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

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:

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

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

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

4. For a reaction $A \to B$, the concentration of A decreases from 0.8 M to 0.2 M in 10 minutes. If the rate constant is 0.1 min¹, what is the order of the reaction?

- (A) 0
- (B) 1
- (C) 2

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

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) $\frac{1}{6}$

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°

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