



TECHNO INDIA GROUP PUBLIC SCHOOLS

Dt. 13-12-2025

JEE (Main)-XII Monthly Mock Test - 6 (December-2025)

Time Allowed: **3 hours**

Maximum Marks: **300**

General Instructions:

1. There are three subjects in the question paper consisting of Physics (Q. no. 1 to 25), Chemistry (Q. no. 26 to 50), and Mathematics (Q. no. 51 to 75).
2. Each subject is divided into two sections. Section A consists of 20 multiple-choice questions & Section B consists of 5 numerical value-type questions.
3. There will be only one correct choice in the given four choices in Section A. For each question for Section A, 4 marks will be awarded for correct choice, 1 mark will be deducted for incorrect choice questions and zero marks will be awarded for not attempted questions.
4. For Section B questions, 4 marks will be awarded for correct choice, 1 mark will be deducted for incorrect choice questions and zero marks will be awarded for not attempted questions.
5. Any textual, printed, or written material, mobile phones, calculator etc. is not allowed for the students appearing for the test.
6. All calculations/written work should be done in the rough sheet, provided with the Question Paper.

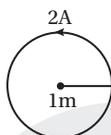
Space For Rough Works



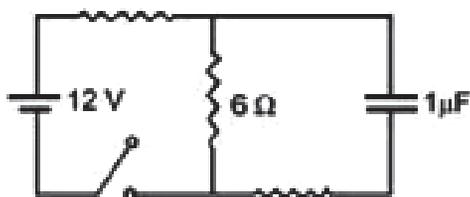
PHYSICS

Section—A (Single Option Correct Type)

- In a double-slit experiment, the slits are separated by a distance d and the screen is at a distance D from the slits. If a maximum is formed just opposite to each of the slits, then what is the order of the fringe so formed?
 - $\frac{a^2}{2\lambda D}$
 - $\frac{2d^2}{\lambda D}$
 - $\frac{d^2}{\lambda D}$
 - $\frac{d^2}{4\lambda D}$
- White light incidents normally on a slit of width d . The first minimum for red light ($\lambda = 6500 \text{ \AA}$) is produced at an angle 30° with the incident light. Then d will be
 - 3250 \AA
 - $6.5 \times 10^{-4} \text{ cm}$
 - $1.3 \mu\text{m}$
 - $2.6 \times 10^{-4} \text{ cm}$
- 2 A current circulates in a circular loop of radius 1 m . The magnetic field produced at the centre of the loop is

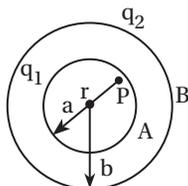


- μ_0 tesla
 - $\frac{\mu_0}{2}$ tesla
 - 2π tesla
 - $\frac{\mu_0}{\pi}$ tesla
- A solenoid of length 2 m and radius 1 cm has 500 turns. If 3 A current flows in the solenoid then magnetic field produced at the centre of solenoid is
 - $750 \mu_0$ tesla
 - $3000 m_0$ tesla
 - $3\mu_0$ tesla
 - $\frac{3\mu_0}{4\pi}$ tesla
 - A charged particle moving in a crossed electric and magnetic fields E and B respectively, moves undeviated. The speed of the charged particle is
 - $\frac{E}{B}$
 - $\frac{B}{E}$
 - $\sqrt{E^2 + B^2}$
 - $(E + B)$
 - When a current I is set up in a wire of radius r , the drift velocity is v_d . If the same current is set up through a wire of radius $2r$, the drift velocity will be
 - $4v_d$
 - $2v_d$
 - $v_d/2$
 - $v_d/4$
 - When the switch is closed, then the initial current through 1Ω resistor is

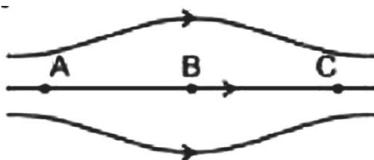


- 12 A
 - 4 A
 - $\frac{10}{7} \text{ A}$
 - 3 A
- Two electric bulbs A and B are rated 60 W and 100 W , respectively. If they are connected in parallel to the same source, then
 - both the bulbs draw the same current
 - bulb A draws more current than bulb B
 - bulb B draws more current than bulb A
 - currents drawn in the bulbs are in the ratio of their resistances

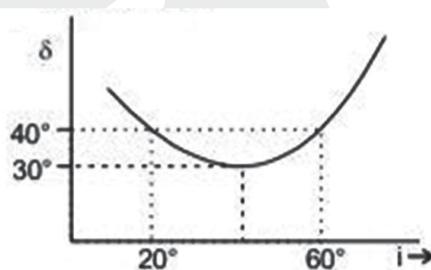
9. There are two concentric shells A and B. A carries charge q_1 and B carries q_2 as shown in figure. A has radius a and B has radius b . The potential at point P is



- ① $\frac{q_1 + q_2}{4\pi\epsilon_0 r}$ ② $\frac{q_1}{4\pi\epsilon_0 a} + \frac{q_2}{4\pi\epsilon_0 b}$ ③ $\frac{q_1 + q_2}{4\pi\epsilon_0 b}$ ④ $\frac{q_1 + q_2}{4\pi\epsilon_0 a}$
10. The figure shows some of the electric field lines corresponding to an electric field. The figure suggests



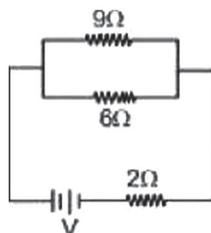
- ① $E_A > E_B > E_C$ ② $E_A = E_B = E_C$ ③ $E_A = E_C > E_B$ ④ $E_A > E_C > E_B$
11. Graphical representation for the variations of angle of deviations with angle of incidence is as shown alongside. Find the angle of incidence corresponding



- ① 25° ② 35° ③ 45° ④ 55°
12. The refractive index of a thin equi-convex lens is 1.5 and the radius of curvatures is 5 cm. The focal length of the lens inside water (refractive Index = $\frac{4}{3}$) is
- ① +10 cm ② +20 cm ③ -10 cm ④ -20 cm
13. **Statement I:** For glass lens in air and real object, If the rays are diverging after emerging from a lens, the lens must be concave.

Statement II: The convex lens can give only converging rays.

- ① Statement I and Statement II both are correct
 ② Statement I is correct but Statement II is incorrect
 ③ Statement I is incorrect but Statement II is correct
 ④ Statement I and Statement II both are incorrect
14. Two bulbs of wattage 40 W and 100 W rated at 220 V are connected in series across a 330 V. What will happen?
 ① 40 W bulb will fuse ② 100 W bulb will fuse ③ Both bulbs will fuse ④ No bulb will fuse
15. If the power dissipated in the 9Ω resistor in the circuit shown is 36 W. then the potential difference across the 2Ω resistor is



- ① 8V ② 10V ③ 2V ④ 4V

16. **Statement I :** The images formed by total internal reflection are much brighter than those formed by mirror.

Statement II : There is no loss of intensity in total internal reflection.

- ① Statement I and Statement II both are correct
 ② Statement I is correct but Statement II is incorrect
 ③ Statement I is incorrect but Statement II is correct ④ Statement I and Statement II both are incorrect

17. The opposite faces of a metal plate of 0.2 cm thickness are at a difference of temperature of 100°C and the area of the plate is 200 cm^2 . Find the quantity of heat that will flow through the plate in one minute if thermal conductivity $k = 0.2\text{ C.GS. unit}$.

- ① $12 \times 10^5\text{ cal}$ ② $24 \times 10^5\text{ cal}$ ③ $36 \times 10^5\text{ cal}$ ④ $48 \times 10^5\text{ cal}$

18. 300 gm of water at 25°C is added to 100 gm of ice at 0°C . The final temperature of the mixture is

- ① $\frac{-5}{3}^\circ\text{C}$ ② $\frac{-5}{2}^\circ\text{C}$ ③ 5°C ④ 0°C

19. An ideal gas is initially at temperature T and volume V . Its volume is increased by ΔV due to an increase in temperature ΔT , pressure remaining constant. The quantity $\delta = \frac{\Delta V}{(V\Delta T)}$ varies with temperature following



20. A gas whose $\gamma = 4/3$ is heated at constant pressure. How much percent of given heat is used in external work done.

- ① 30% ② 25% ③ 50% ④ 55%

SECTION-B

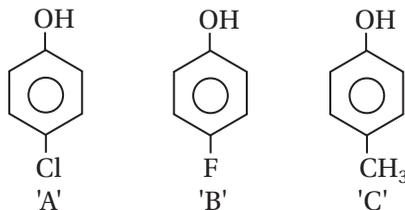
Integer Type Questions (Q.21 - Q.25)

21. A particle executes SHM with amplitude 5 cm. Its maximum speed is 20 cm/s, find its time period T (in seconds).
22. A parallel plate capacitor has plate area 2 m^2 and separation 1 cm. It is filled with a dielectric of constant 5. Find the capacitance in pF (rounded to nearest integer).
23. A transformer has primary turns 400 and secondary turns 100. If input voltage is 220V, find the output voltage (integer value).
24. The binding energy per nucleon of nucleus A is 7 MeV and for nucleus B is 8 MeV . If 2 nucleons transfer from A to B with total mass number remaining 60, find the net change in total binding energy (in MeV).
25. For a transistor in CE mode, $\beta = 100$ and base current = $50\ \mu\text{A}$. Find collector current in mA (integer value).

CHEMISTRY

Section—A (Single Option Correct Type)

26. Arrange in order of decreasing acidic strength:



- ① $A > C > B$ ② $B > A > C$ ③ $A > B > C$ ④ $B > C > A$

27. Which of the following is Swarts reaction?

- ① $\text{CH}_3\text{Br} + \text{AgF} \longrightarrow \text{CH}_3\text{F} + \text{AgBr}$ ② $\text{CH}_3\text{Br} + \text{NaI} \xrightarrow{\text{Acetone}} \text{CH}_3\text{I} + \text{NaBr}$
 ③ $\text{C}_6\text{H}_5\text{N}_2^+\text{Cl}^- + \text{KI} \xrightarrow{\Delta} \text{C}_6\text{H}_5\text{I} + \text{N}_2$ ④ $\text{ROH} + \text{SOCl}_2 \xrightarrow{\text{C}_5\text{H}_5\text{N}} \text{R-Cl} + \text{SO}_2 + \text{HCl}$

28. Total vapour pressure of mixture of 1 mol A ($P_A^\circ = 150$ torr) and 2 mol B ($P_B^\circ = 240$ torr) is 200 torr. In this case

- ① There is positive deviation from Raoult's law
 ② There is negative deviation from Raoult's law
 ③ There is no deviation from Raoult's law
 ④ Molecular mass of A and B are also required for calculating the deviation

29. Which of the following gives the maximum number of isomers?

- ① $[\text{CO}(\text{NH}_3)_4\text{I}_2]$ ② $[\text{Ni}(\text{en})_2(\text{NH}_3)_4]^{2+}$
 ③ $[\text{Ni}(\text{C}_2\text{O}_4)_2(\text{en})_2]$ ④ $[\text{Cr}(\text{SCN})_2(\text{NH}_3)_4]^{2+}$

30. The magnetic moment of a complex ion is 2.83 BM. The complex ion is:

- ① $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ ② $[\text{Cu}(\text{CN})_4]^{3-}$ ③ $[\text{V}(\text{H}_2\text{O})_6]^{3+}$ ④ $[\text{MnCl}_4]^{3-}$

31. Which compound does not dissolve in not diluted nitric acid?

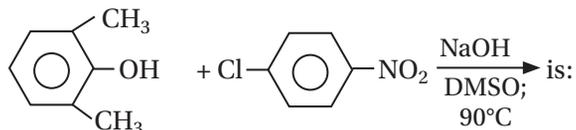
- ① PbS ② CdS ③ CuS ④ HgS

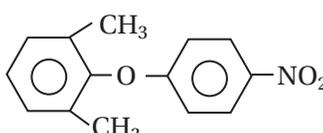
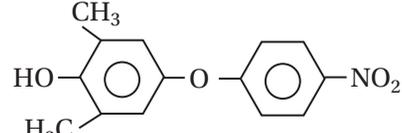
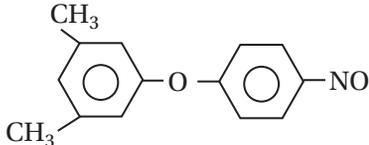
32. 96.5 A current is passed for 10 sec through 1 litre solution of 0.1 M aqueous CuSO_4 . After 10 sec, the pH of the solution

- ① 1 ② 3 ③ 2 ④ 4

33. Regarding $\text{S}_\text{N}2$ reaction which of the following is/are correct?

- ① On increasing polarity of solvent there is decrease in rate and order of reactivity of alkyl halides $3^\circ < 2^\circ < 1^\circ$
 ② Transition state is trigonal bipyramidal species
 ③ 100% inversion takes place
 ④ All of these are correct

34. The major product of reaction,  is:

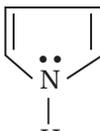
- ①  ② 
- ③  ④ None of these

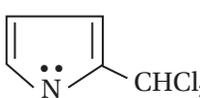
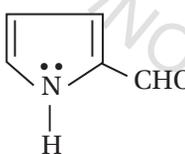
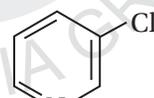
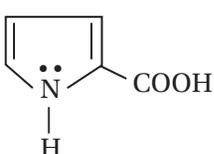
35. What should be minimum concentration of Cu^{2+} at which the cell reaction:



will be spontaneous, if $[\text{Zn}^{2+}] = 1\text{M}$? [Let $E^\circ_{\text{cell}} = 1.18\text{V}$]

- ① 10^{-40}M ② 10^{-23}M ③ $10^{-11.8}\text{M}$ ④ $1.18 \times 10^{-20}\text{M}$
36. The product of acid-catalysed hydration of 2-phenylpropene is:
- ① 3-phenyl-2-propanol ② 1-phenyl-2-propanol
③ 2-phenyl-2-propanol ④ 2-phenyl-1-propanol

37. Which of the following is neither intermediate nor product of the reaction when  reacts with CHCl_3 and NaOH ?

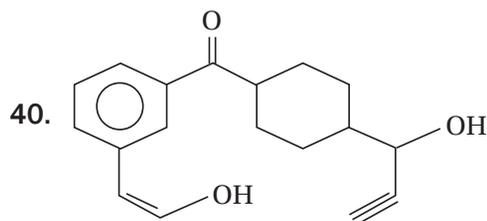
- ①  ②  ③  ④ 

38. The specific conductance of saturated solution of silver chloride is K ($\text{ohm}^{-1}\text{cm}^{-1}$). The limiting ionic conductance of Ag^+ and Cl^- ions are x and y respectively. The solubility of AgCl in g/litre is silver mass of $\text{AgCl} = 143.5$ (mole^{-1})

- ① $K \frac{1000}{x - y}$ ② $\frac{K}{(x + y)} \times 143.5$ ③ $\frac{K \times 100 \times 143.5}{x + y}$ ④ $\frac{K}{(x + y)} \times 46$

39. Rate constant for the reaction is $1.5 \times 10^7 \text{sec}^{-1}$ at 50°C and $4.5 \times 10^7 \text{sec}^{-1}$ at 100°C . What is the value of activation energy?

- ① $220 \text{J}(\text{mole})^{-1}$ ② $2300 \text{J}(\text{mole})^{-1}$ ③ $2.2 \times 10^3 \text{J}(\text{mole})^{-1}$ ④ $2.2 \times 10^4 \text{J}(\text{mole})^{-1}$



which of the following reagents will not react with above compound?

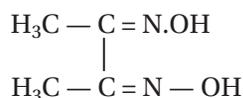
- ① Na metal ② $\text{AgNO}_3 + \text{NH}_4\text{OH}$ ③ $\text{Cu}_2\text{Cl}_2 + \text{NH}_4\text{OH}$ ④ NaHCO_3

41. **Statement I:** Tollen's reagent gives positive result with all aldehydes.

Statement II: Tollen's reagent gives negative result with all ketones.

- 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

42. Consider the following structure



The name and the colour of the complex it form with Ni are respectively

- ① Dimethyl glycine, red ② Dimethyl glyoxime, red
 ③ Dimethyl glycol, yellow ④ Dimethyl formide, blue

43. A gas 'X' is passed through water to form a saturated solution. The aqueous solution on treatment with AgNO_3 gives a white precipitate. The saturated aqueous solution also dissolves magnesium ribbon with evolution of a colourless gas 'Y'. Identify 'X' and 'Y'

- ① $\text{X} = \text{CO}_2, \text{Y} = \text{Cl}_2$ ② $\text{X} = \text{Cl}_2, \text{Y} = \text{CO}_2$ ③ $\text{X} = \text{Cl}_2, \text{Y} = \text{H}_2$ ④ $\text{X} = \text{H}_2, \text{Y} = \text{Cl}_2$

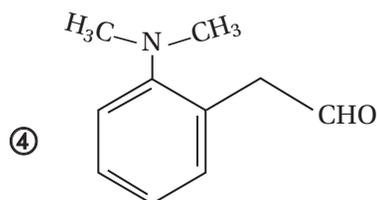
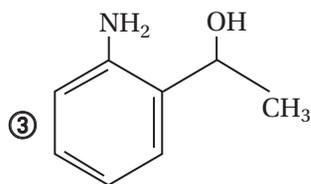
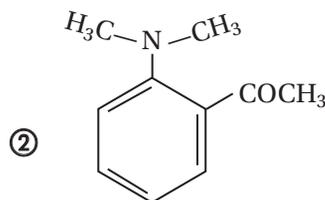
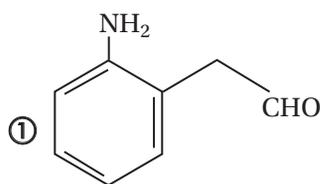
44. The outer electron configuration of Gd (At. No = 64) is:

- ① $4f^3, 5d^5, 6s^2$ ② $4f^3, d^0, 6s^2$ ③ $4f^4, 5d^4, 6s^2$ ④ $4f^7, 5d^1, 6s^2$

45. The tests performed on compound 'X' and their inferences are:

	Test	Inference
(A)	2, 4-DNP test	Coloured precipitate
(B)	Iodoform test	Yellow precipitate
(C)	Azodye test	No dye formation

Compound 'X' is:



Section—B
(Numerical Answer Type)

46. For $[\text{CrCl}_3 \cdot x\text{NH}_3]$, elevation in boiling point of one molal solution is double of one molal urea solution. Hence, the value of x (assuming complete dissociation) is _____.
47. An organic compound undergoes first order decomposition. The time taken for its decomposition to $\frac{1}{8}$ and $\frac{1}{10}$ of its initial concentration are $t_{\frac{1}{8}}$ and $t_{\frac{1}{10}}$ respectively. What is the value of $\frac{t_{\frac{1}{8}}}{t_{\frac{1}{10}}} \times 10$? [Given $\log_{10}^2 = 0.3$]
48. The ratio of $\left(\frac{\Lambda_m}{\Lambda_c}\right)$ for $\text{Ca}_3(\text{PO}_4)_2$ will be equal to _____.
49. Potassium ferrocyanide is 50% ionized in aqueous solution, its van't Hoff factor will be equal to _____.
50. At 300 K, half-life of a gaseous reactant initially at 58 KPa is 320 mm. When the pressure is 29 KPa , the half-life is 160 mm. The order of the reaction is _____.

MATHEMATICS

Section—A
(Single Option Correct Type)

51. Let $f(x) = \frac{2^{x+2} + 16}{2^{2x+1} + 2^{x+4} + 32}$. Then the value of $8\left(f\left(\frac{1}{15}\right) + f\left(\frac{2}{15}\right) + \dots + f\left(\frac{59}{15}\right)\right)$ is equal to
- ① 108 ② 92 ③ 118 ④ 102
52. The values of a and b , for which the system of equations $2x + 3y + 6z = 8$, $x + 2y + az = 5$, $3x + 5y + 9z = b$ has no solution, are :
- ① $a = 3, b \neq 13$ ② $a \neq 3, b \neq 13$ ③ $a \neq 3, b = 3$ ④ $a = 3, b = 13$
53. Let A be a symmetric matrix of order 2 with integer entries. If the sum of the diagonal elements of A^2 is 1, then the possible number of such matrices is :
- ① 6 ② 4 ③ 1 ④ 12
54. If the domain of the function $\sin^{-1}\left(\frac{3x-22}{2x-19}\right) + \log_e\left(\frac{3x^2-8x+5}{x^2-3x-10}\right)$ is $(\alpha, \beta]$, then $3\alpha + 10\beta$ is equal to :
- ① 95 ② 100 ③ 97 ④ 98
55. Let $A = \begin{bmatrix} 2 & a & 0 \\ 1 & 3 & 1 \\ 0 & 5 & b \end{bmatrix}$. If $A^3 = 4A^2 - A - 21I$, where I is the identity matrix of order 3×3 , then $2a + 3b$ is equal to
- ① -10 ② -12 ③ -13 ④ -9
56. Let the point A divide the line segment joining the points $P(-1, -1, 2)$ and $Q(5, 5, 10)$ internally in the ratio $r : 1$ ($r > 0$). If O is the origin and $\left(\frac{\vec{OQ} \cdot \vec{OA}}{|\vec{OQ}| |\vec{OA}|} - \frac{1}{5} \left| \vec{OP} \times \vec{OA} \right|^2\right) = 10$, then the value of r is
- ① $\sqrt{7}$ ② 14 ③ 7 ④ 3
57. If the equation of the line passing through the point $\left(0, -\frac{1}{2}, 0\right)$ and perpendicular to the lines

69. If a curve $y = y(x)$ passes through the point $\left(1, \frac{\pi}{2}\right)$ and satisfies the differential equation $(7x^4 \cot y - e^x \operatorname{cosec} y) \frac{dx}{dy} = x^5, x \geq 1$, then at $x = 2$, the value of $\cos y$ is
- ① $\frac{2e^2 + e}{64}$ ② $\frac{2e^2 - e}{64}$ ③ $\frac{2e^2 - e}{128}$ ④ $\frac{2e^2 + e}{128}$
70. Let $y = y(x)$ be the solution of the differential equation $(xy - 5x^2\sqrt{1+x^2})dx + (1+x^2)dy = 0, y(0) = 0$. Then $y(\sqrt{3})$ is equal to
- ① $\frac{5\sqrt{3}}{2}$ ② $\sqrt{\frac{15}{2}}$ ③ $\sqrt{\frac{14}{3}}$ ④ $2\sqrt{2}$

Section—B
(Numerical Answer Type)

71. Three distinct numbers are selected randomly from the set $\{1, 2, 3, \dots, 40\}$. If the probability, that the selected numbers are in an increasing G.P., is $\frac{m}{n}, \gcd(m, n) = 1$, then $m + n$ is equal to _____.
72. Let $A = \{1, 2, 3, 4, 5\}$ and $B = \{1, 2, 3, 4, 5, 6\}$. Then the number of functions $f : A \rightarrow B$ satisfying $f(1) + f(2) = f(4) - 1$ is equal to _____.
73. If $S = \left\{x \in \mathbb{R} : \sin^{-1}\left(\frac{x+1}{\sqrt{x^2+2x+2}}\right) - \sin^{-1}\left(\frac{x}{\sqrt{x^2+1}}\right) = \frac{\pi}{4}\right\}$, then $\sum_{x \in S} \left(\sin\left(\left(x^2+x+5\right)\frac{\pi}{2}\right) - \cos\left(\left(x^2+x+5\right)\pi\right)\right)$ is equal to _____.
74. If $f(x) = x^2 + g'(1)x + g'(2)$ and $g(x) = f(1)x^2 + xf'(x) + f''(x)$, then the value of $f(4) - g(4)$ is equal to _____.
75. If the area of the region $\{(x, y) : |4 - x^2| \leq y \leq x^2, y \leq 4, x \geq 0\}$ is $\left(\frac{80\sqrt{2}}{\alpha} - \beta\right), \alpha, \beta \in \mathbb{N}$, then $\alpha + \beta$ is equal to _____.