BITSAT 2026 May 26 Shift 2

Question Paper (Memory-Based)

Conducted by BITS Pilani

General Instructions

(i) **Duration:** The total duration of the examination is 3 hours (180 minutes).

(ii) **Total Marks:** The complete paper carries a maximum of 390 marks.

(iii) **Structure:** The paper has 4 Sections:

- **Part 1:** 30 Multiple Choice Questions (Physics).
- **Part 2:** 30 Multiple Choice Questions (Chemistry).
- **Part 3:** 10 Multiple Choice Questions (English Proficiency), 20 Multiple Choice Questions (Logical Reasoning)
- **Part 4:** 40 Multiple Choice Questions (Mathematics/Biology)

(iv) **Compulsory Questions:** All 130 questions are compulsory,and +12 Questions(Optional Extra Questions)

(v) Each question has four options. Only **one** option is correct.

(vi) **Correct Answer:** +3 marks.

(vii) **Incorrect Answer:** −1 (Negative marking).

(viii) **Unanswered/Marked for Review:** 0 marks.

PHYSICS

1. A wire of length L and cross-sectional area A is made of a material of Young's modulus Y. If it is stretched by an amount x, the elastic potential energy stored in the wire is:

(A) $\frac{YAx^2}{L}$

(B) $\frac{YAx^2}{2L}$

(C) $\frac{2YAx^2}{L}$

(D) $\frac{YAx}{L}$

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2. A particle moves in a circle of radius R such that its linear speed varies with time t as $v = kt$, where k is a positive constant. The angle θ between the net acceleration vector and the velocity vector at time t is given by:

(A) $\tan^{-1}\left(\frac{k^2t^2}{R}\right)$

(B) $\tan^{-1}\left(\frac{kt^2}{R}\right)$

(C) $\tan^{-1}\left(\frac{kt}{R}\right)$

(D) $\tan^{-1}\left(\frac{R}{k^2t^2}\right)$

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3. Two wires X and Y of the same material have lengths in the ratio $1:2$ and diameters in the ratio $2:1$. If they are subjected to the same stretching force, the ratio of the elongation produced in wire X to that in wire Y ($\Delta L_X : \Delta L_Y$) is:

(A) 1 : 4

(B) 1 : 8

(C) 1 : 2

(D) 8 : 1

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4. The elastic potential energy stored per unit volume (energy density) in a stretched string under a longitudinal tension stress σ and material Young's modulus Y is expressed as:

(A) $\frac{\sigma^2}{2Y}$

(B) $\frac{2Y}{\sigma^2}$

(C) $\frac{Y\sigma^2}{2}$

(D) $\frac{\sigma^2}{Y}$

CHEMISTRY

5. An octahedral coordination complex with the electronic configuration $t_{2g}^4 e_g^0$ is expected to exhibit which of the following magnetic properties and d-d transition characteristics?

(A) Paramagnetic with 4 unpaired electrons; spin-allowed transitions

(B) Paramagnetic with 2 unpaired electrons; spin-allowed transitions

(C) Diamagnetic; spin-forbidden transitions

(D) Paramagnetic with 2 unpaired electrons; spin-forbidden transitions

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6. During the structural analysis of an unknown aldohexose, a chemist treats a sample with periodic acid (HIO_4). If the carbohydrate is completely cleaved to yield five molecules of formic acid (HCOOH) and one molecule of formaldehyde (HCHO), this diagnostic breakdown directly proves the presence of:

(A) A ketohexose structure with a carbonyl at C-2

(B) A cyclic pyranose ring configuration

(C) A continuous straight-chain structure containing five $-CHOH$ groups and one $-CH_2OH$ group

(D) Three isolated, non-adjacent primary alcohol branches

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7. In an analytical laboratory, a 20.0 **mL sample of an aqueous solution containing oxalic acid ($H_2C_2O_4$) requires exactly** 16.0 **mL of a** 0.05 **M potassium permanganate ($KMnO_4$) solution for complete oxidation in a hot, acidic medium (H_2SO_4). Calculate the molarity of the oxalic acid solution.**

(A) 0.010 M

(B) 0.040 M

(C) 0.100 M

(D) 0.250 M

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8. A current of 2.0 **A is passed for 5 hours through an electrolytic cell containing an aqueous solution of a metal salt, depositing** 12.0 **g of the metal at the cathode. If the atomic mass of the metal is** 193 **g mol^{-1}, find the oxidation state of the metal ion in the solution. (Take Faraday's constant $F = 96500$ C mol^{-1}).**

(A) +1

(B) +2

(C) +3

(D) +4

MATHEMATICS

9. In how many ways can the letters of the word COCHIN be arranged such that the two 'C's are never separated by any other letter?

(A) 360

(B) 120

(C) 240

(D) 720

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10. Evaluate the definite integral: $\int_0^{2026} \frac{x^5}{x^5+(2026-x)^5}\,dx$

(A) 2026

(B) 1013

(C) 506.5

(D) 0

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11. If the vectors $\vec{a} = 2\hat{i} - \hat{j} + \hat{k}$, $\vec{b} = \hat{i} + 2\hat{j} - 3\hat{k}$, **and** $\vec{c} = 3\hat{i} + \lambda\hat{j} + 5\hat{k}$ **represent the concurrent coterminous edges of a parallelopiped whose volume is** 0 **(i.e., the vectors are coplanar), find the value of the scalar parameter** λ**.**

(A) 4

(B) -4

(C) 2

(D) -2

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12. A pair of fair dice is thrown simultaneously. What is the probability that the sum of the numbers appearing on the top faces is at least 10?

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

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

(C) $\frac{5}{36}$

(D) $\frac{1}{4}$
