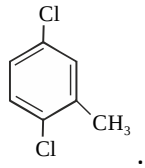
Chapter 10

Haloalkane And Haloarenes

Very Short Answer Type Questions

01. What happens when CH_3Br is treated with KCN?

02. Write the IUPAC name of 

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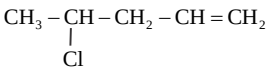
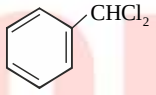
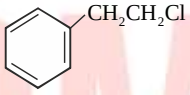
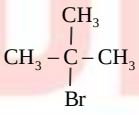
03. Give IUPAC name of. 

04. Out of 

and 

, which is an example of benzylic halide?

05. Which would undergo S_N1 reaction faster in the following pair and why?

CH_3-CH_2-Br and 

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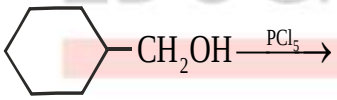
06. How do you convert the following? (i) Prop - 1- ene to 1-Fluro propane.

07. Draw the structure of the following compound



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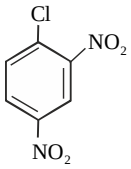
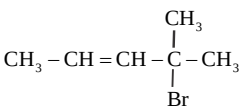
08. Write the IUPAC name of the following compound:



09. What happens when ethyl chloride is treated with aqueous KOH?

10. Write the IUPAC name of the following compound



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Short Answer Type Questions

11. Chlorobenzene is extremely less reactive towards a nucleophilic substitution reaction gives two reasons for the same.

12. (a) Which alkyl halide from the following pairs would you expect to react more rapidly by a SN^2 mechanism and why?

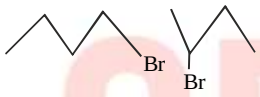
(a) $CH_3-CH_2-\underset{\underset{Br}{|}}{CH}-CH_3$, $CH_3-CH_2-CH_2-CH_2-Br$.

(b) Racemisation occurs in SN^1 reactions. Why?

13. How do you convert the following :

(i) Chlorobenzene to 2-chlorotoluene. (ii) Ethanol to propane nitrile.

14. (i) Which alkyl halide from the following pair is chiral and undergoes faster SN^2 reactions.



(ii) Out of SN^2 & SN^1 which reaction occurs with

(a) Inversion of configuration (b) Racemisation

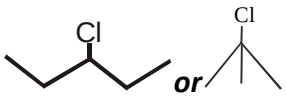
15. Account for the following :

(i) The C-Cl bond length in chlorobenzene is shorter than in CH_3-Cl .

(ii) Chloroform is stored in closed dark-colored bottles.

16. (i) Write the chemical equation when chlorobenzene is treated within the presence of anhydrous $AlCl_3$.

(ii) Which one of the following two substances undergoes S_{N^1} reaction faster and why?



17. Explain why (i) the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride.

(ii) Haloalkanes are only slightly soluble in water but dissolve easily in organic solvents.

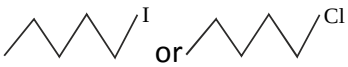
18. Answer the following questions :

(i) What is meant by the chirality of a compound ? Give an example.

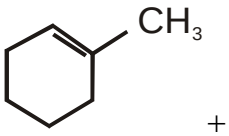
(ii) Which one of the following compounds is more easily hydrolyzed by KOH & Why?

$CH_3CH(Cl)CH_2CH_3$ or $CH_3CH_2CH_2Cl$

(iii) Which one undergoes S_N2 substitution Reaction and Why?



19. Complete the following reaction equations:

(i)  $+ HI \rightarrow$ (ii) $CH_3CH_2CH = CH_2 + HBr \rightarrow$

20. Give reactions.

(i) n-Butyl bromide has a higher boiling point than tert-butyl bromide.

(ii) A racemic mixture is optically inactive.

(iii) The presence of $-NO_2$ group at O/P positions increases the reactivity of haloarenes towards nucleophilic substitution reaction.

Long Answer Type Questions

21. Write the main products when:

(i) n-butyl chloride is treated with alcoholic KOH.

(ii) 2,4,6-trinitro chlorobenzene is subjected to hydrolysis.

(iii) Methyl chloride is treated with AgCN.

22. (a) Write the mechanism of the following reaction

$$nBuBr + KCN \xrightarrow{EtOH-H_2O} n-Bu-CN + KBr$$

23. (i) Out of chlorobenzene and benzyl chloride, which one gets easily hydrolyzed by aqueous NaOH and Why.

(ii) Write the structure of the product when chlorobenzene is treated with methyl chloride in the presence of sodium metal and dry ether.

(iii) Write the structure of the alkene formed by dehydrohalogenation of 1-Bromo-1-methylcyclohexane with alcoholic KOH.

24. Rearrange the compounds of each of the following sets in order of reactivity towards S_{N^2} displacement:

(i) 2-Bromo-2-methylbutane, 1-Bromopentane, 2-Bromopentane

(ii) 1-Bromo-3-methylbutane, 2-Bromo-2-methylbutane, 3-Bromo-2-methylbutane

(iii) 1-Bromobutane, 1-Bromo-2, 2-dimethylpropane, 1-Boromo-2-methylbutane.

25. Answer the following:

(i) Haloalkanes easily dissolve in organic solvents, why?

(ii) What is known as a racemic mixture? Give an example.

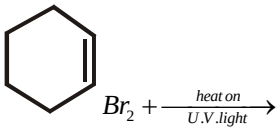
(iii) Of the two bromoderivatives, $C_6H_5CH(CH_3)$ Br and $C_6H_6CH(C_6H_5)Br$, which one is more reactive in S_{N^1} substitution reaction and why?

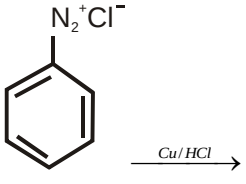
26. How will you bring about the following conversion?

(i) Ethanol to but - 1 - gne (ii) But - 1 - ene to but - 2 - ene (iii) Toluene to benzyl alcohol.

27. Answer the following questions:

(i) What is meant by the chirality of a compound? Give an example.

(ii) 

(iii) 

28. Although chlorine is an electron-withdrawing group, yet it is ortho-, para- directing in electrophilic aromatic substitution reactions. Explain why it is so?

29. Explain as to why

(i) Alkyl halides, though polar, are immiscible with water.

(ii) Grignard's reagents should be prepared under anhydrous conditions.

30. The following compounds are given to you 2-Bromopentane, 2-Bromo-2-methylbutane, 1-Bromopentane.

(i) Write the compound which is most reactive towards SN^2 reaction.

(ii) Write the optically active compound.

(iii) Write the compound which is most reactive towards β-elimination reaction.