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
- 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
- **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
- **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) $\frac{2}{3}$
- 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

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

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

- (A) $e^{2x}(2\sin x + \cos x)$
- **(B)** $<math>e^{2x}(2\sin x \cos x)$
- (C) $e^{2x}(2\cos x + \sin x)$
- (D) $e^{2x}(\sin x 2\cos x)$

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

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

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

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 $k = 9 \times 10^{9}$ Nm²/C²)

- (A) 1×10^{-9} C
- (B) 3×10^{-9} C
- (C) 1×10^{-9} C
- (D) 3×10^{-9} C

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

13. How much water must be added to 500 mL of 2 M $\rm H_2SO_4$ 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.

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

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

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