

CUET 2026 May 12 Shift 2 Chemistry

Question Paper (Memory-Based) With Solutions PDF

Conducted by National Testing Agency (NTA)

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General Instructions

- (i) The examination will be conducted in Computer-Based Test (CBT) mode.
- (ii) Each question carries +5 marks for correct answer and -1 mark for wrong answer.
- (iii) The total number of questions are 50.
- (iv) Duration of the exam is 1 hour (60 minutes).

1. Which of the following compounds shows geometrical isomerism?

- (A) But-1-ene
- (B) But-2-ene
- (C) Propene
- (D) Ethene

Correct Answer: (B) But-2-ene

Solution:

Step 1: Understanding the Concept:

Geometrical isomerism (cis-trans isomerism) occurs in alkenes when there is restricted rotation around a double bond and each carbon atom of the double bond is attached to two different groups.

Step 2: Detailed Explanation:

Let's examine the structure of But-2-ene ($\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$):

- Each carbon in the $\text{C} = \text{C}$ bond is attached to one Hydrogen ($-\text{H}$) and one Methyl group ($-\text{CH}_3$).

- Because the two groups on each carbon are different, they can exist in two spatial arrangements: Cis (same groups on the same side) and Trans (same groups on opposite sides).
- In But-1-ene or Propene, one of the double-bonded carbons is attached to two identical Hydrogen atoms, so they cannot show this isomerism.

Step 3: Final Answer:

The compound that shows geometrical isomerism is But-2-ene.

Quick Tip: To quickly check for geometrical isomerism, look at the $C = C$ bond. If either carbon has two identical atoms (like two H atoms), it cannot have cis-trans isomers.

2. The IUPAC name of $(CH_3 - CH_2 - CHO)$ is:

- (A) Propanone
- (B) Propanal
- (C) Propanoic acid
- (D) Ethanol

Correct Answer: (B) Propanal

Solution:**Step 1: Understanding the Concept:**

IUPAC nomenclature follows a specific set of rules: identifying the longest carbon chain, the functional group, and the appropriate suffix.

Step 2: Detailed Explanation:

1. Count the Carbons: The chain $CH_3 - CH_2 - CHO$ has 3 carbon atoms. The prefix for 3 carbons is "prop-". 2. Identify the Bond: It is a saturated chain (single bonds between carbons), so it is "propan-". 3. Identify the Functional Group: The group $-CHO$ is an aldehyde. 4. Determine the Suffix: The IUPAC suffix for aldehydes is "-al".

Step 3: Final Answer:

Combining these, we get Propanal. (Propanone is a ketone, Propanoic acid is a carboxylic acid).

Quick Tip: Don't forget to count the carbon atom that is part of the functional group! In CH_3CH_2CHO , the C in CHO is the 1st carbon.

3. The oxidation state of chromium in ($K_2Cr_2O_7$) is:

- (A) +4
- (B) +5
- (C) +6
- (D) +7

Correct Answer: (C) +6

Solution:

Step 1: Understanding the Concept:

The oxidation state is the hypothetical charge an atom would have if all bonds to atoms of different elements were 100% ionic. The sum of oxidation states in a neutral compound must be zero.

Step 2: Identifying Known Oxidation States:

In $K_2Cr_2O_7$:

- Potassium (K) is an alkali metal, so its state is +1.
- Oxygen (O) is usually -2.
- Let the oxidation state of Chromium (Cr) be x .

Step 3: Calculation:

Set up the equation for the neutral molecule:

$$2(+1) + 2(x) + 7(-2) = 0$$

$$2 + 2x - 14 = 0$$

$$2x - 12 = 0$$

$$2x = 12 \implies x = +6$$

Step 4: Final Answer:

The oxidation state of Chromium in Potassium Dichromate is +6.

Quick Tip: Chromium in the +6 state is a very strong oxidizing agent. This is why $K_2Cr_2O_7$ is commonly used in laboratories for titration and organic oxidation reactions.

4. Which of the following is a strong electrolyte?

- (A) Glucose solution
- (B) Urea solution
- (C) Acetic acid
- (D) Sodium chloride solution

Correct Answer: (D) Sodium chloride solution

Solution:

Step 1: Understanding the Concept:

An electrolyte is a substance that dissociates into ions when dissolved in water, allowing the solution to conduct electricity. A "strong" electrolyte is one that dissociates almost completely (100%) into ions.

Step 2: Detailed Explanation:

- **Sodium chloride ($NaCl$):** Is an ionic salt. In water, it breaks down completely into Na^+ and Cl^- ions. Hence, it is a strong electrolyte.
- **Acetic acid (CH_3COOH):** Is a weak acid. It only partially ionizes in water, making it a weak electrolyte.
- **Glucose and Urea:** Are covalent molecular compounds. They dissolve in water but do not form ions; therefore, they are non-electrolytes.

Step 3: Final Answer:

Sodium chloride solution is the strong electrolyte.

Quick Tip: Strong acids (like HCl), strong bases (like $NaOH$), and most soluble salts are strong electrolytes. If it's a "weak" acid or base, it's a weak electrolyte!

5. The hybridization of carbon in ethyne (C_2H_2) is:

- (A) sp^3
- (B) sp^2
- (C) sp
- (D) dsp^2

Correct Answer: (C) sp

Solution:**Step 1: Understanding the Concept:**

Hybridization explains the mixing of atomic orbitals to form new hybrid orbitals suitable for the pairing of electrons to form chemical bonds. The type of hybridization depends on the number of sigma (σ) bonds and lone pairs around the atom.

Step 2: Detailed Explanation:

In ethyne ($H - C \equiv C - H$):

- Each carbon atom is bonded to one Hydrogen atom (one σ bond) and one Carbon atom (one σ bond and two π bonds).
- Total number of σ bonds per carbon = 2.
- There are no lone pairs on the carbon atoms.
- A total of 2 hybrid orbitals are needed, which corresponds to sp hybridization.

Step 3: Final Answer:

The hybridization of carbon in ethyne is sp .

Quick Tip: Single bond ($C - C$) $\rightarrow sp^3$

Double bond ($C = C$) $\rightarrow sp^2$

Triple bond ($C \equiv C$) $\rightarrow sp$

6. Which gas is evolved when zinc reacts with dilute hydrochloric acid?

- (A) Oxygen
- (B) Chlorine
- (C) Hydrogen
- (D) Nitrogen

Correct Answer: (C) Hydrogen

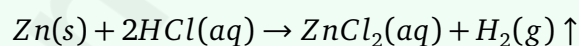
Solution:

Step 1: Understanding the Concept:

Metals that are more reactive than hydrogen (positioned above hydrogen in the reactivity series) react with dilute acids to displace hydrogen gas.

Step 2: Detailed Explanation:

Zinc (Zn) is more reactive than hydrogen. When it reacts with hydrochloric acid (HCl), it forms zinc chloride and releases hydrogen gas. The chemical equation is:



Step 3: Final Answer:

Hydrogen gas is evolved during the reaction.

Quick Tip: You can test for Hydrogen gas by bringing a burning splinter near the mouth of the test tube—it will burn with a characteristic "pop" sound!

7. Identify the correct order of acidic strength:

- (A) $\text{CH}_3\text{COOH} > \text{C}_2\text{H}_5\text{OH} > \text{H}_2\text{O}$
 (B) $\text{H}_2\text{O} > \text{CH}_3\text{COOH} > \text{C}_2\text{H}_5\text{OH}$
 (C) $\text{CH}_3\text{COOH} > \text{H}_2\text{O} > \text{C}_2\text{H}_5\text{OH}$
 (D) $\text{C}_2\text{H}_5\text{OH} > \text{H}_2\text{O} > \text{CH}_3\text{COOH}$

Correct Answer: (C) $\text{CH}_3\text{COOH} > \text{H}_2\text{O} > \text{C}_2\text{H}_5\text{OH}$

Solution:

Step 1: Understanding the Concept:

Acidic strength depends on the stability of the conjugate base formed after the loss of a proton (H^+). The more stable the conjugate base, the stronger the acid.

Step 2: Detailed Explanation:

- **Acetic acid (CH_3COOH):** It is a carboxylic acid. Its conjugate base (acetate ion) is stabilized by resonance between two oxygen atoms, making it the strongest acid in this group.
- **Water (H_2O):** It is neutral but more acidic than simple alcohols.
- **Ethanol ($\text{C}_2\text{H}_5\text{OH}$):** In alcohols, the alkyl group (C_2H_5) exerts an electron-releasing inductive effect (+I effect), which destabilizes the conjugate base (ethoxide ion) and makes it less acidic than water.

Step 3: Final Answer:

The correct order is $\text{CH}_3\text{COOH} > \text{H}_2\text{O} > \text{C}_2\text{H}_5\text{OH}$.

Quick Tip: Remember the general rule for common organic liquids: Carboxylic acids > Water > Alcohols. The only common alcohol stronger than water is Methanol.

8. Which quantum number determines the shape of an orbital?

- (A) Principal quantum number
 (B) Azimuthal quantum number

- (C) Magnetic quantum number
(D) Spin quantum number

Correct Answer: (B) Azimuthal quantum number

Solution:

Step 1: Understanding the Concept:

Quantum numbers are a set of four numbers used to describe the location, energy, and behavior of electrons in an atom.

Step 2: Detailed Explanation:

Each quantum number has a specific role:

- **Principal (n):** Determines the size and energy of the orbital.
- **Azimuthal (l):** Also known as the orbital angular momentum quantum number, it determines the **three-dimensional shape** of the orbital (e.g., $l = 0$ is spherical s , $l = 1$ is dumbbell p).
- **Magnetic (m_l):** Determines the spatial orientation of the orbital.
- **Spin (m_s):** Determines the direction of electron spin.

Step 3: Final Answer:

The Azimuthal quantum number determines the shape of the orbital.

Quick Tip: Think of the quantum numbers as an address: n is the City (size), l is the Building Shape, m_l is the Room Orientation, and m_s is the Bed Choice!

9. Which of the following polymers is formed by addition polymerization?

- (A) Nylon-6,6
(B) Bakelite
(C) Terylene
(D) Polyethene

Correct Answer: (D) Polyethene

Solution:**Step 1: Understanding the Concept:**

Polymerization is the process of reacting monomer molecules together in a chemical reaction to form polymer chains.

- **Addition Polymerization:** Monomers join together without the loss of any small molecules. It typically involves unsaturated monomers (with double or triple bonds).
- **Condensation Polymerization:** Monomers join together with the elimination of small molecules like water or alcohol.

Step 2: Detailed Explanation:

- **Polyethene:** Formed by the repeated addition of ethene ($\text{CH}_2 = \text{CH}_2$) molecules. No byproduct is formed.
- **Nylon-6,6, Bakelite, and Terylene:** These are all formed by condensation reactions where molecules like water are released.

Step 3: Final Answer:

Polyethene is formed by addition polymerization.

Quick Tip: If the name of the polymer starts with "Poly-" and the monomer has a double bond (like Ethene, Styrene, or Vinyl Chloride), it is almost certainly an addition polymer!

10. The reagent used in the conversion of alcohol into aldehyde is:

- (A) LiAlH_4
- (B) PCC
- (C) NaBH_4
- (D) Grignard reagent

Correct Answer: (B) PCC

Solution:**Step 1: Understanding the Concept:**

To convert a primary alcohol into an aldehyde, we need an oxidizing agent. However, many strong oxidizing agents (like $KMnO_4$) will continue to oxidize the aldehyde into a carboxylic acid. Therefore, a "mild" or "selective" oxidizing agent is required.

Step 2: Detailed Explanation:

- **PCC (Pyridinium Chlorochromate):** This is a mild oxidizing agent. It selectively oxidizes primary alcohols to aldehydes and secondary alcohols to ketones without further oxidation to carboxylic acids.
- **$LiAlH_4$ and $NaBH_4$:** These are reducing agents, not oxidizing agents. They would do the opposite (convert an aldehyde back into an alcohol).
- **Grignard reagent:** This is used for carbon-carbon bond formation, not for the simple oxidation of an alcohol to an aldehyde.

Step 3: Final Answer:

The reagent used is PCC.

Quick Tip: Think of PCC as a "controlled" stop. It stops the oxidation at the Aldehyde stage. Stronger reagents like Jones Reagent (CrO_3/H_2SO_4) are like an express train—they go all the way to the Carboxylic Acid!