JEE Main 2025 Apr 2 Shift 1 Question Paper

Time Allowed :3 Hour	Maximum Marks :300	Total Questions :75

> ## General Instructions
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> **Read the following instructions very carefully and strictly follow them:**
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> 1. The test is of 3 hours duration.
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> 2. The question paper consists of 75 questions. The maximum marks are 300.
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> 3. There are three parts in the question paper consisting of Physics, Chemistry and Mathematics having 25 questions in each part of equal weightage.
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> 4. Each part (subject) has two sections.
>   (i) Section-A: This section contains 20 multiple choice questions which have only one correct answer. Each question carries 4 marks for correct answer and −1 mark for wrong answer.
>   (ii) Section-B: This section contains 5 questions. The answer to each of the questions is a numerical value. Each question carries 4 marks for correct answer and −1 mark for wrong answer. For Section-B, the answer should be rounded off to the nearest integer.

1. The distance of the point $P(1, 2, 3)$ **from the plane** $3x - 4y + 12z - 7 = 0$ **is:**

(1) $\frac{1}{\sqrt{14}}$

(2) $\frac{2}{\sqrt{14}}$

(3) $\frac{3}{\sqrt{14}}$

(4) $\frac{4}{\sqrt{14}}$

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2. Which of the following molecules hydrolyzes fast?

(1) Methyl chloride

(2) Acetamide

(3) Methyl acetate

(4) Ethyl formate

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3. Find the value of the integral:

$$\int_0^e \log_e x \, dx$$

(1) 1

(2) $e - 1$

(3) $\frac{e}{2} - 1$

(4) 0

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4. The greatest value of n, where $n \in \mathbb{N}$, such that 3^n divides $50!$ is:

(1) 20

(2) 21

(3) 22

(4) 23

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5. Number of solutions in the interval $[-2\pi, 2\pi]$ for the equation:

$$2\sqrt{2}\cos^2\theta + (2 - \sqrt{6})\cos\theta - \sqrt{3} = 0$$

(1) 2

(2) 3

(3) 4

(4) 5

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6. Which of the following is the correct order of basic strength of amines in aqueous medium?

(1) $CH_3NH_2 > (CH_3)_2NH > (CH_3)_3N > NH_3$

(2) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N > NH_3$

(3) $CH_3NH_2 > NH_3 > (CH_3)_2NH > (CH_3)_3N$

(4) $(CH_3)_3N > (CH_3)_2NH > CH_3NH_2 > NH_3$

7. Let $P_n = \alpha^n + \beta^n$, $P_{10} = 123$, $P_9 = 76$, $P_8 = 47$, and $P_1 = 1$. The quadratic equation whose roots are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ is:

(1) $x^2 + x - 1 = 0$

(2) $x^2 - 2x + 1 = 0$

(3) $x^2 + x - 2 = 0$

(4) $x^2 - x - 2 = 0$

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8. The moment of inertia of a uniform rod of mass m and length l is α when rotated about an axis passing through the centre and perpendicular to the length. If the rod is broken into equal halves and arranged as shown, then the moment of inertia about the given axis is:

(1) 2α

(2) $\frac{\alpha}{2}$

(3) 4α

(4) α

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9. The total number of 10-digit sequences formed by only $\{0, 1, 2\}$, where 1 should be used at least 5 times and 2 should be used exactly three times, is:

(1) $\binom{10}{5} \times \binom{5}{3}$

(2) $\binom{10}{5} \times \binom{5}{2}$

(3) $\binom{10}{3} \times \binom{7}{2}$

(4) $\binom{10}{3} \times \binom{7}{3}$

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10. Which of the following statement(s) is correct for the adiabatic process?

(1) $\binom{1}{0}$ Molar heat capacity is zero.

(2) $\binom{1}{1}$ Molar heat capacity is infinite.

(3) $\binom{2}{1}$ Work done on gas is equal to increase in internal energy.

(4) $\binom{2}{0}$ The increase in temperature results in a decrease in internal energy.

11. Two point charges q and $9q$ are placed at a distance of l from each other. Then the electric field is zero at a

(1) Distance $\frac{l}{4}$ from charge $9q$

(2) Distance $\frac{3l}{4}$ from charge q

(3) Distance $\frac{l}{3}$ from charge $9q$

(4) Distance $\frac{l}{4}$ from charge q

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12. What are the units of viscosity, intensity of wave, and pressure gradient?

(1) Viscosity: $\mathrm{kg \cdot m^{-1} \cdot s^{-1}}$, Intensity of wave: $\mathrm{kg \cdot m^{-1} \cdot s^{-3}}$, Pressure Gradient: $\mathrm{kg \cdot m^{-2} \cdot s^{-2}}$

(2) Viscosity: $\mathrm{N \cdot s \cdot m^{-2}}$, Intensity of wave: $\mathrm{N \cdot m^{-2} \cdot s^{-3}}$, Pressure Gradient: $\mathrm{N \cdot m^{-3}}$

(3) Viscosity: $\mathrm{kg \cdot m^{-1} \cdot s^{-1}}$, Intensity of wave: $\mathrm{kg \cdot m^{-2} \cdot s^{-3}}$, Pressure Gradient: $\mathrm{kg \cdot m^{-2} \cdot s^{-2}}$

(4) Viscosity: $\mathrm{kg \cdot m^{-1} \cdot s^{-1}}$, Intensity of wave: $\mathrm{kg \cdot m^{-3} \cdot s^{-2}}$, Pressure Gradient: $\mathrm{kg \cdot m^{-2} \cdot s^{-2}}$

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13. Let $a_1, a_2, a_3, \ldots$ be an A.P. and $\sum_{k=1}^{12} a_{2k-1} = -\frac{72}{5}a_1$ and $\sum_{k=1}^{n} a_k = 0$. Then the value of n is:

(1) 8

(2) 10

(3) 11

(4) 13

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14. The ratio of the magnetic field at the center of a circular coil to the magnetic field at a distance x from the center of the circular coil is:

(1) $\frac{x}{R} = \frac{3}{4}$

(2) $\frac{x}{R} = \frac{4}{3}$

(3) $\frac{x}{R} = 1$

(4) $\frac{x}{R} = 2$

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15. In group 17, which property does not follow the regular trend?

(1) Electron affinity

(2) Ionisation energy

(3) Covalent radii

(4) Ionic radii