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CBSE 12th Chemistry
Chapter- 10 (Haloalkanes and Haloarenes)
Solved Important Questions

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SECTION A

(Each question in this section carry 1 mark)

Q.1. Write a chemical reaction in which the iodide ion replaces the diazonium group in a diazonium salt.

Q.2. Write the IUPAC name of the following compound:

CH_3CH CH CH_3
| |
Cl   Br

Q3. Write the IUPAC name of the following compound:
$(CH_3)_3CCH_2Br$

Q.4. Write the IUPAC name of the following compound.

$CH_2 = C - CH_2Br$
|
CH_3

Q.5. What happens when $CH_3 - Br$ is treated with KCN?

Q.6. Which would undergo S_N2 reaction faster in the following pair and why?

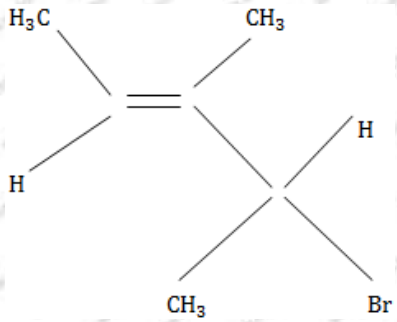
CH_3
|
$CH_3 - CH_2 - Br$ and $CH_3 - C - CH_3$
|
Br

Q.7. Write the structure of 1-Bromo-4-chlorobut-2-ene.

Q.8. Write the IUPAC name of the following compound:

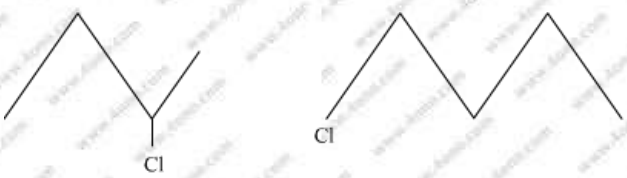
$$CH_3 - O - CH_2 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - CH_3$$

Q.9. Give the IUPAC name of the following compound:

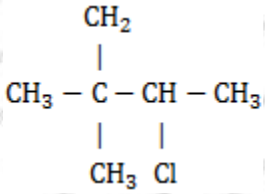


Q.10. Write the IUPAC name of the following compound:
$CH_2 = CHCH_2Br$

Q.11. Identify the chiral molecule in the following pair:



Q.12. Write the IUPAC name of the following compound.



Q.13. Write the IUPAC name of the following compound:
$CH_2 = CHCH_2Br$

Q.14. Which would undergo S_N1 reaction faster in the following pair:

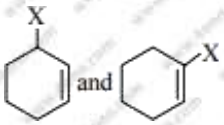
$$CH_3 - CH_2 - CH_2 - Br \text{ and } CH_3 - \underset{\underset{Br}{|}}{CH} - CH_3$$

Q.15. Write the structure of an isomer of compound C_4H_9Br which is most reactive towards S_N1 reaction.

Q.16. Explain "Friedel Craft's reaction" with one example.

Q.17. Out of $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - Cl$ **and** $CH_3 - CH_2 - \underset{\underset{CH_3}{|}}{CH} - Cl$ **,**

Which is more reactive towards S_N1 Reaction and why?

Q.18. Out of the  **which is an example of allylic halide?**

Q.19. Write the IUPAC name of the following compound:

$$CH_3\underset{\underset{Cl}{|}}{CH}\ \ \underset{\underset{Br}{|}}{CH}\ CH_3$$

SECTION B

(Each question in this section carry 2 marks)

Q.20. Give reasons for the following:

(i) Ethyl iodide undergoes S_N2 reaction faster than ethyl bromide.

(ii) $(\pm)$2-Butanol is optically inactive.

(iii) C-X bond length in halobenzene is smaller than C-X bond length in $CH_3 - X$.

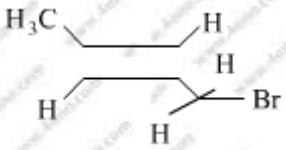
Q.21. Explain as to why haloarenes are much less reactive than halo-alkanes towards nucleophilic substitution reactions.

Q.22. Which compound in each of the following pairs will react faster in S_N2 reactions with - OH? Why?

(i) CH_3Br or CH_3I

(ii) $(CH_3)_3CCl$ or CH_3Cl

Q.23. (a) State the IUPAC name of the following compound:

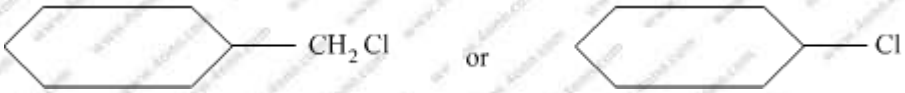


(b) Complete the following chemical equation:

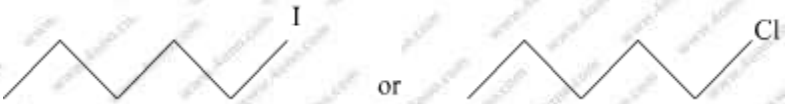
$$CH_3CH_2CH = CH_2 + HBr \xrightarrow{\text{peroxide}} \ldots\ldots$$

Q.24. Which ones in the following pairs of substances undergoes S_N2 substitution reaction faster and why?

(i)



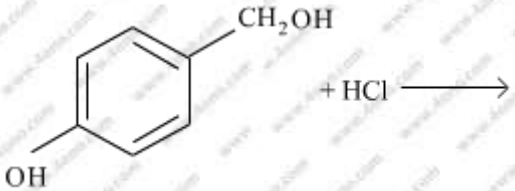
(ii)



Q.25. Complete the following reactions equations:

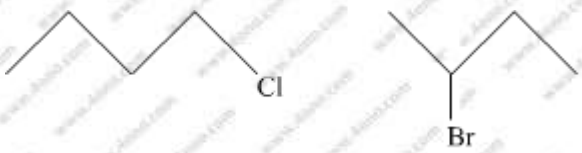
(i)

(ii)



Q.26. Chlorobenzene is extremely less reactive towards a nucleophilic substitution reaction. Give two reasons for the same.

Q.27. (i) Which alkyl halide from the following pair is chiral and undergoes faster S_N2 reaction?

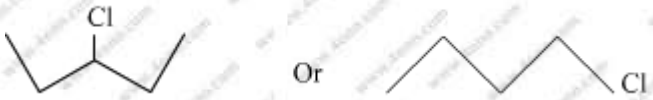


(ii) Out of S_N1 and S_N2 which reaction occurs with

(a) Inversion of configuration
(b) Racemization

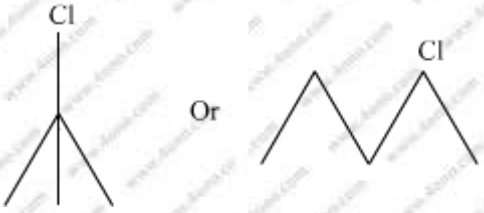
Q.28. (i) Why are halo alkanes more reactive towards nucleophilic substitution reactions than haloarenes?

(ii) Which one of the following two substances undergoes S_N1 reaction faster and why?

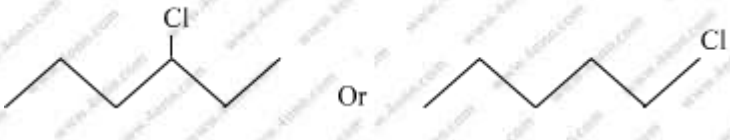


Q.29. Which one in the following pairs undergoes S_N1 Substitution reaction faster and why?

(i)



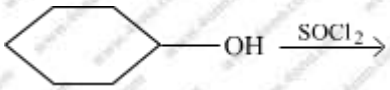
(ii)



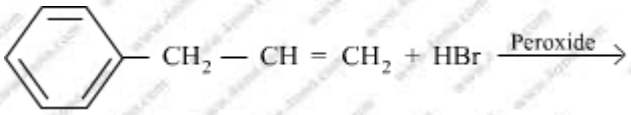
Q.30. Differentiate between S_N1 and S_N2 mechanisms and Give examples.

Q.31. Draw the structure of major monohalo product in each of the following reactions:

(i)



(ii)



Q.32. Complete the following reaction equations:

(i) $C_6H_5N_2Cl + H_3PO_2 + H_2O \longrightarrow$

(ii) $C_6H_5NH_2 + Br_2(aq.) \longrightarrow$

SECTION C

(Each question in this section carry 3 marks)

Q.33. Give reasons:

(a) n-Butylbromide has higher boiling point than t-butyl bromide.

(b) Racemic mixture is optically inactive.

(c) The presence of nitro group ($-NO_2$) at o/p positions increases increases the reactivity of haloarenes towards nucleophilic substitution reactions.

Q.34. Answer the following:

(i) Halo alkanes 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 $C_6H_5CH(C_6H_5)Br$, which one is more reactive in S_{n^1} substitution reaction and why?

Q.35. Although chlorine is an electron withdrawing group, yet it is ortho-, para-directing in electrophilic aromatic substitution reactions. Explain why it is so?

Q.36. Give reasons:

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

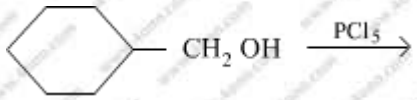
(ii) The dipole moment of chlorobenzene is lower than that of cyclohexyl chloride.

(iii) S_N1 reactions are accompanied by racemization in optically active alkyl halides.

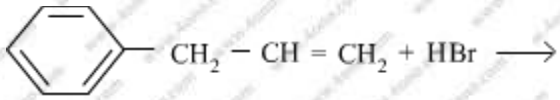
Q.37. Following compounds are given to you:
2-Bromopentane, 2-Bromo-2-methylbutane, 1-Bromopentane
(i) Write the compound which is most reactive towards S_N2 reaction.
(ii) Write the compound which is optically active.
(iii) Write the compound which is most reactive towards β-elimination reaction.

Q.38. (a) Draw the structures of major monohalo products in each of following reactions:

(i)



(ii)



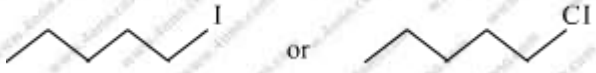
(b) Which halogen compound in each of the following pairs will react faster in S_N2 reaction:

(i) CH_3Br **or** CH_3I. $(ii)(CH_3)_3C-Cl$ **or** CH_3-Cl.

Q.39. Give reasons for the following:
(i) Ethyl iodide undergoes S_N2 reaction faster than ethyl bromide.
(ii) $(\pm)$2-Butanol is optically inactive.
(iii) C-X bond length in halobenzene is smaller than C-X bond length in CH_3-X.

Q.40. Answer the following questions:
(i) What is meant by chirality of a compound? Give an example.
(ii) Which one of the following compounds is more easily hydrolyzed by KOH and why?
$CH_3CHClCH_2CH_3$ or $CH_3CH_2CH_2Cl$

(iii) Which one undergoes SN2 substitution reaction faster and why?



Q.41. How can the following conversions be carried out:

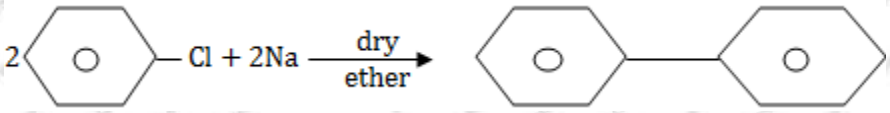
(i) Aniline to bromobenzene
(ii) Chlorobenzene to 2-chloroactophenone
(iii) Chloroethane to butane

Q.42. What happen when?

(i) Chlorobenzene is treated with Cl_2 $FeCl_3$.
(ii) Ethyl chloride is treated with $AgNO_2$.
(iii) 2-bromopentane is treated with alcoholic KOH?

Write the chemical equation in support of your answer.

Q.43. How do you convert:
(i) Chlorobenzene to biphenyl
(ii) Propene to 1-iodopropane
(iii) 2-bromobutane to but-2-ene



Q.44. Write the major product (s) in the following:
(i)

$$2CH_3 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_3 \xrightarrow[\text{dry ether}]{Na}$$

(ii)

$$CH_3 - CH_2 - Br \xrightarrow{AgCN}$$

Q.45. The following compounds are given to you:
2-Bromopentane, 2-Bromo-2-methylbutane, 1-Bromopentane

(a) Write the compound which is most reactive towards SN_2 reaction.
(b) Write the compound which is optically active.
(c) Write the compound which is most reactive towards β-elimination reaction.

Q.46. (i) State one use each of DDT and iodoform.
(ii) Which compound in the following couples will react faster in $S_N{}^2$ displacement and why?

(a) 1-Bromopentane or 2-bromopentane
(b) 1-Bromo-2-methylbutane or 2-bromo-2-methylbutane

SECTION D

(Each question in this section carry 5 marks)

Q.47. 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-Bromo-2-methylbutane