Jee Main 2026 B.Arch and B. Planning Memory Based Question Paper

Time Allowed :3 Hours	Maximum Marks :300	Total questions :75

Important Instructions

1. **The test is of 3 hours duration.**
2. **This test paper consists of 75 questions. Each subject (PCM) has 25 questions. The maximum marks are 300.**
3. **This question paper contains Three Parts. Part-A is Physics, Part-B is Chemistry, and Part-C is Mathematics. Each part has only two sections: Section-A and Section-B.**
4. **Section-A: Attempt all questions.**
5. **Section-B: Attempt all questions.**
6. **Section-A (01 – 20):** Contains 20 multiple choice questions which have only one correct answer. Each question carries +4 marks for the correct answer and –1 mark for the wrong answer.
7. **Section-B (21 – 25):** Contains 5 Numerical value-based questions. The answer to each question should be rounded off to the nearest integer. Each question carries +4 marks for the correct answer and –1 mark for the wrong answer.

1. If

$$a_n = (2n^2 - n + 2)(n!),$$

then

$$\sum_{n=1}^{20} a_n$$

is equal to:

(1) $37(20!) - 1$
(2) $37(20!) + 1$
(3) $39(21!) + 1$
(4) $39(21!) - 1$

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2. Let $x = x(t)$ be the solution curve of the differential equation

$$\frac{dx}{dt} = -kx,$$

with

$$x(0) = 100, \quad x\left(\frac{1}{2}\right) = 80.$$

If $x(t_\alpha) = 5$, then t_α is equal to:

(1) $\dfrac{\ln 5 + \ln 4}{2(\ln 5 - \ln 4)}$
(2) $\dfrac{\ln 5 + \ln 4}{\ln 5 - \ln 4}$
(3) $\dfrac{\ln 5 - \ln 4}{2(\ln 5 + \ln 4)}$
(4) $\dfrac{\ln 5 - \ln 4}{\ln 5 + \ln 4}$

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3. Let α, β, γ $(0 < \alpha, \beta, \gamma < \frac{\pi}{2})$ be the angles between non–zero vectors $\vec{a}$ and $\vec{b}$, $\vec{b}$ and $\vec{c}$, $\vec{c}$ and $\vec{a}$ respectively. If θ is the angle that the vector $\vec{a}$ makes with the plane containing $\vec{b}$ and $\vec{c}$, then:
(1) $\cos^2\theta =^2 \beta\big(\cos^2\alpha + \cos^2\gamma - 2\cos\alpha\cos\beta\cos\gamma\big)$
(2) $\cos^2\theta = \sec^2\beta\big(\cos^2\alpha + \cos^2\gamma + 2\cos\alpha\cos\beta\cos\gamma\big)$
(3) $\sin^2\theta =^2 \beta\big(\cos^2\alpha + \cos^2\gamma - 2\cos\alpha\cos\beta\cos\gamma\big)$
(4) $\sin^2\theta = \sec^2\beta\big(\cos^2\alpha + \cos^2\gamma + 2\cos\alpha\cos\beta\cos\gamma\big)$

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4. Let α and β be the roots of the equation

$$2x^2 - 5x - 1 = 0.$$

For $n \in \mathbb{N}$, let

$$P_n = \alpha^n + \beta^n.$$

Then the value of

$$\frac{2P_{11}\,(2P_{10} - 5P_9)}{P_8\,(5P_{10} + P_9)}$$

is equal to:
(1) $-\dfrac{1}{2}$
(2) $\dfrac{1}{2}$
(3) -1
(4) 1

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5. For three non–coplanar vectors $\vec{a}, \vec{b}, \vec{c}$, if

$$(\vec{b} + \vec{c}) \cdot \big((\vec{c} + \vec{a}) \times (\vec{a} + \vec{b})\big) = \alpha\,[\vec{a}\,\vec{b}\,\vec{c}]$$

and

$$(\vec{a} + \vec{b}) \cdot \big((\vec{b} + \vec{c}) \times (\vec{a} + \vec{b} + \vec{c})\big) = \beta\,[\vec{a}\,\vec{b}\,\vec{c}],$$

then $\alpha + \beta$ is equal to:
(1) -3
(2) -1

(3) 1
(4) 3

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6. Let X have a binomial distribution $B(6, p)$. If the sum of the mean and the variance of X is $\frac{21}{8}$, then

$$\frac{P(2 \leq X < 4)}{P(4 < X < 6)}$$

is equal to:

(1) 65
(2) 195
(3) $\frac{195}{2}$
(4) $\frac{225}{2}$
