

**Previous Years' CBSE Board Questions**

**10.2 Nomenclature**

**VSA (1 mark)**

- Draw the structure of 2-bromopentane.  
(Delhi 2014C)
- Write the IUPAC name of  

$$\begin{array}{c} \text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}=\text{CH}_2 \\ | \\ \text{Cl} \end{array}$$
 (Delhi 2013)
- Write the IUPAC name of  

$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3\text{CH}=\text{CH}-\text{C}-\text{CH}_3 \\ | \\ \text{Br} \end{array}$$
 (Delhi 2013)
- Write the IUPAC name of  
 $(\text{CH}_3)_2\text{CHCH}(\text{Cl})\text{CH}_3$ .  
(Delhi 2013)
- Write the IUPAC name of the following compound:  

$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3-\text{C}-\text{CH}-\text{CH}_3 \\ | \quad | \\ \text{CH}_3 \quad \text{Cl} \end{array}$$
 (AI 2013)
- Write the IUPAC name of the following compound:  

$$\begin{array}{c} \text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}-\text{CH}_3 \\ | \quad \quad | \\ \text{Br} \quad \quad \text{Cl} \end{array}$$
 (AI 2013)
- Write IUPAC name of the following:  

$$\begin{array}{c} \text{CH}_3-\text{C}=\text{C}-\text{CH}_2\text{OH} \\ | \quad | \\ \text{CH}_3 \quad \text{Br} \end{array}$$
 (AI 2013C, 2012C, Foreign 2011)
- Give the IUPAC name of the following compound:  

$$\begin{array}{c} \text{CH}_2=\text{C}-\text{CH}_2\text{Br} \\ | \\ \text{CH}_3 \end{array}$$
 (Delhi 2012, AI 2011)
- Write the IUPAC name of the following compound:  
 $(\text{CH}_3)_3\text{CCH}_2\text{Br}$ 
 (Delhi 2011)
- Write the IUPAC name of the following compound:  
 $\text{CH}_2=\text{CHCH}_2\text{Br}$ 
 (AI 2011)
- Write the structure of the following compound:  
 1, 4-dibromobut-2-ene  
(Delhi 2011C)
- Write the structure of the following compound:  
 2-(2-Bromophenyl)butane  
(Delhi 2011C)
- Give IUPAC name of the following organic compound:  

$$\begin{array}{c} \text{CH}_3\text{CH}=\text{C}-\text{CH}-\text{CH}_3 \\ | \quad | \\ \text{CH}_3 \quad \text{Br} \end{array}$$
 (Delhi 2011C)
- Write the structure of the following compound:  
 2-(2-chlorophenyl)-1-iodooctane  
(AI 2011C)
- Write the structure of the following compound:  
 1-bromo-4-sec-butyl-2-methylbenzene  
(AI 2011C)
- Write the structure of the compound:  
 4-tert-butyl-3-iodoheptane  
(AI 2010C)
- Write the IUPAC name of the following compound:  

$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{H}_3\text{C}-\text{C}-\text{CH}_2\text{Cl} \\ | \\ \text{CH}_3 \end{array}$$
 (AI 2010C)
- Write the structure of the compound 1-chloro-4-ethylcyclohexane.  
(AI 2010C)
- Write the IUPAC name of the following compound:  

$$\begin{array}{c} \text{CH}_3\text{CH}-\text{CH}-\text{CH}_3 \\ | \quad | \\ \text{Cl} \quad \text{Br} \end{array}$$
 (Delhi 2008)
- State the IUPAC name of the following compound:  

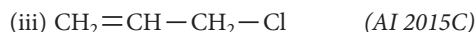
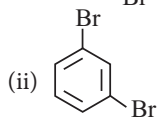
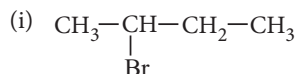
$$\begin{array}{c} \text{H}_3\text{C} \quad \quad \text{H} \\ \diagdown \quad \diagup \\ \text{H} \quad \quad \text{H} \\ \diagup \quad \diagdown \\ \text{H} \quad \quad \text{H} \end{array}$$
 (AI 2008C)
- Write the IUPAC name of  $\text{ClCH}_2\text{C}\equiv\text{CCH}_2\text{Br}$ .  
(AI 2008C)

**SAI (2 marks)**

- Write the IUPAC names of the following compounds:  
 (i)  $\text{CH}_2=\text{CHCH}_2\text{Br}$  (ii)  $(\text{CCl}_3)_3\text{CCl}$   
(AI 2014C)

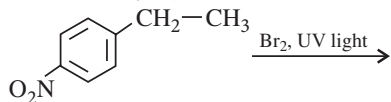
**SA II (3 marks)**

23. Give the IUPAC names of the following compounds :

**10.4 Methods of Preparation****VSA (1 mark)**

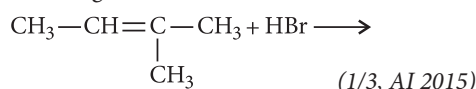
24. How do you convert:  
Propene to 1-iodopropane ? (1/3, AI 2016)

25. Write the major products in the following :



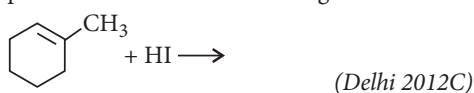
(1/3, AI 2016)

26. Write the structure of the major product in the following reaction :

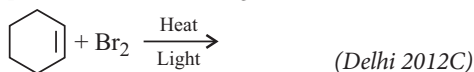


27. A hydrocarbon  $\text{C}_5\text{H}_{12}$  gives only one monochlorination product. Identify the hydrocarbon. (Delhi 2013C)

28. Draw the structure of major monohalogen product formed in the following reaction :



29. Draw the structure of major monohalogen product in the following reaction :

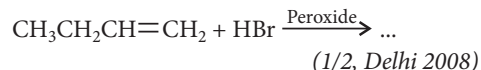


30. Draw the structure of major monohalo product in the following reaction :

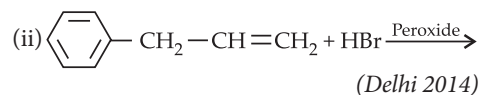
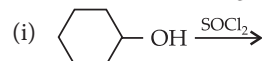


31. What happens when bromine attacks  $\text{CH}_2=\text{CH}-\text{CH}_2-\text{C}\equiv\text{CH}$ ? (AI 2012)

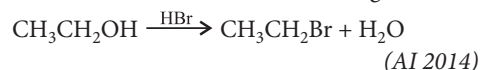
32. Complete the following chemical equation :

**SA I (2 marks)**

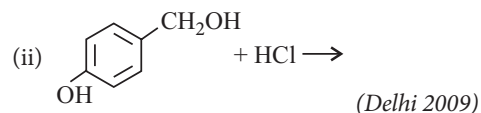
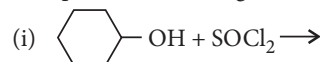
33. Draw the structure of major monohalo product in each of the following reactions :



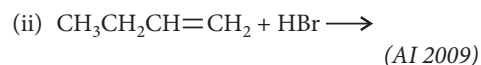
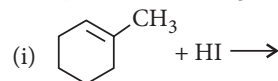
34. Write the mechanism of the following reaction :



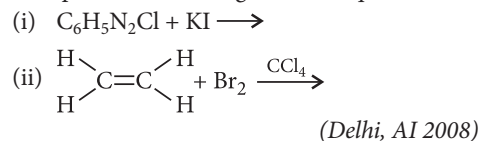
35. Complete the following reaction equations :



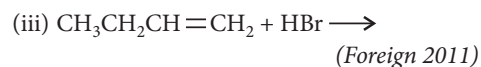
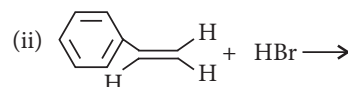
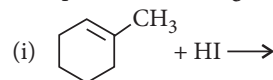
36. Complete the following reaction equations :



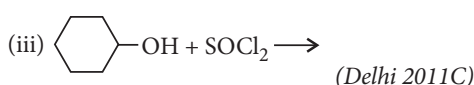
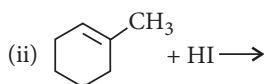
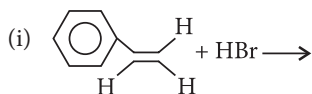
37. Complete the following reaction equation :

**SA II (3 marks)**

38. Compute the following reaction equations:



39. Complete the equation for the following reactions :



## 10.5 Physical Properties

### VSA (1 mark)

40. Give reason :  
n-Butyl bromide has higher boiling point than t-butyl bromide. (1/3, Delhi 2015)
41. Why are alkyl halides insoluble in water? (1/3, Foreign 2015)
42. Why does p-dichlorobenzene have a higher m.p. than its o- and m-isomers? (1/2, Delhi 2013, 1/3, AI 2009C)
43. Explain the following :  
Alkyl halides, though polar, are immiscible with water. (1/3, Delhi 2013C, 1/3, AI 2010C)
44. Answer the following :  
Haloalkanes easily dissolve in organic solvents, why? (1/3, Delhi 2011)
45. Out of ethyl bromide and ethyl chloride which has higher boiling point and why? (1/3, AI 2007)

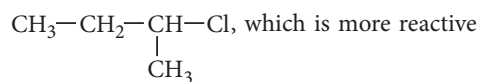
### SA I (2 marks)

46. Explain why  
(i) the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride? (1/3, Delhi 2016, 2013C, 2011 C, 1/2 Delhi, 2010C, 1/3, AI 2010C)  
(ii) alkyl halides, though polar, are immiscible with water? (2/3, AI 2013C, 2012C)

## 10.6 Chemical Reactions

### VSA (1 mark)

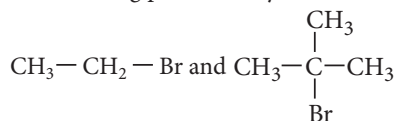
47. Out of  $\text{CH}_3-\text{CH}(\text{CH}_3)-\text{CH}_2-\text{Cl}$  and  $\text{CH}_3-\text{CH}_2-\text{CH}(\text{CH}_3)-\text{Cl}$ , which is more reactive towards S<sub>N</sub>1 reaction and why? (Delhi 2016)



towards S<sub>N</sub>1 reaction and why? (Delhi 2016)

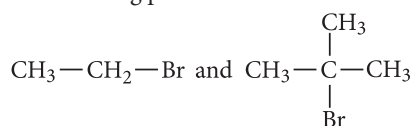
48. Write the structure of an isomer of compound C<sub>4</sub>H<sub>9</sub>Br which is most reactive towards S<sub>N</sub>1 reaction. (AI 2016)

49. Which would undergo S<sub>N</sub>2 reaction faster in the following pair and why?



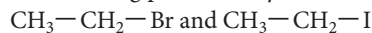
(Delhi 2015)

50. Which would undergo S<sub>N</sub>1 reaction faster in the following pair :



(AI 2015)

51. Which would undergo S<sub>N</sub>2 reaction faster in the following pair and why?



(Foreign 2015)

52. Identify the chiral molecule in the following pair:



(AI 2014)

53. Which halogen compound in each of the following pairs will react faster in S<sub>N</sub>2 reaction:

- (i) CH<sub>3</sub>Br or CH<sub>3</sub>I  
(ii) (CH<sub>3</sub>)<sub>3</sub>CCl or CH<sub>3</sub>Cl

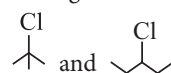
(Delhi 2014C, AI 2014)

54. What happens when CH<sub>3</sub>-Br is treated with KCN? (Delhi 2013)

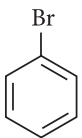
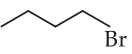
55. What happens when ethyl chloride is treated with aqueous KOH? (Delhi 2013)

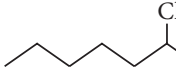
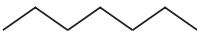
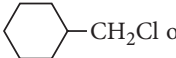
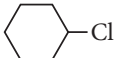
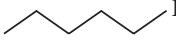
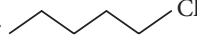
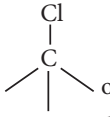
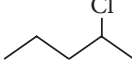
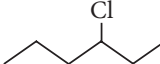
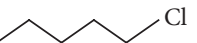
56. Why is (±)-butan-2-ol is optically inactive? (1/2, Delhi 2013)

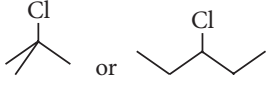
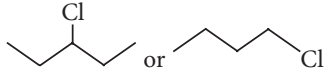
57. Which compound in the following pair undergoes faster S<sub>N</sub>1 reaction?



(Delhi 2013, 2013C, 2012C)

58. How may methyl bromide be preferentially converted to methyl isocyanide? (*Delhi 2013C*)
59. Account for the following :  
Grignard's reagents should be prepared under anhydrous conditions.  
(1/3, *Delhi 2013C*, 1/3, *AI 2012C*)
60. Predict the order of reactivity of four isomeric bromobutanes in  $S_N1$  reaction. (*Delhi 2012C*)
61. Predict the order of reactivity of the following compounds in  $S_N1$  reaction.  
 $C_6H_5CH_2Br$ ,  $C_6H_5C(CH_3)(C_6H_5)Br$ ,  
 $C_6H_5CH(C_6H_5)Br$ ,  $C_6H_5CH(CH_3)Br$   
(*Delhi 2012C*)
62. Give a chemical test of distinguish between  $C_2H_5Br$  and  $C_6H_5Br$ . (*AI 2012C*)
63. Which will react faster in  $S_N2$  displacement, 1-bromopentane or 2-bromopentane and why?  
(*Foreign 2011*)
64. Which will react faster in  $S_N1$  displacement reaction :  
1-Bromobutane or 2-bromobutane and why?  
(*Foreign 2011*)
65. A solution of KOH hydrolyses  $CH_3CHClCH_2CH_3$  and  $CH_3CH_2CH_2CH_2Cl$ . Which one of these is more easily hydrolysed?  
(*Delhi 2010*)
66. Explain the following reactions with an example:  
Friedel-Crafts reaction. (1/2, *Delhi 2010*)
67. Why is the following occur :  
Chloroform is stored in closed dark coloured bottles completely filled so that air is kept out.  
(1/2, *Delhi 2010C*)
68. Explain why in the pair,  $(CH_3)_3CCl$  and  $CH_3Cl$  will react faster in  $S_N2$  reaction with  $OH^-$ ?  
(1/3, *AI 2010C*)
- SA I (2 marks)**
69. Give reasons :  
(i) C—Cl bond length in chlorobenzene is shorter than C—Cl bond length in  $CH_3-Cl$ .  
(ii)  $S_N1$  reactions are accompanied by racemization in optically active alkyl halides.  
(2/3, *Delhi 2016*)
70. How do you convert?  
(i) Chlorobenzene to biphenyl  
(ii) 2-bromobutane to but-2-ene  
(2/3, *AI 2016*)
71. Write the major product(s) in the following :  
(i)  $2CH_3-\underset{\text{Cl}}{\text{CH}}-CH_3 \xrightarrow[\text{Dry ether}]{Na}$   
(ii)  $CH_3-CH_2-Br \xrightarrow{AgCN}$  (2/3, *AI 2016*)
72. Give reasons:  
(i) Racemic mixture is optically inactive.  
(ii) The presence of nitro group ( $-NO_2$ ) at *o/p* positions increases the reactivity of haloarenes towards nucleophilic substitution reactions. (2/3, *Delhi 2015*)
73. Write the structure of the major product in each of the following reactions :  
(i)  $CH_3-CH_2-CH_2-\underset{\text{Br}}{\text{CH}}-CH_3 + KOH \xrightarrow[\text{Heat}]{\text{Ethanol}}$   
(ii)  +  $CH_3Cl \xrightarrow{\text{anhyd. AlCl}_3}$   
(2/3, *AI 2015*)
74. (i) Why is butan-1-ol optically inactive but butan-2-ol is optically active?  
(ii) Although chlorine is an electron withdrawing group, yet it is *ortho*-, *para*-directing in electrophilic aromatic substitution reactions. Why?  
(2/3, *Foreign 2015, Delhi 2012*)
75. (i) Which alkyl halide from the following pair is chiral and undergoes faster  $S_N2$  reaction?  
(a)  (b)   
(ii) Out of  $S_N1$  and  $S_N2$ , which reaction occurs with  
(a) inversion of configuration  
(b) racemisation? (2/3, *Delhi 2014*)
76. Write chemical equations when  
(i) ethyl chloride is treated with aqueous KOH.  
(ii) chlorobenzene is treated with  $CH_3COCl$  in presence of anhydrous  $AlCl_3$ .  
(*Foreign 2014*)

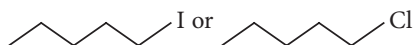
77. (i) Which alkyl halide from the following pairs would you expect to react more rapidly by an  $S_N2$  mechanism and why?
- $$\begin{array}{c} \text{CH}_3-\text{CH}_2-\text{CH}-\text{CH}_3 \\ | \\ \text{Br} \end{array}$$
- $$\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{Br}$$
- (ii) Racemisation occurs in  $S_N1$  reactions. Why? (Foreign 2014)
78. Write chemical equations when
- (i) methyl chloride is treated with  $\text{AgNO}_2$ .
- (ii) bromobenzene is treated with  $\text{CH}_3\text{Cl}$  in the presence of anhydrous  $\text{AlCl}_3$ . (Foreign 2014)
79. What are ambident nucleophiles? Explain with an example. (2/3, AI 2014C)
80. Chlorobenzene is extremely less reactive towards a nucleophilic substitution reaction. Give two reasons for the same. (Delhi 2013)
81. Account for the following:
- (i) The C—Cl bond length in chlorobenzene is shorter than that in  $\text{CH}_3-\text{Cl}$ .
- (ii) Chloroform is stored in closed dark brown bottles. (Delhi 2013)
82. Give reasons for the following :
- (i) Ethyl iodide undergoes  $S_N2$  reaction faster than ethyl bromide.
- (ii) C—X bond length in halobenzene is smaller than C—X bond length in  $\text{CH}_3-\text{X}$ . (2/3, AI 2013)
83. Haloalkanes undergo nucleophilic substitution whereas haloarenes undergo electrophilic substitution. Explain. (2/3, Delhi 2012C)
84. Answer the following :
- (i) What is known as a racemic mixture? Give an example.
- (ii) Of the two bromoderivatives,  $\text{C}_6\text{H}_5\text{CH}(\text{CH}_3)\text{Br}$  and  $\text{C}_6\text{H}_5\text{CH}(\text{C}_6\text{H}_5)\text{Br}$ , which one is more reactive in  $S_N1$  substitution reaction and why? (2/3, Delhi 2011)
85. Write the mechanism of the following reaction :
- $$n\text{-BuBr} + \text{KCN} \xrightarrow{\text{EtOH}, \text{H}_2\text{O}} n\text{-BuCN}$$
- (1/3, Delhi, 2011C)
86. How are the following conversions carried out?
- (i) Benzyl chloride to benzyl alcohol,
- (ii) Methyl magnesium bromide to methylpropan-2-ol. (2/3, Delhi 2010)
87. Which compound in the following couple will react faster in  $S_N2$  displacement and why?
- (i) 1-Bromopentane or 2-bromopentane
- (ii) 1-Bromo-2-methylbutane or 2-bromo-2-methylbutane. (2/3, Delhi 2010)
88. (a) Why is sulphuric acid not used during the reaction of alcohols with KI in the conversion of an alcohol to the alkyl iodide?
- (b) Why are haloarenes less reactive than haloalkanes towards nucleophilic substitution reactions? (Delhi 2010C)
89. How would you account for the following :
- (i) Grignard reagents are prepared strictly under anhydrous conditions?
- (ii)  undergoes faster  $S_N1$  reaction than ? (Delhi 2010C)
90. Which one in the following pairs of substances undergoes  $S_N2$  substitution reaction faster and why?
- (i)  or 
- (ii)  or  (Delhi 2009)
91. Which one in the following pairs undergoes  $S_N1$  substitution reaction faster and why?
- (i)  or 
- (ii)  or  (AI 2009)
92. Suggest a possible reason for the following observations :
- (i) The order of reactivity of haloalkanes is  $\text{RI} > \text{RCl} > \text{RBr}$ .

- (ii) Neopentyl chloride  $(\text{CH}_3)_3\text{CCH}_2\text{Cl}$  does not follow  $\text{S}_{\text{N}}2$  mechanism. (2/3, Delhi 2009C)
93. Give reasons for the following observations :
- Haloarenes are less reactive than haloalkanes towards nucleophilic substitution reactions.
  - The treatment of alkyl chloride with aqueous KOH leads to the formation of alcohol but in the presence of alcoholic KOH, alkene is the major product. (2/3, AI 2009C)
94. (i) Why is it that haloalkanes are more reactive than haloarenes towards nucleophiles.  
 (ii) Which one of the following reacts faster in an  $\text{S}_{\text{N}}1$  reaction and why?
-  (Delhi 2008)
95. (i) Why are haloalkanes more reactive towards nucleophilic substitution reactions than haloarenes?  
 (ii) Which one of the following two substances undergoes  $\text{S}_{\text{N}}1$  reaction faster and why?
-  (AI 2008)
96. Discuss the mechanism of  $\text{S}_{\text{N}}1$  reaction of haloalkanes. (Delhi 2008C)
97. What is Saytzeff rule? Illustrate with suitable example. (2/5, AI 2007)
98. Give one example of each of the following reactions :
- Wurtz reaction
  - Wurtz-Fittig reaction. (2/5, Delhi 2007)

**SA II (3 marks)**

99. Answer the following questions:

- What is meant by chirality of a compound? Give an example.
- Which one of the following compounds is more easily hydrolysed by KOH and why?  $\text{CH}_3\text{CHClCH}_2\text{CH}_3$  or  $\text{CH}_3\text{CH}_2\text{CH}_2\text{Cl}$
- Which one undergoes  $\text{S}_{\text{N}}2$  substitution reaction faster and why?



(AI 2012)

100. Rearrange the compounds of each of the following sets in order of reactivity towards  $\text{S}_{\text{N}}2$  displacement:
- 2-Bromo-2-methylbutane, 1-Bromopentane, 2-Bromopentane
  - 1-Bromo-3-methylbutane, 2-Bromo-2-methylbutane, 3-bromo-2-methylbutane
  - 1-Bromobutane, 1-Bromo-2, 2-dimethylpropane, 1-Bromo-2-methylbutane (AI 2011)
101. (a) Write a chemical test to distinguish between:
- Chlorobenzene and benzyl chloride
  - Chloroform and carbon tetrachloride
- (b) Why is methyl chloride hydrolysed more easily than chlorobenzene? (Delhi 2011C)
102. Differentiate between  $\text{S}_{\text{N}}1$  and  $\text{S}_{\text{N}}2$  mechanisms and give examples. (AI 2010)

**10.7 Polyhalogen Compounds****VSA (1 mark)**

103. State one use each of DDT and iodoform. (Delhi 2010)
104. Write the balanced equation for the following:
- When chloroform is oxidised by air.
  - Chloroform reacts with chlorine. (2/5, Delhi 2007)