What are Aldehydes and Ketones?

Worksheet

Aldehydes and ketones contain the carbonyl (C=O) functional group. Aldehydes are R-CHO (terminal), ketones are RC=O (internal). Both react with nucleophiles, undergo aldol condensation, and form stable derivatives.

Questions

1. Which is an aldehyde?

A) CHCOCH
B) CHCHO
C) (CH)C-OH
D) CHCHOCH

2. From oxidation of 2-propanol, the product is

A) Propanal
B) Acetone
C) Propanol
D) Propionic acid

3. Aldehydes are more reactive than ketones because

A) More hydrogen bonds
B) Terminal H and less steric hindrance
C) Stronger C=O
D) Smaller molecular weight

4. A typical test for aldehydes is

A) Bromine water
B) Tollens' reagent
C) Chromium test
D) Iodoform test

5. What aldehyde is produced from the oxidation of ethanol (CHCHOH)?

6. Acetone (CHCOCH) is formed from which alcohol?

7. Benzaldehyde (CHCHO) undergoes nucleophilic addition with HCN. What is the product?

8. Define: What is the carbonyl group?

9. Define: How do aldehydes differ from ketones?

10. Define: Which alcohol produces aldehydes?

Answer Key

1. B) CHCHO - CHCHO (benzaldehyde) has the CHO aldehyde group.

2. B) Acetone - 2-propanol (secondary) acetone (ketone), not aldehyde.

3. B) Terminal H and less steric hindrance - The terminal hydrogen and reduced steric hindrance make aldehydes more susceptible to nucleophilic attack.

4. B) Tollens' reagent - Tollens' reagent (Ag-NH) gives a silver mirror with aldehydes.

5. Ethanol is a primary alcohol Oxidation converts R-CHOH R-CHO Product: acetaldehyde CHCHO The carbonyl group is at the terminal carbon

6. Acetone is a ketone: RC=O Ketones come from secondary alcohols The precursor is 2-propanol (CH)CHOH Carbonyl is between two methyl groups

7. HCN adds to the C=O: nucleophile attacks C Intermediately forms C-H and C-N bonds Product: CHCH(OH)CN (cyanohydrin) Cyanohydrins are stable -hydroxy nitriles

8. A C=O double bond - highly polar and reactive, found in aldehydes and ketones.

9. Aldehydes: R-CHO (end of chain). Ketones: RC=O (between two carbons).

10. Primary alcohols (R-CHOH) oxidize to aldehydes (R-CHO).