

## **BITSAT 2025 June 23 Shift 1 Question Paper**

<b>Time Allowed :3 Hours</b>	<b>Maximum Marks :390</b>	<b>Total questions :130</b>
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### **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.
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**1. Calculate the electric field at a point due to a uniformly charged spherical shell.**

(1)  $\frac{Q}{4\pi\epsilon_0 r^2}$

(2) 0

(3)  $\frac{Q}{4\pi\epsilon_0 r}$

(4)  $\frac{Q}{8\pi\epsilon_0 r^2}$

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**2. Determine the final temperature when two bodies at different temperatures are brought into thermal contact.**

(1) The temperature will always be the average of the two temperatures.

(2) The temperature will depend on the masses and specific heats of the bodies.

(3) The temperature will always be the temperature of the body with the higher initial temperature.

(4) The temperature will be the higher of the two initial temperatures.

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**3. Find the focal length of a lens in a compound lens system.**

(1)  $\frac{1}{f_{total}} = \frac{1}{f_1} + \frac{1}{f_2}$

(2)  $\frac{1}{f_{total}} = \frac{1}{f_1} - \frac{1}{f_2}$

(3)  $f_{total} = f_1 + f_2$

(4)  $f_{total} = f_1 - f_2$

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**4. Calculate the de Broglie wavelength of an electron moving with a given velocity.**

(1)  $\lambda = \frac{h}{mv}$

(2)  $\lambda = \frac{h}{2mv}$

(3)  $\lambda = \frac{mv}{h}$

(4)  $\lambda = \frac{2mv}{h}$

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**5. What is the major product of the reaction of an alkene with bromine water?**

(1) Alkane

(2) Dibromoalkane

(3) Alcohol

(4) Bromoalkene

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**6. Identify the geometry and hybridization of the central atom in SF<sub>6</sub>.**

- (1) Trigonal bipyramidal, sp<sup>2</sup> hybridization
  - (2) Tetrahedral, sp<sup>3</sup> hybridization
  - (3) Seesaw, sp<sup>3</sup>d hybridization
  - (4) Square planar, sp<sup>3</sup>d<sup>2</sup> hybridization
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**7. What is the oxidation state of chromium in KCrO<sub>4</sub>?**

- (1) +6
  - (2) +3
  - (3) +2
  - (4) 0
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**8. What is the molecular geometry of the water molecule (H<sub>2</sub>O)?**

- (1) Linear
  - (2) Trigonal planar
  - (3) Bent
  - (4) Tetrahedral
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**9. Calculate the rate constant of a reaction with a given half-life.**

- (1)  $k = \frac{0.693}{t_{1/2}}$
  - (2)  $k = \frac{1}{t_{1/2}}$
  - (3)  $k = \frac{2.303}{t_{1/2}}$
  - (4)  $k = \frac{0.5}{t_{1/2}}$
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**10. What is a primary key in a relational database?**

- (1) A unique identifier for each record in a table
  - (2) A key used for sorting records
  - (3) A key linking two tables
  - (4) A key for encrypting data
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