

Aldehydes, Ketones and Carboxylic Acids

Assertion & Reason Type Questions

consists of two statements, one is Assertion (A) and the other is Reason (R). Give answer:

- a. Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
- b. Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
- c. Assertion (A) is true but Reason (R) is false.
- d. Assertion (A) is false but Reason (R) is true.

Q 1. Assertion (A): Benzoic acid is a weaker acid than formic acid.

Reason (R): Phenyl group destabilises the carboxylate anion due to conjugation.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q 2. Assertion (A): Acetic acid does not undergo haloform reaction.

Reason (R): Acetic acid has no α -hydrogen atom.

Answer : (c) Acetic acid behaves as an acid in the presence of OH^- ions and does not create CHX_3 , haloform. So, it does not undergo the haloform reaction. Hence, the assertion is true, but reason is false because the acetic acid has three α hydrogens.

Q 3. Assertion (A): Formic acid and acetic acid can be distinguished by Tollen's reagent.

Reason (R): Formic acid is a stronger acid than acetic acid.

Answer : (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

Q 4. Assertion (A): Strong oxidising agents oxidise toluene and its derivatives to benzoic acids.

Reason (R): It is possible to stop the oxidation of toluene at the aldehyde stage with suitable reagents.

Answer : (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).

Q 5. Assertion (A): Nitration of benzoic acid gives meta nitrobenzoic acid.

Reason (R): Carboxyl group deactivates the ortho and para positions in the ring.

Answer : (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q 6. Assertion (A): Carboxylic acids do not give characteristic reactions of carbonyl group.

Reason (R): The carbonyl group is sterically hindered in carboxylic acid.

Answer : (c) Assertion (A) is true due to the lone pairs on oxygen atom attached to hydrogen atom in the -COOH group that are involved in resonance and hence making the carbon atom less electrophilic. So, carboxylic acids do not give characteristic reactions of carbonyl group. Reason (R) is false because the carbonyl group in carboxylic acid has both single and double bond characters due to resonance.

Q7. Assertion : The boiling points of aldehydes and ketones are higher than hydrocarbons and ethers of comparable molecular masses.

Reason : There is a weak molecular association in aldehydes and ketones arising out of the dipole-dipole interactions.

Q8. Assertion : Formaldehyde is a planar molecule.

Reason : It contains sp^2 hybridised carbon atom.

Q9. Assertion : Compounds containing -CHO group are easily oxidised to corresponding carboxylic acids.

Reason : Carboxylic acids can be reduced to alcohols by treatment with $LiAlH_4$

ANSWER KEY 7 to 9

Q7 : (a)

Q8 : (a)

Q9 : (b)