Haloalkanes and Haloarenes

(Assignment - 3)

1. Write the difference between

   (i) enantiomers and diastereomers

   (ii) retention and inversion of configuration.

   (iii) electrophilic and nucleophilic substitution reactions.

2. Give a chemical test to distinguish between the following pairs of compounds:

   (i) Chlorobenzene and cyclohexylchloride.

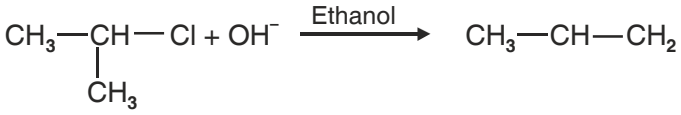
   (ii) Vinyl chloride and Ethyl chloride.

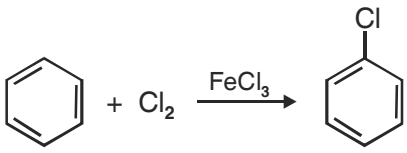
   (iii) *n*-Propyl bromide and Isopropyl bromide.

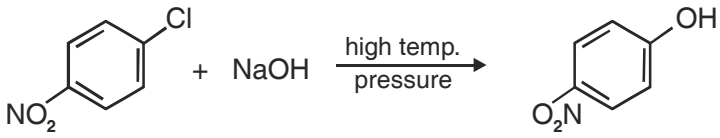
3. Give mechanism of the following reactions :

(i) $(CH_3)_3C - Cl + OH^- \longrightarrow (CH_3)_3\ C - OH$

(ii) $CH_3 - Cl + OH^- \longrightarrow CH_3 - OH$

(iii) 

(iv) 

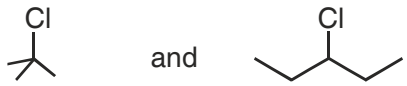
(v) 

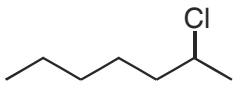
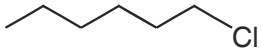
4. Which compound in each of the following pairs will react faster in S_N2 reaction with OH^- and why?

   (i) CH_3Br or CH_3I

   (ii) $(CH_3)_3\ CCl$ or CH_3Cl

5. In the following pairs which halogen compound undergoes faster S_N1 reaction?

(i)  and

(ii)  and 

(iii) $(CH_3)_3C - Cl$ and $C_6H_5CH_2Cl$

(iv) $C_6H_5CH_2Cl$ and $C_6H_5C(Cl)C_6H_5$

(v) $CH_2 = CH - Cl$ and $CH_2 = CH - CH_2Cl$

6. Give reasons for the following :

(i) The bond length of C–Cl bond is larger in haloalkanes than that in haloarenes.

(ii) Although alkyl halides are polar in nature but are not soluble in water.

(iii) *t*-Butyl bromide has lower boiling point than *n*-butyl bromide.

(iv) Haloalkanes react with KCN to form alkyl cyanide as main product while with AgCN alkylisocyanide is the main product.

(v) Sulphuric acid is not used in the reaction of alcohol with KI.

(vi) Thionyl chloride is the preferred reagent for converting ethanol to chloroethane.

(vii) Haloalkanes undergo nucleophilic substitution reaction easily but haloarenes do not undergo nucleophilic substitution under ordinary conditions.

(viii) Chlorobenzene on reaction with fuming sulphuric acid gives ortho and para chlorosulphonic acids.

(ix) 2, 4-Dinitro chlorobenzene is much more reactive than chlorobenzene towards hydrolysis reaction with NaOH.

(x) Grignard reagent should be prepared under anhydrous conditions.