QB365 Question Paper Software
12th Standard - Chemistry
Haloalkanes and Haloarenes Assertion and reason

Exam Time: 00:20 Hrs | Date: 2025-10-01
Total Marks: 10

Questions:

1. In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Boiling points of chlorides, bromides and iodides are considered to be higher than hydrocarbons.
Reason (R) Due to greater polarity and higher molecular mass, the intermolecular forces of attraction are weaker in halogen derivative as compared to hydrocarbon.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct, (R) is incorrect.
(d) (A) is incorrect, (R) is correct.

2. In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) It is necessary to avoid traces of moisture from Grignard reagent.
Reason (R) Grignard reagent reacts with water and forms hydrocarbon.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

3. In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Nitration of chlorobenzene leads to the formation of ortho and para nitrochloro benzene.
Reason (R) -NO_2 group is a o,p-directing group.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

4. **Assertion:** n-Butyl bromide has higher boiling point than isobutyl bromide.
Reason: The branching of the chain makes the molecule more compact and therefore decreases the surface area.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

5. **Assertion :** Nucleophilic substitution reaction on an optically active alkyl halide gives a mixture of enantiomers.
Reason: The reaction occurs by S_N2 mechanism.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

6. **Assertion:** $S_N1$mechanism is facilitated by polar protic solvents like water, alcohol, etc.
Reason: $C_6H_5CH(C_6H_5)$ Br is less reactive than$C_6H_5CH(CH_3)$Br in S_N1 reactions.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

7. **Assertion:** 2-Chloro-3-methylbutane on treatment with alcoholic potash gives 2-methylbut-2-ene as major product.
Reason: The reaction occurs according to Saytzeff rule.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

8. In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.
Assertion: KCN reacts with methyl chloride to give methyl isocyanide.
Reason: CN^- is an ambident nucleophile.
Codes:
(a) Assertion and reason both are correct and reason is correct explanation of assertion.
(b) Assertion and reason both are wrong statements.
(c) Assertion is correct but reason is wrong statement.
(d) Assertion is wrong but reason is correct statement.
(e) Assertion and reason both are correct statements but reason is not correct explanation of assertion.

9. In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.
Assertion: In monohaloarenes, further electrophilic substitution occurs at ortho and para positions.
Reason: Halogen atom is a ring deactivator.

Codes:

(a) Assertion and reason both are correct and reason is correct explanation of assertion.

(b) Assertion and reason both are wrong statements.

(c) Assertion is correct but reason is wrong statement.

(d) Assertion is wrong but reason is correct statement.

(e) Assertion and reason both are correct statements but reason is not correct explanation of assertion.

10. In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

Assertion: It is difficult to replace chlorine by -OH in chlorobenzene in comparison to that in chloroethane.

Reason: Chlorine-carbon (C-Cl) bond in chlorobenzene has a partial double bond character due to resonance.

Codes:

(a) Assertion and reason both are correct and reason is correct explanation of assertion.

(b) Assertion and reason both are wrong statements.

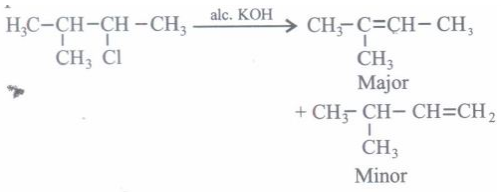
(c) Assertion is correct but reason is wrong statement.

(d) Assertion is wrong but reason is correct statement.

(e) Assertion and reason both are correct statements but reason is no! correct explanation of assertion.

Answers Key:

1. (c) (A) is correct but (R) is incorrect. Due to greater polarity as well as higher molecular mass as compared to the parent hydrocarbon, the intermolecular forces of attraction (dipole-dipole and van der Waals) are stronger in the halogen derivatives that is why the boiling points of chlorides, bromides and iodides are considerably higher than those of the hydrocarbons of comparable molecular mass.
2. (a) It is necessary to avoid traces of moisture from Grignard reagent, because it reacts with water to give hydrocarbon.
   $RMgX + H_2O \longrightarrow RH + Mg(OH)X$
   Both (A) and (R) are correct and (R) is correct explanation of (A).
3. (c) (A) is correct but (R) is incorrect. Presence of - Cl in chlorobenzene activates the ring at ortho and, para-positions and therefore, nitration of chlorobenzene leads to the formation of o- and p-chloro nitro chlorobenzene. NO_2 group is a meta-directing group.
4. **(a):** Branching of chain makes molecule more compact and therefore, decreases the surface area. Due to decreases in surface area, the magnitude of van der Waals' force of attraction decreases and consequently, the boiling points of branched chain are less than those of straight chain compounds.
5. **(c):** In case of optically active alkyl halides, S_N1 reactions are accompanied by racemisation. The carbocation formed is sp^2 hybridised and planar. The attack of the nucleophile may be accomplished from either side resulting in a mixture of products with opposite configuration i.e., racemic mixture.
6. **(c):** Carbocation intermediate obtained from $C_6H_5CH(C_6H_5)$ Br is more stable than that obtained from $C_6H_5CH(CH_3)Br$ because it is stabilized by two phenyl groups due to resonance. Therefore, the former bromide is reactive than the latter in S_N1 reactions.
7. **(a):** 2-Chloro-3-methylbutane on treatment with alcoholic potash gives 2-methylbut-2-ene as main product.



Elimination occurs according to Saytzeff rule, "the major product is one which involves elimination of H from less hydrogenated carbon".

8. (d) Assertion is wrong but reason is correct statement. AgCN reacts with CH_3Cl to give isocyanide, KCN gives cyanide. CN^- is ambident nucleophile,
9. (e) Assertion and reason both are correct statements but reason is not correct explanation of assertion.
10. (a) Assertion and reason both are correct and reason is correct explanation of assertion.