BITSAT 2025 May 28 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.

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1. The quadratic equation $x^2 - 5x + k = 0$ has equal roots. Find the value of k.

(A) 6

(B) $\frac{25}{4}$

(C) $\frac{9}{4}$

(D) 0

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2. If the sum of the first n terms of an arithmetic progression is given by $S_n = 3n^2 + 5n$, find the first term a and common difference d.

(A) $a = 8, d = 6$

(B) $a = 8, d = 3$

(C) $a = 5, d = 6$

(D) $a = 3, d = 5$

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3. If $\sin\theta = \frac{3}{5}$ and θ lies in the first quadrant, find $\cos\theta$.

(A) $\frac{4}{5}$

(B) $\frac{3}{4}$

(C) $\frac{5}{3}$

(D) $\frac{5}{4}$

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4. How many different 4-letter words can be formed from the letters of the word "BINARY" without repetition?

(A) 360

(B) 720

(C) 840

(D) 1260

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5. Find the equation of the circle which passes through the points $(1, 2)$, $(4, 3)$ and has its center on the line $x + y = 5$.

(A) $(x - 2)^2 + (y - 3)^2 = 5$

(B) $(x - 3)^2 + (y - 2)^2 = 2$

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(C) $(x-2.5)^2+(y-2.5)^2=2.5)$

(D) $(x-2)^2+(y-3)^2=2$

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6. Find the equation of the tangent to the curve $y=x^3-3x+1$ at the point where $x=2$.

(A) $y=9x-19$

(B) $y=9x-15$

(C) $y=13x-23$

(D) $y=15x-25$

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7. Two dice are rolled simultaneously. What is the probability that the sum of the numbers on the two dice is at least 10?

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

(B) $\frac{1}{9}$

(C) $\frac{1}{12}$

(D) $\frac{1}{18}$

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8. If $\log_2(x-1)+\log_2(x-3)=3$, find the value(s) of x.

(A) 5

(B) 4

(C) 3 and 5

(D) 4 and 5

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9. If

$$A=\begin{pmatrix}2 & 3\\ 1 & k\end{pmatrix}$$

and $\det(A)=7$, find the value of k.

(A) 1

(B) 2

(C) 5

(D) 4

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10. Find the sum of the infinite geometric series:

$$S = 8 + 4 + 2 + \cdots$$

if it converges.

(A) 14

(B) 16

(C) 18

(D) 20

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11. A particle is projected vertically upward with an initial velocity of $20\,m/s$. Calculate the maximum height reached by the particle.

(A) $20\,m$

(B) $15\,m$

(C) $10\,m$

(D) $25\,m$

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12. How much heat is required to raise the temperature of $2\,kg$ of water from $20°C$ to $80°C$? (Specific heat capacity of water = $4200\,J/kg°C$)

(A) $504000\,J$

(B) $50400\,J$

(C) $126000\,J$

(D) $168000\,J$

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13. A resistor of resistance $10\,\Omega$ is connected across a $20\,V$ battery. Calculate the current flowing through the resistor.

(A) $1\,A$

(B) $2\,A$

(C) $0.5\,A$

(D) $4\,A$

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14. An object is placed $30\,cm$ in front of a convex lens of focal length $20\,cm$. Find the position of the image.

(A) $60\,cm$

(B) $12\,cm$

(C) $15\,cm$

(D) $10\,cm$

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15. The rate constant k of a reaction doubles when the temperature is raised from 300 K to 310 K. Calculate the activation energy E_a of the reaction. (Use $R = 8.314\,J/mol \cdot K$)

(A) $52\,kJ/mol$

(B) $55\,kJ/mol$

(C) $53\,kJ/mol$

(D) $60\,kJ/mol$

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16. Calculate the de Broglie wavelength of an electron moving with velocity $6 \times 10^6\,m/s$. (Mass of electron $m = 9.11 \times 10^{-31}\,kg$, Planck's constant $h = 6.626 \times 10^{-34}\,Js$)

(A) $1.2 \times 10^{-10}\,m$

(B) $1.1 \times 10^{-10}\,m$

(C) $1.0 \times 10^{-10}\,m$

(D) $0.9 \times 10^{-10}\,m$

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17. Which of the following molecules has a trigonal planar shape?

(A) CH_4

(B) BF_3

(C) NH_3

(D) H_2O

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18. Choose the word which is closest in meaning to "Eloquent".

(A) Silent

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(B) Fluent

(C) Awkward

(D) Hesitant

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19. Identify the part of the sentence that contains an error:

"Neither the manager nor the employees ___ willing to accept the new policy."

(A) Neither the manager

(B) nor the employees

(C) willing

(D) to accept the new policy

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20. Read the passage and answer the question:

"Climate change is one of the biggest challenges facing humanity. It affects the environment, economy, and health. Immediate action is required to reduce greenhouse gas emissions."

Question: What is the main idea of the passage?

(A) The economy is not affected by climate change.

(B) Climate change is a minor issue.

(C) Immediate action is needed to combat climate change.

(D) Health is unrelated to climate change.

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21. Choose the word which is most opposite in meaning to "Benevolent".

(A) Kind

(B) Cruel

(C) Generous

(D) Compassionate

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22. Choose the best alternative to improve the underlined part:

"She gave a beautiful speech, which everyone enjoyed it."

(A) which everyone enjoyed

(B) that everyone enjoyed

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(C) whom everyone enjoyed

(D) who everyone enjoyed

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23. Identify the part of the sentence which contains a grammatical error:

"Each of the students have submitted their assignments on time."

(A) Each of the students

(B) have submitted

(C) their assignments

(D) on time

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