# Haloalkanes and Haloarenes

1. **Assertion (A):** In the electrophilic substitution of aryl halides, the incoming electrophile gets attached to the meta position.

   **Reason (R):** Aryl halides are moderately deactivating.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

2. **Assertion (A):** Phosphorus chlorides (tri and penta) are preferred over thionyl chloride for the preparation of alkyl chlorides from alcohols.

   **Reason (R):** Phosphorus chlorides give pure alkyl halides.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

3. **Assertion (A):** The boiling points of alkyl halides decrease in the order:

   RI > RBr > RCl > RF

   **Reason (R):** The boiling points of alkyl chlorides. Bromides and iodides are considerably higher than that of the hydrocarbon of comparable molecular mass.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

4. **Assertion (A):–** KCN reacts with methyl chloride to give methyl isocyanide

   **Reason (R):–** $CN^-$ is an ambident nucleophile.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

5. **Assertion (A):** Presence of a nitro group at ortho or para position increases the reactivity of haloarenes towards nucleophilic substitution.

   **Reason (R):** Nitro group, being an electron withdrawing group decreases the electron density over the benzene ring.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

6. **Assertion (A):** In monohaloarenes, further electrophilic substitution occurs at ortho and para positions.

   **Reason (R):** Halogen atom is a ring deactivator.

   (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

   (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

   (3) (A) is true but (R) is false

   (4) Both (A) and (R) are false

7. **Assertion (A):** Aryl iodides can be prepared by reaction of arenes with iodine in the presence of an oxidizing agent.

**Reason (R):** Oxidising agent oxidises $I_2$ into HI.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

8. **Assertion (A):** It is difficult to replace chlorine by –OH in chlorobenzene in comparison to that in chloroethane.

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

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

9. **Assertion (A):** Hydrolysis of (–)-2-bromooctane proceeds with inversion of configuration.

**Reason (R):** This reaction proceeds through the formation of a carbocation.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

10. **Assertion (A):** Nitration of chlorobenzene leads to the formation of m-nitrochlorobenzene

**Reason (R):** $-NO_2$ group is a m-directing group.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

11. **Assertion (A):** Rate of hydrolysis of methyl chloride to methanol is higher in DMF than in water

**Reason (R):** Hydrolysis of methyl chloride follows second order kinetics.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

12. **Assertion (A):** The presence of nitro group facilitates nucleophilic substitution reactions in aryl halides.

**Reason (R):** The intermediate carbanion is stabilised due to the presence of nitro group.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

13. **Assertion (A):** Alkyl iodide can be prepared by treating alkyl chloride/bromide with Nal in acetone.

**Reason (R):** NaCl/NaBr are soluble in acetone while Nal is not

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

14. **Assertion (A):** Rate of reaction of alkyl halide in Williamson's synthesis reaction is 1°RX > 2°RX > 3°RX

**Reason (R):** It is a type of bimolecular substitution reaction ($S_N2$).

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

15. **Assertion (A):** Peroxide effect is shown by H – X (where X = F, Cl, Br, I).

**Reason (R):** HCl bond dissociation energy is low and that of H – I is high.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

16. **Assertion (A):** Aryl halides and vinyl halides are less reactive than alkyl halides and are not easily hydrolysed.

**Reason (R):** Cleavage bond in aryl halides acquire double bond character due to resonance which makes its cleavage difficult.

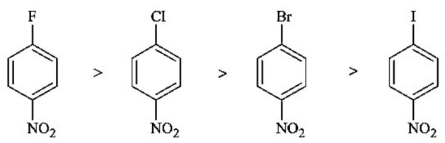
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

17. **Assertion (A):** The order of reactivity of the following compounds, towards nucleophilie substitution reaction




**Reason (R):** Higher the electro negativity of the atom greater will be the stability of the intermediate formed by the attack of the nucleophile at the rate determining step.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

18. **Assertion (A):** Reaction of 3° R—X with an alkoxide ion at elevated temperature results in elimination exclusively.

**Reason (R):** $S_N2$ attack of alkoxide ion on 1° R – X results in formation of ether.

(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)

(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)

(3) (A) is true but (R) is false

(4) Both (A) and (R) are false

| ANSWER KEY | | | | | | | | | | | | | | | | | |
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| **Que.** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **17** | **18** |
| **Ans.** | 4 | 4 | 2 | 4 | 1 | 2 | 3 | 1 | 3 | 4 | 1 | 1 | 3 | 1 | 4 | 1 | 1 | 2 |