

CHEMISTRY

CLASS XII

COMPETENCY BASED EXAM – DECEMBER 2025

Alcohols, Phenols & Ethers

Q1. The major product formed when ethanol reacts with concentrated H_2SO_4 at 443 K is:

- A. Ethyl hydrogen sulfate
- B. Ethene
- C. Diethyl ether
- D. Acetaldehyde

Answer: B. Ethene

Reasoning: At higher temperature, dehydration dominates \rightarrow ethene formed.

Q2. Phenol reacts with bromine water to give:

- A. 2-bromophenol
- B. 4-bromophenol
- C. 2,4,6-tribromophenol
- D. Bromobenzene

Answer: C. 2,4,6-tribromophenol

Reasoning: $-\text{OH}$ group activates ortho and para positions strongly \rightarrow tribromination.

Q3. Assertion–Reason

Assertion (A): Ethers are less reactive than alcohols.

Reason (R): Ethers lack $-\text{OH}$ group and cannot form hydrogen bonds easily.

- A. Both A and R are true, and R is the correct explanation of A
- B. Both A and R are true, but R is not the correct explanation of A
- C. A is true, R is false
- D. A is false, R is true

Answer: A

Q4. The Lucas test is used to distinguish between:

- A. Primary, secondary, and tertiary alcohols
- B. Aldehydes and ketones
- C. Phenols and ethers
- D. Carboxylic acids and esters

Answer: A

Reasoning: Tertiary alcohols react immediately, secondary slowly, primary very slowly.

Q5. Williamson synthesis is used for preparation of:

- A. Alcohols
- B. Phenols
- C. Ethers
- D. Aldehydes

Answer: C. Ethers

Reasoning: Alkoxide ion reacts with alkyl halide \rightarrow ether.

Aldehydes & Ketones

Q6. The product formed when acetaldehyde reacts with Tollen's reagent is:

- A. Acetic acid
- B. Silver mirror + acetic acid
- C. Ethanol
- D. Methanol

Answer: B

Reasoning: Aldehydes reduce Ag^+ to metallic silver \rightarrow silver mirror test.

Q7. Which of the following compounds gives positive iodoform test?

- A. Methanol
- B. Ethanol
- C. Acetone
- D. Both B and C

Answer: D. Both B and C

Reasoning: Compounds with $-\text{COCH}_3$ or $\text{CH}_3\text{CH}(\text{OH})-$ group give iodoform test.

Q8. Assertion-Reason

Assertion (A): Ketones are less reactive than aldehydes towards nucleophilic addition.

Reason (R): Aldehydes have less steric hindrance and greater positive charge on carbonyl carbon.

- A. Both A and R are true, and R is the correct explanation of A
- B. Both A and R are true, but R is not the correct explanation of A
- C. A is true, R is false
- D. A is false, R is true

Answer: A

Carboxylic Acids

Q9. The acidity of carboxylic acids is due to:

- A. Resonance stabilization of carboxylate ion
- B. Presence of carbonyl group
- C. Presence of hydroxyl group
- D. Hydrogen bonding

Answer: A

Reasoning: Carboxylate ion is resonance stabilized → strong acidity.

Q10. Assertion-Reason

Assertion (A): Benzoic acid is stronger than acetic acid.

Reason (R): $-\text{COOH}$ group in benzoic acid is stabilized by resonance with benzene ring.

- A. Both A and R are true, and R is the correct explanation of A
- B. Both A and R are true, but R is not the correct explanation of A
- C. A is true, R is false
- D. A is false, R is true

Answer: A

Would you like me to **expand this into a 20-question practice paper** with numericals (like pKa comparisons, mechanism-based traps, and synthetic applications), so it mirrors a full exam set?