Hydrocarbons

Assertion Reason Questions

a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choice.

(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 but (R) is false.
(d) (A) is false but (R) is true.

1. Assertion (A): Among isomeric pentanes, 2,2-dimethyl propane has the lowest boiling point.
Reason (R): Branching does not affect the boiling point.

Ans. (c) (A) is true but (R) is false.
Explanation: 2, 2-dimethylpropane has

the lowest boiling point because branching affects the boiling point. As the branching increases, the boiling point decreases simultaneously. So, Assertion is true but Reason is false.

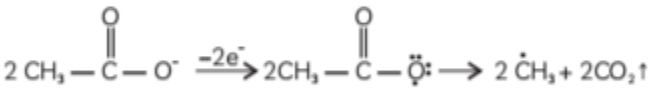
2. Assertion (A): Sodium acetate on Kolbe's electrolysis give methane.
Reason (R): Methyl free radical is formed at the anode.

Ans. (d) (A) is false but (R) is true.
Explanation: Sodium acetate on Kolbe electrolysis gives ethane. It is formed at the anode.

Kolbe electrolysis reaction:

$$2CH_3COO^-Na^+ + 2H_2O \xrightarrow{\Delta} CH_3CH_3 + 2CO_2 + H_2 + 2NaOH$$

At anode:



$$\dot{C}H_3 + \dot{C}H_3 \longrightarrow CH_3 - CH_3\uparrow$$

3. Assertion (R): The IUPAC name of CH_3CH
=CH-C CH is pent-3-en-
1-yne and not pent-2-en-4- yne.
Reason (R): While deciding the locants of double and triple bonds, the lowest sum rule is always followed.

Ans. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: Lowest sum rule is always followed, if both double and triple bonds are on same position then preference is given to the triple bond.

5 4 3 2 1
$CH_3CH = CH - C \equiv CH$ (Lowest sum 1+3 =4)
pent-3-en-1-yne (correct)
1 2 3 4 5
$CH_3CH = CH - C \equiv CH$ (Sum 2+4 =6)
pent-2-en-4-yne (incorrect)

4. Assertion (A): Propene reacts with HBr in presence of benzyol peroxide to yield 1-bromopropane.
Reason (R): In presence of peroxide, the addition of HBr to propene follows ionic mechanism.

Ans. (c) (A) is true but (R) is false.
Explanation: Propene reacts with HBr in presence of benzoyl peroxide to give 1-bromopropane. In presence of peroxide, the addition of HBr to propane occurs by a free radical mechanism.

5. Assertion (A): The compound cyclooctane has the following structural formula:

It is cyclic and has a conjugated 8π-electron system but it is not an aromatic compound.
Reason (R): (4n+2) electron rule does not hold good and ring is not planar.

Ans. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: Aromaticity is demonstrated by compounds with the following properties: planarity, complete delocalization of the electrons in the ring, and the presence of (4n+2)π electrons in the ring, where n is an integer (n= 0, 1, 2...). This is known as the Hückel rule. The given compound is antiaromatic, according to Huckel's rule.

6. Assertion (A): Pyrrole is an aromatic hetero- cyclic organic compound.
Reason (R): It has 6 electrons that are cyclic and delocalised.

Ans. (a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: Pyrrole is a five-membered ring heterocyclic compound. It contains 6π