BITSAT 2025 June 22 Shift 1 Question Paper

Time Allowed :3 Hours	**Maximum Marks :**390	**Total questions :**130

General Instructions

Read the following instructions very carefully and strictly follow them:

1. Duration of Exam: 3 Hours
2. Total Number of Questions: 130 Questions
3. Section-wise Distribution of Questions:
    - Physics - 40 Questions
    - Chemistry - 40 Questions
    - Mathematics - 50 Questions
4. Type of Questions: Multiple Choice Questions (Objective)
5. Marking Scheme: Three marks are awarded for each correct response
6. Negative Marking: One mark is deducted for every incorrect answer.
7. Each question has four options; only one is correct.
8. Questions are designed to test analytical thinking and problem-solving skills.

1. A block of mass 2 kg slides on a frictionless horizontal surface with a velocity of 3 m/s. It collides elastically with another block of mass 3 kg initially at rest. What is the velocity of the 2 kg block after the collision?

(A) 1 m/s

(B) 1.5 m/s

(C) 2 m/s

(D) 2.5 m/s

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2. The electric field at a point on the axis of a uniformly charged ring of radius R at a distance x from its center is given by:

$$E = \frac{1}{4\pi\epsilon_0} \cdot \frac{2\pi k Q x}{(x^2 + R^2)^{3/2}}.$$

If x = 2R, what is the magnitude of the electric field?

(A) $\frac{kQ}{R^2}$

(B) $\frac{2kQ}{R^2}$

(C) $\frac{3kQ}{R^2}$

(D) $\frac{kQ}{2R^2}$

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3. A gas expands isothermally and reversibly from a volume V to 2V. If the initial pressure is P, what is the final pressure?

(A) $\frac{P}{2}$

(B) $\frac{P}{4}$

(C) $2P$

(D) P

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4. For a reaction A $\rightarrow$ B, the concentration of A decreases from 0.8 M to 0.2 M in 10 minutes. If the rate constant is 0.1 min^1, what is the order of the reaction?

(A) 0

(B) 1

(C) 2

(D) 3

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5. Find the value of the integral:

$$\int_0^{\pi} \sin^2(x)\, dx.$$

(A) 0

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

(C) $\frac{\pi}{4}$

(D) π

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6. A bag contains 5 red, 3 blue, and 2 green balls. If two balls are drawn at random without replacement, what is the probability that both are red?

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

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

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

(D) $\frac{1}{6}$

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7. Find the angle between the vectors $\mathbf{a} = (2, -1, 3)$ and $\mathbf{b} = (1, 4, -2)$.

(A) 45°

(B) 60°

(C) 90°

(D) 120°

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8. If $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$, find the determinant of A^2.

(A) 0

(B) 4

(C) 9

(D) 25
