BITSAT 2025 May 27 Shift 2 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. If $A = \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$**, then the determinant of the adjoint of** A^2 **is:**

A) 121

B) 144

C) 169

D) 196

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2. If $f(x) = \sin^{-1}(2x\sqrt{1-x^2})$**, then** $f'(x)$ **is:**

A) $\frac{2(1-2x^2)}{\sqrt{1-4x^2(1-x^2)}}$

B) $\frac{2x(1-2x^2)}{\sqrt{1-4x^2(1-x^2)}}$

C) $\frac{1-2x^2}{\sqrt{1-4x^2(1-x^2)}}$

D) $\frac{2x\sqrt{1-x^2}}{1-x^2}$

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3. If $y = \tan^{-1}\left(\frac{2x}{1-x^2}\right)$**, then** $\frac{dy}{dx}$ **is:**

A) $\frac{2}{1+x^2}$

B) $\frac{1-x^2}{1+x^2}$

C) $\frac{2}{(1-x^2)^2}$

D) $\frac{2}{1-x^2}$

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4. If the roots of the quadratic equation $x^2 + 4x + k = 0$ **are real and equal, then the value of** k **is:**

A) 2

B) 4

C) 8

D) 16

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5. If $f(x) = x^2 + 3x$**, then** $f'(x)$ **is:**

A) $x + 3$

B) $2x + 3$

C) $x^2 + 3$

D) $2x$

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6. Find the slope of the line passing through the points $(1, 2)$ and $(3, 6)$:

A) 3

B) 2

C) 4

D) 1

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7. A body starts from rest and moves with constant acceleration. If it covers a distance of 40 m in 4 seconds, then its acceleration is:

A) $5\,\text{m/s}^2$

B) $2.5\,\text{m/s}^2$

C) $10\,\text{m/s}^2$

D) $4\,\text{m/s}^2$

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8. If a force of 10 N displaces a body by 5 m in the direction of the force, the work done is:

A) 2 J

B) 50 J

C) 0 J

D) 5 J

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9. A block of mass 5 kg is placed on a rough horizontal surface. A horizontal force of 25 N is applied. If the coefficient of friction is 0.4, what is the acceleration of the block? (Take $g = 10\,\text{m/s}^2$)

A) $1\,\text{m/s}^2$

B) $2\,\text{m/s}^2$

C) $3\,\text{m/s}^2$

D) $4\,\text{m/s}^2$

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10. Three resistors of $2\,\Omega$, $3\,\Omega$, and $6\,\Omega$ are connected in parallel. What is the equivalent resistance of the combination?

A) $1\,\Omega$

B) $2\,\Omega$

C) $3\,\Omega$

D) $4\,\Omega$

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11. How many moles are present in 22 g of carbon dioxide (CO_2)? (Molar mass of CO_2 = 44 g/mol)

A) 0.25 mol

B) 0.5 mol

C) 1 mol

D) 2 mol

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12. Which of the following elements has the highest electronegativity?

A) Sodium

B) Fluorine

C) Oxygen

D) Chlorine

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13. Which of the following molecules has a linear shape?

A) H_2O

B) CO_2

C) NH_3

D) SO_2

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14. Which of the following is a strong acid?

A) CH_3COOH

B) HCl

C) NH_4^+

D) H_2CO_3

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15. Which of the following is an alkene?

A) C_2H_6

B) C_2H_4

C) C_3H_8

D) C_4H_{10}
