Isentropic

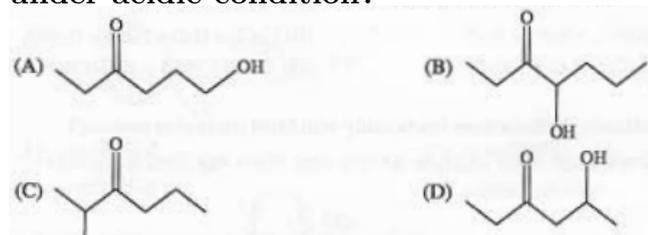50. Which of the following hydrogen bonds is likely to be the weakest?

(A) C–H· · · O
(B) N–H· · · O
(C) O–H· · · O
(D) O–H· · · F

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51. Which of the following compounds is most reactive in SN$_1$ reaction?

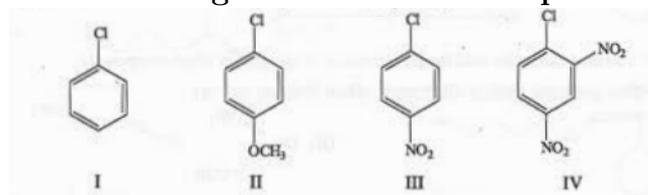(A) —Br   (B) —Br

(C)   (D)

(A) Option a
(B) Option b
(C) Option c
(D) Option d

---

52. Which one among the following compounds will most readily be dehydrated under acidic condition?

(A)   (B)

(C)   (D)

(A) Option a
(B) Option b
(C) Option c
(D) Option d

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53. Increasing order of the nucleophilic substitution of following compounds is

(A) I < III < II < IV
(B) II < I < III < IV
(C) II < III < I < IV
(D) IV < III < I < II

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54. What is the four-electron reduced form of O$_2$?

(A) Superoxide
(B) Peroxide
(C) Oxide
(D) Ozone

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55. The common stable oxidation states of Eu and Gd are respectively
(A) +3 and +3
(B) +3 and +2
(C) +2 and +3
(D) +2 and +2

---

56. Increasing order of solubility of AgCl in (i) H_2O, (ii) 1M NaCl (aq.), (iii) 1M $CaCl_2$ (aq.), and (iv) 1M $NaNO_3$ (aq.) solution
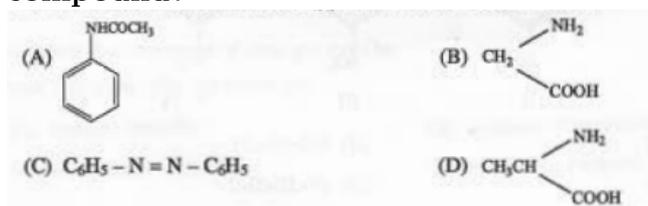(A) $CaCl_2 < NaNO_3 < NaCl < H_2O$
(B) $CaCl_2 > H_2O > NaCl > NaNO_3$
(C) $CaCl_2 > NaCl > H_2O > NaNO_3$
(D) $CaCl_2 < NaCl < H_2O < NaNO_3$

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57. Which of the following hydrocarbons reacts easily with MeMgBr to give methane?
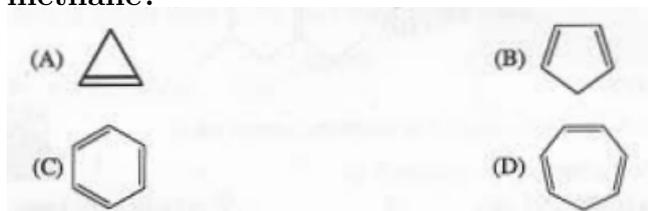
(A) Option a
(B) Option b
(C) Option c
(D) Option d

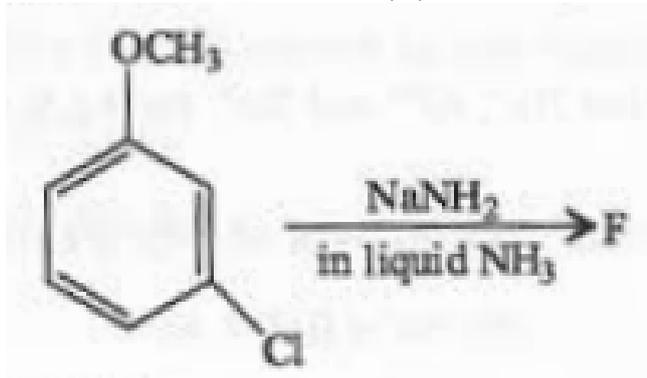**58. Kjeldahl's method cannot be used for the estimation of nitrogen in which compound?**

(A) Option a
(B) Option b
(C) Option c
(D) Option d
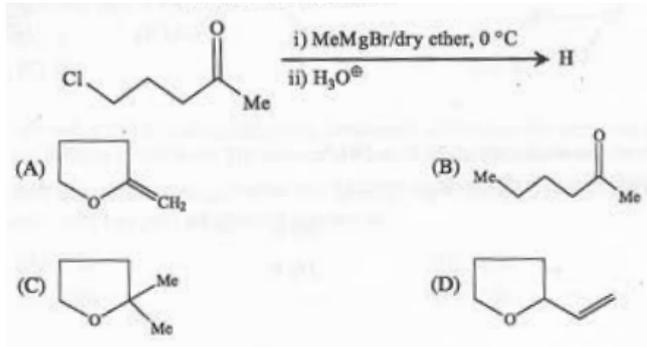
59. Which of the following oxides is paramagnetic?

(A) SO_2
(B) NO_2
(C) SiO_2
(D) CO_2

60. The major product (F) in the following reaction is

(A) o-Anisidine
(B) m-Anisidine
(C) p-Anisidine
(D) p-Chloroaniline

61. In the following reaction, the major product (H) is

(A) Option a
(B) Option b
(C) Option c
(D) Option d

62. The number of lone pair of electrons and the hybridization of Xenon (Xe) in $XeOF_2$ are
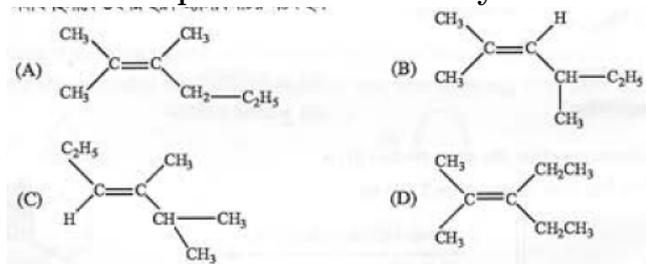
(A) 1, sp^3
(B) 1, dsp^2

(C) 3, dsp^3

(D) 2, sp^3d

---

63. The coagulating power of electrolytes having ions Na^+, Al^{3+} and Ba^{2+} for As_2S_3 sol increases in the order

(A) $Al^{3+} < Ba^{2+} < Na^+$

(B) $Na^+ < Ba^{2+} < Al^{3+}$

(C) $Ba^{2+} < Na^+ < Al^{3+}$

(D) $Al^{3+} < Na^+ < Ba^{2+}$

---

64. An optically active alkene having molecular formula C_8H_{16} gives acetone as one of the products on ozonolysis. The structure of the alkene is

(A) Option a

(B) Option b

(C) Option c

(D) Option d

---

65. How many electrons are needed to reduce N_2 to NH_3?

(A) 3

(B) 4

(C) 5

(D) 6

---

66. For a chemical reaction, half-life period $(t_{1/2})$ is 10 minutes. How much reactant will be left after 20 minutes if one starts with 100 moles of reactant and the order of the reaction be (i) zero, (ii) one and (iii) two?

(A) 0, 25, 33.33

(B) 25, 0, 33.33

(C) 33.33, 25, 0

(D) 25, 33.33, 0

---

67. $^{10}_{5}B + ^{4}_{2}He \rightarrow X + ^{1}_{0}n$. In the above nuclear reaction, X will be

(A) $^{14}_{7}\text{N}$
(B) $^{13}_{7}\text{N}$
(C) $^{12}_{6}\text{C}$
(D) $^{12}_{7}\text{N}$

---

68. How many oxygen atoms are present in 0.36 g of a drop of water at STP?
(A) 6.023×10^{22}
(B) 1.205×10^{22}
(C) 6.023×10^{23}
(D) 1.205×10^{23}

---

69. The bond order of HeH$^+$ is
(A) 1
(B) 2
(C) 3
(D) 4

---

70. 360 cm^3 of a hydrocarbon diffuses in 30 minutes, while under the same conditions 360 cm^3 of SO$_2$ gas diffuses in one hour. The molecular formula of the hydrocarbon is
(A) CH$_4$
(B) C$_2$H$_6$
(C) C$_2$H$_4$
(D) C$_2$H$_2$

---

71. As per the following equation, 0.217 g of HgO (molecular mass $= 217$ g mol^{-1}) reacts with excess iodide. On titration of the resulting solution, how many mL of 0.01 M HCl is required to reach the equivalence point?

$$\text{HgO} + 4\text{I}^- + \text{H}_2\text{O} \rightarrow \text{HgI}_4^{2-} + 2\text{OH}^-$$
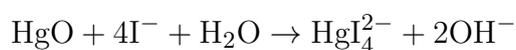
(A) 50 mL
(B) 200 mL
(C) 10 mL
(D) 5 mL

---

72. Consider the gas phase dissociation, PCl$_5$(g) $\rightleftharpoons$ PCl$_3$(g) + Cl$_2$(g) with equilibrium constant K_p at a particular temperature and pressure P. The degree of dissociation (α) for PCl$_5$(g) is
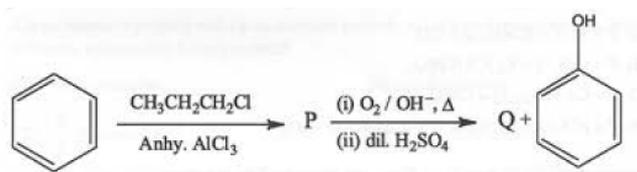
(A) $\alpha = \left(\dfrac{K_p}{K_p+P} \right)^{1/3}$

(B) $\alpha = \dfrac{K_p}{K_p+P}$

(C) $\alpha = \left(\dfrac{K_p}{K_p+P} \right)^{1/2}$

(D) $\alpha = \left(\dfrac{K_p}{K_p+P} \right)^{2}$

---

73. An egg takes 4.0 minutes to boil at sea level where boiling point of water is T_1 K, whereas it takes 8.0 minutes to boil on a mountain top where boiling point of water is T_2 K. The activation energy for the reaction that takes place during boiling of egg is
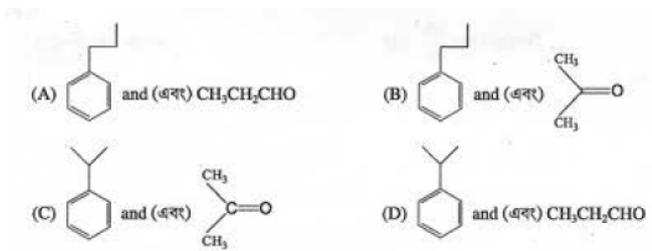
(A) $0.693\dfrac{T_2-T_1}{T_1T_2}$

(B) $0.693\dfrac{T_1-T_2}{T_1T_2}$

(C) $0.693R\dfrac{T_1T_2}{T_2-T_1}$

(D) $0.693R\dfrac{T_1T_2}{T_1-T_2}$

---

74. Compound given below will produce effervescence when mixed with aqueous sodium bicarbonate solution
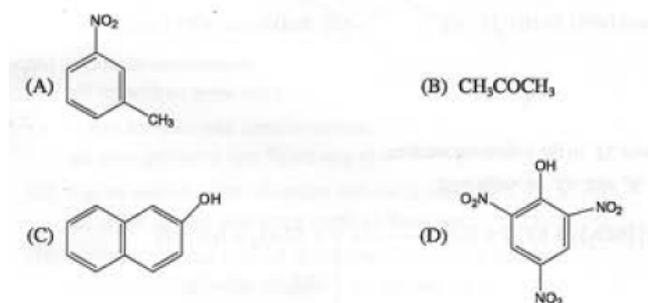
(A) Option a
(B) Option b
(C) Option c
(D) Option d

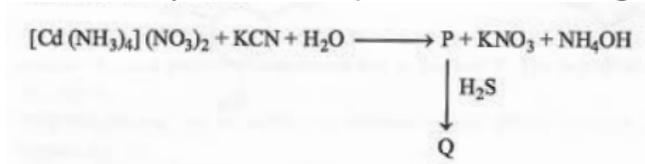**75.** The major product 'P' and 'Q' are

(A) Option a
(B) Option b
(C) Option c
(D) Option d

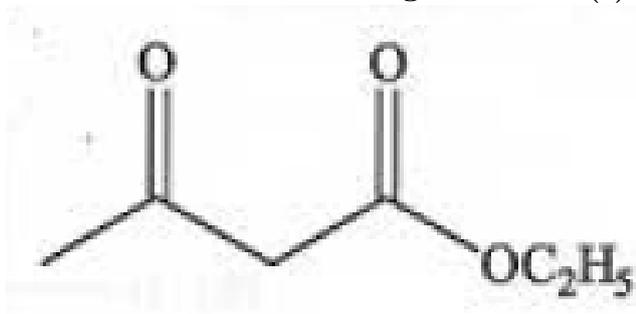**76. Which pair of ions among the following can be separated by precipitation method?**

(A) Eu(II) and Dy(III)
(B) Gd(III) and Dy(III)
(C) Eu(II) and Yb(II)
(D) Eu(II) and Gd(II)

---

77. Identify 'P' and 'Q' in the following reaction

$$[Cd(NH_3)_4](NO_3)_2 + KCN + H_2O \longrightarrow P + KNO_3 + NH_4OH$$

(A) Option a
(B) Option b
(C) Option c
(D) Option d

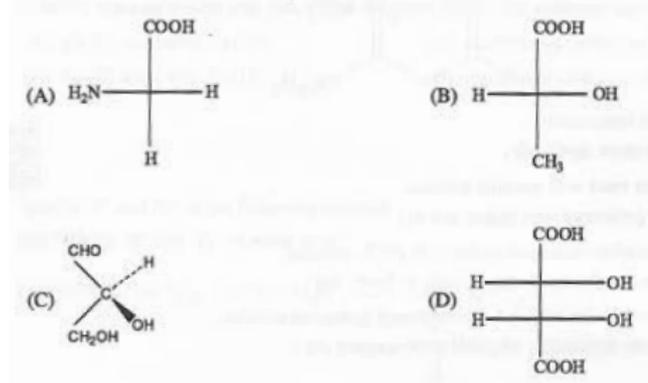**78. Which of the following statement(s) is/are correct about the given compound?**

(A) It exhibits tautomerism.
(B) It does not react with metallic sodium.
(C) It gives reddish-violet coloration with $FeCl_3$ solution.
(D) It gives precipitate with 2,4-dinitrophenylhydrazine solution.

79. X is an extensive property and x is an intensive property of a thermodynamic system. Which of the following statement(s) is/are correct?
(A) Xx is extensive.
(B) $\frac{X}{x}$ is intensive.
(C) $\frac{X}{x}$ is extensive.
(D) $\frac{dX}{dx}$ is intensive.

80. The compound(s) showing optical activity is/are

(A) Option a
(B) Option b
(C) Option c
(D) Option d