JEE Main 2025 Apr 4 Shift 1 Question Paper

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

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The test is of 3 hours duration.
2. The question paper consists of 75 questions. The maximum marks are 300.
3. There are three parts in the question paper consisting of Physics, Chemistry and Mathematics having 25 questions in each part of equal weightage.
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. In the following, the number of paramagnetic molecules are: O_2, N_2, F_2, B_2, Cl_2.

(1) 1

(2) 2

(3) 3

(4) 4

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2. Find the dimension of $\frac{E}{B}$ where, E represents electric field and B represents magnetic field.

(1) ML^2T^{-1}

(2) LT^{-1}

(3) L^2T^{-1}

(4) LT^{-2}

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3. Which of the following is the ratio of 5th Bohr orbit (r_5) of He^+ Li^{2+}?

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

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

(3) $\frac{9}{4}$

(4) $\frac{4}{9}$

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4. Solve $\int_{-1}^{1} \frac{1+2x}{e^{-x}+e^{x}}\,dx$.

(1) $2\left(\tan^{-1} e - \frac{\pi}{4}\right)$

(2) $2\left(\tan^{-1} e - \frac{\pi}{3}\right)$

(3) $2\left(\tan^{-1} e - \frac{\pi}{2}\right)$

(4) $2\left(\frac{\pi}{2} - \tan^{-1} e\right)$

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5. A ring and a solid sphere are released from rest from the same height on enough rough inclined surface. The ratio of their speed when they reach the bottom is $\sqrt{\frac{7}{x}}$ m/s, then x is

(1) 3

(2) 4

(3) 7

(4) 5

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6. Which of the following pair of ions have equal number of unpaired electrons?

(1) V^{2+} and Ni^{2+}

(2) Cr^{2+} and Mn^{2+}

(3) Fe^{2+} and Sc^{2+}

(4) Mn^{3+} and Fe^{2+}

7. If the equation of an ellipse E is $\frac{x^2}{9} + \frac{y^2}{16} = 1$, then the length of the latus rectum of E is?

(1) $\frac{32}{5}$

(2) $\frac{9}{2}$

(3) $\frac{16}{3}$

(4) $\frac{9}{5}$

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8. Mean free path for an ideal gas is observed to be 20 m while the average speed of molecules of gas is observed to be 600 m/s, then the frequency of collision is near?

(1) 4×10^7

(2) 1.2×10^7

(3) 3×10^7

(4) 2×10^7

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9. The sum of the series $1 + 3 + 5^2 + 7 + 9^2 + \ldots$ up to 80 terms is?

(1) 328160

(2) 338160

(3) 339400

(4) 326870

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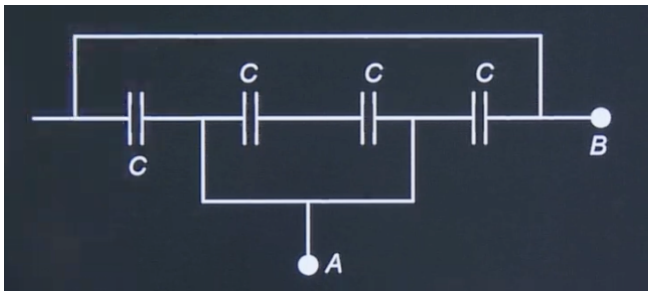
10. Find the equivalent capacitance between A and B, where $C = 16\,\mu F$.



(1) 48 μF

(2) 8 μF

(3) 32 μF

(4) 16 μF

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11. Incorrect order of atomic radius is?

(1) $B < Al$

(2) $In < Tl$

(3) $Al < Ga$

(4) $Ga < In$

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12. One mole of an ideal gas expands from 10 dm^3 to 20 dm^3 through an isothermal reversible process. Find ΔU, q, and w.

(1) $\Delta U = 0, q = 0, w = 0$

(2) $\Delta U = 0, q \neq 0, w \neq 0$

(3) $\Delta U \neq 0, q = 0, w \neq 0$

(4) $\Delta U \neq 0, q \neq 0, w = 0$

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13. Let there be two A.P.'s with each having 2025 terms. Find the number of distinct terms in the union of the two A.P.'s, i.e., $A \cup B$, if the first A.P. is $1, 6, 11, \ldots$ and the second A.P. is $9, 16, 23, \ldots$.

(1) 3761

(2) 4035

(3) 3022

(4) 2025
