BITSAT 2025 May 30 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. **Exam Mode**: Computer Based Test
2. **BITSAT exam duration**: 3 hours
3. **Medium of Exam**: English
4. **BITSAT exam Sections**:
   - Part I - Physics (30 questions)
   - Part II - Chemistry (30 questions)
   - Part III - English Proficiency (10 questions) and Logical Reasoning (20 questions)
   - Part IV - Mathematics/Biology (40 questions)
5. **Type of Questions**: Multiple Choice Questions (MCQ)
6. **BITSAT Total Questions**: 130 Questions
7. **BITSAT Exam Pattern Total Marks**: 390 Marks

1. If $x + \frac{1}{x} = 4$, find the value of $x^4 + \frac{1}{x^4}$.

(A) 194

(B) 1945

(C) 190

(D) 1940

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2. The equation of the line passing through the point $(2, 3)$ and making equal intercepts on the coordinate axes is:

(A) $x + y = 5$

(B) $3x + 2y = 12$

(C) $2x + 3y = 12$

(D) $5x + 5y = 25$

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3. If $\tan\theta + \cot\theta = 4$, then find the value of $\tan^3\theta + \cot^3\theta$.

(A) 52

(B) 44

(C) 46

(D) 54

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4. If $y = \ln(x^2 + 1)$, then find $\frac{dy}{dx}$ at $x = 1$.

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

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

C) 1

D) $\frac{2}{3}$

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5. If a, b are roots of the equation $x^2 - 5x + 6 = 0$, find the value of $a^3 + b^3$.

(A) 125

(B) 215

(C) 98

(D) 35

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6. In triangle ABC, the length of sides are $AB = 7$, $BC = 10$, and $AC = 5$. What is the length of the median drawn from vertex B?

(A) 6

(B) 5

(C) 7

(D) 8

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7. If $f(x) = e^{2x} \sin x$, find $f'(x)$.

(A) $e^{2x}(2\sin x + \cos x)$

(B) $e^{2x}(2\sin x - \cos x)$

(C) $e^{2x}(2\cos x + \sin x)$

(D) $e^{2x}(\sin x - 2\cos x)$

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8. The half-life of a radioactive substance is 4 hours. If initially there are 256 grams, how much remains after 10 hours?

(A) 45.26 g

(B) 16 g

(C) 64 g

(D) 8 g

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9. A fluid flows through a pipe with varying cross-section. If the velocity at the narrow section is 3 m/s and the cross-sectional area is half of the wider section, what is the velocity in the wider section?

(A) 1.5 m/s

(B) 6 m/s

(C) 0.5 m/s

(D) 3 m/s

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10. The escape velocity from the surface of a planet is 11.2 km/s. If the radius of the planet is doubled but the mass remains the same, what will be the new escape velocity?

(A) 22.4 km/s

(B) 7.9 km/s

(C) 15.8 km/s

(D) 5.6 km/s

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11. Two identical charges q are placed 1 m apart. The electrostatic force between them is 9×10^{-9} N. What is the magnitude of each charge? (Take $k = 9 \times 10^9$ $\mathbf{Nm^2/C^2}$)

(A) 1×10^{-9} C

(B) 3×10^{-9} C

(C) 1×10^{-9} C

(D) 3×10^{-9} C

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12. A charged particle moves in a magnetic field with velocity v perpendicular to the field B. The radius of the circular path is r. Which of the following expressions gives the charge q of the particle?

A) $q = \frac{mv}{Br}$

B) $q = \frac{mvB}{r}$

C) $q = \frac{mB}{vr}$

D) $q = \frac{Bvr}{m}$

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13. How much water must be added to 500 mL of 2 M $\mathrm{H_2SO_4}$ solution to make it 0.5 M?

(A) 1.5 L

(B) 2.0 L

(C) 1.0 L

(D) 0.75 L

Quick Tip

For dilution problems, always use:

$$M_1V_1 = M_2V_2$$

and remember that volume units must be consistent. The volume of water added is the difference between final and initial volumes.

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14. Question 14 How many grams of CO_2 are produced when 10 g of C_2H_6 (ethane) is completely combusted? Reaction: $2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$

(A) 29.3 g

(B) 44.0 g

(C) 58.6 g

(D) 88.0 g

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15. A 2 L container holds oxygen gas at 300 K and 2 atm pressure. If the temperature is increased to 600 K and the volume is doubled, what is the final pressure?

(A) 1 atm

(B) 2 atm

(C) 0.5 atm

(D) 4 atm

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16. For the reaction $N_2 + 3H_2 \rightleftharpoons 2NH_3$, if initially 1 mole of N_2 and 3 moles of H_2 are taken and at equilibrium 0.4 moles of NH_3 are formed, find the equilibrium concentration of H_2.

(A) 2.4 moles

(B) 2.8 moles

(C) 3.4 moles

(D) 3.0 moles
