CUET 2026 May 22 Chemistry Shift 2

Question Paper (Memory-Based)

Conducted by National Testing Agency (NTA)

General Instructions

(i) The examination will be conducted in Computer-Based Test (CBT) mode.

(ii) Each question carries +5 marks for a correct answer and -1 mark for a wrong answer.

(iii) The total number of questions is 50.

(iv) Duration of the examination is 1 hour (60 minutes).

1. Which of the following liquid mixtures forms an ideal solution that strictly obeys Raoult's Law across the entire concentration range at a constant temperature?

(A) Ethanol + Acetone

(B) Chloroform + Acetone

(C) n-Hexane + n-Heptane

(D) Water + Nitric acid

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2. Aldehydes and ketones react with semicarbazide ($NH_2NHCONH_2$) in a weakly acidic medium to form crystalline semicarbazone derivatives. Which of the three nitrogen atoms in a semicarbazide molecule acts as the primary nucleophilic center during this reaction?

(A) The nitrogen atom attached directly to the carbonyl carbon atom ($-NH-C=O$).

(B) The amide nitrogen atom of the terminal primary amide group ($-CONH_2$).

(C) The terminal hydrazine nitrogen atom linked to the adjacent secondary nitrogen ($-NH_2$ of the $-NH-NH_2$ group).

(D) All three nitrogen atoms are equally nucleophilic due to resonance stabilization.

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3. An organic primary amide is treated with bromine (Br_2) and an aqueous solution of sodium hydroxide (NaOH) to yield a primary amine. Which of the following statements correctly

describes this transformation (Hofmann Bromamide Degradation)?

(A) The resulting primary amine contains one more carbon atom than the starting amide.

(B) The resulting primary amine contains the exact same number of carbon atoms as the starting amide.

(C) The resulting primary amine contains one less carbon atom than the starting amide due to the loss of the carbonyl group as a carbonate ion.

(D) The reaction converts a secondary amide into a tertiary amine via a molecular rearrangement.

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4. Which of the following coordination complex compounds is officially classified as a 'Heteroleptic Complex'?

(A) $[Fe(H_2O)_6]Cl_3$

(B) $[Co(NH_3)_5(Cl)]Cl_2$

(C) $K_4[Fe(CN)_6]$

(D) [Ni(CO)4]

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5. What are the exact constituent monosaccharide units and the specific structural glycosidic linkage present inside a standard molecule of Lactose (Milk Sugar)?

(A) α-D-Glucose and β-D-Fructose linked via a $C_1 - C_2$ glycosidic bond.

(B) Two units of α-D-Glucose linked via a $C_1 - C_4$ glycosidic bond.

(C) β-D-Galactose and β-D-Glucose linked via a $C_1 - C_4$ glycosidic bond.

(D) Two units of β-D-Glucose linked via a $C_1 - C_6$ glycosidic bond.

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6. When an aqueous solution of an electrolyte is progressively diluted by adding more solvent water, how do its Specific Conductivity (κ) and Molar Conductivity (Λ_m) respond?

(A) Both Specific Conductivity (κ) and Molar Conductivity (Λ_m) increase uniformly.

(B) Both Specific Conductivity (κ) and Molar Conductivity (Λ_m) decrease uniformly.

(C) Specific Conductivity (κ) increases, while Molar Conductivity (Λ_m) decreases.

(D) Specific Conductivity (κ) decreases, while Molar Conductivity (Λ_m) increases.

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7. Benzene reacts with a mixture of carbon monoxide (CO) and hydrogen chloride (HCl) gas in the presence of an anhydrous aluminium chloride ($AlCl_3$) catalyst to yield Benzaldehyde. This organic transformation is officially known as the:

(A) Rosenmund Reduction

(B) Gattermann-Koch Reaction

(C) Etard Reaction

(D) Stephen Reaction

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8. Which of the following oxidation state configurations represents the most common, energetically stable, and dominant oxidation state exhibited by nearly all the Lanthanoid elements across the f-block series?

(A) +2

(B) +4

(C) +3

(D) +5

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9. According to the structural constraints of Valence Bond Theory (VBT), which of the following hybridization geometries and magnetic configurations accurately describes the low-spin coordination complex ion $[\mathbf{Fe(CN)_6}]^{4-}$? (Atomic Number of Fe $= 26$)

(A) sp^3d^2 hybridization and Paramagnetic

(B) d^2sp^3 hybridization and Diamagnetic

(C) dsp^2 hybridization and Diamagnetic

(D) sp^3d^2 hybridization and Diamagnetic

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10. Deficiency of which of the following essential vitamins in the human diet causes a reduction in intestinal calcium absorption, leading to the bone-softening childhood skeletal deformity known as Rickets?

(A) Vitamin A

(B) Vitamin C

(C) Vitamin K

(D) Vitamin D
