Haloalkanes and Haloarenes (2015-2025)

CBSE 2025

1. **Assertion (A) :** Aromatic primary amines cannot be prepared by Gabriel Phthalimide synthesis.

   Reason (R) : Aryl halides do not undergo nucleophilic substitution reaction with the anion formed by phthalimide. CBSE-2025

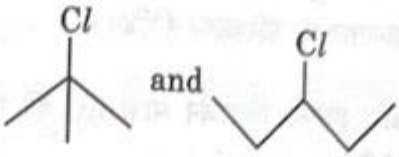
2. Which is the correct IUPAC name for CBSE-2025

(A) Methylchlorobenzene (B) Toluene

(C) 1–Chloro–4–Methylbenzene (D) 1–Methyl–4–Chlorobenzene

SECTION – B

3. (a) In the following pair of halogen compounds, which compound undergoes S_N1 reaction faster and why ? CBSE-2025 1



(b) Arrange the following compounds in increasing order of their reactivity towards S_N2 displacement : 1

2–Bromo–2–methylbutane, 1–Bromopentane, 2–Bromopentane.

4. (a) Define the following : CBSE-2025 2 + 1 = 3

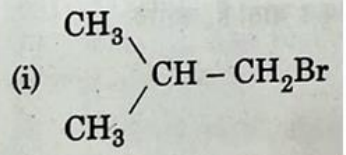
   (i) Enantiomers

   (ii) Racemic mixture

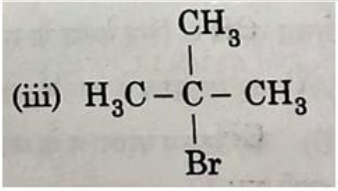
   (b) Why is chlorobenzene resistant to nucleophilic substitution reaction ?

5 **Arrange the following compounds in increasing order of their boiling points:**

CBSE-2025

(i) 

(ii) $CH_3CH_2CH_2CH_2Br$

(iii) 

(A) (ii) < (i) < (iii)

(B) (i) < (ii) < (iii)

(C) (iii) < (i) < (ii)

(D) (iii) < (ii) < (i)

6 **Assertion (A): The boiling points of alkyl halides decrease in the order: RI > RBr > RCl > RF.**

CBSE-2025

7. Alkyl halides undergoing nucleophilic bimolecular substitution reaction involve:

(A) retention of configuration

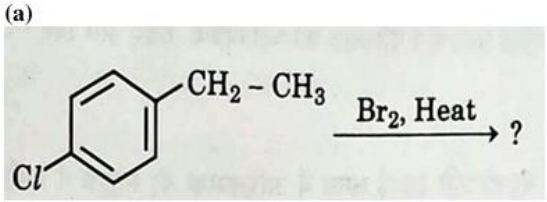
(B) formation of racemic mixture

(C) inversion of configuration

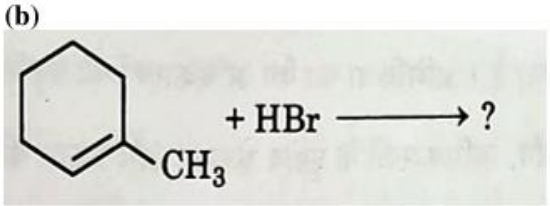
(D) formation of carbocation

8 **(A) Draw the structure of the major monohalo product for each of the following reactions:**

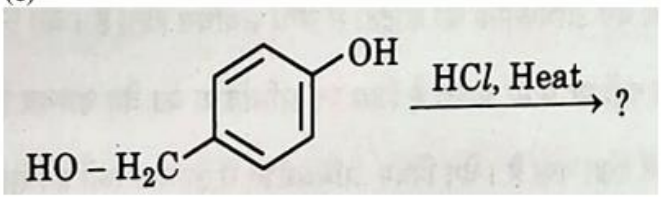
(a)



(b)



(c)



(B) How do you convert:

(a) Chlorobenzene to biphenyl

(b) Propene to 1-Iodopropane

(c) 2-Bromobutane to but-2-ene

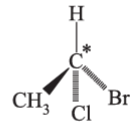
CBSE 2024

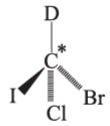
1. Auto-oxidation of chloroform in air and light produces a poisonous gas known as

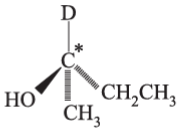
(*a*) Phosphine (*b*) Mustard gas

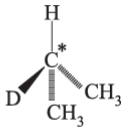
(*c*) Phosgene (*d*) Tear gas CBSE-2024

2. In which of the following molecules, C atom marked with asterisk is chiral?

(I) 

(II) 

(III) 

(IV) 

(*a*) I, II, III,

(*b*) I, II, III, IV

(*c*) II, III, IV

(*d*) I, III, IV CBSE-2024

3. Account for the following: CBSE-2024

(*a*) Haloalkanes react with AgCN to form isocyanide as main product.

(*b*) Allyl chloride shows high reactivity towards S_N1 reaction.

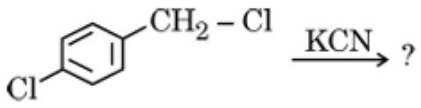
(*c*) Haloarenes are extremely less reactive towards nucleophilic substitution reactions.

4. (a) Which halogen compound in the following pair will react faster in S_N2 reactions and why ? CBSE-2024

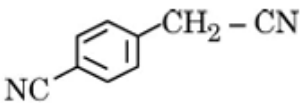
$CH_3 - CH_2 - I$ OR $CH_3 - CH_2 - Br$

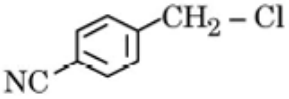
(b) Why is chloroform stored in closed dark coloured bottles ? *1+1=2*

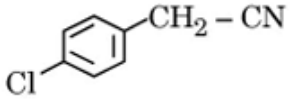
5. Consider the following reaction : CBSE-2024

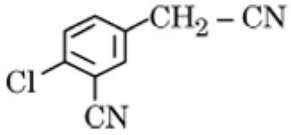


The major product of the reaction is :

(A) 

(B) 

(C) 

(D) 

5. (a) What type of nucleophilic substitution (S_N1 or S_N2) occurs in the hydrolysis of 2-Bromobutane to form (±)-Butan-2-ol ? Give reason.

(b) What happens when chlorobenzene and methyl chloride are treated with sodium metal in dry ether ? *2+1=3*

CBSE 2023

1. Which of the following belongs to the class of Vinyl halides? CBSE - 2023

(*a*) $CH_2{=}CHCH_2CH_2Cl$

(*b*) $CH_2{=}\underset{\displaystyle Br}{\underset{|}{C}}{-}CH_3$

(*c*) $CH_2{=}CH{-}CH_2{-}Br$

(*d*) $CH{\equiv}C{-}Br$

2. Retention of configuration is observed in CBSE - 2023

(*a*) S_N1 reaction

(*b*) S_N2 reaction

(*c*) Neither S_N1 nor S_N2 reaction

(*d*) S_N2 reaction as well as S_N1 reaction

3. **Assertion (A):** Chlorobenzene is resistant to electrophilic substitution reaction. CBSE - 2023

Reason (R): C—Cl bond in chlorobenzene acquires partial double bond characters due to resonance.

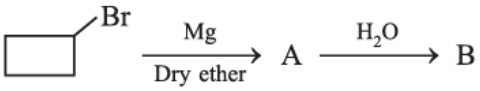
4. Answer any **3** of the following: CBSE - 2023

(*a*) Which isomer of C_5H_{10} gives a single monochloro compound C_5H_9Cl in bright sunlight?

(*b*) Arrange the following compounds in increasing order of reactivity towards S_N2 reaction:
2-Bromopentane, 1-Bromopentane, 2-Bromo-2-methylbutane

(*c*) Why *p*-dichlorobenzene has higher melting point than those of *ortho*- and *meta*-isomers?

(*d*) Identify A and B in the following:



5. The synthesis of alkyl fluoride is best obtained from : CBSE-2023

(a) Free radicals (b) Swartz reaction

(c) Sandmeyer reaction (d) Finkelstein reaction

6. In the reaction $R-OH + HCl \xrightarrow{ZnCl_2} RCl + H_2O$, what is the correct order of reactivity of alcohol ?

(a) $1^\circ < 2^\circ < 3^\circ$ (b) $1^\circ > 3^\circ > 2^\circ$

(c) $1^\circ > 2^\circ > 3^\circ$ (d) $3^\circ > 1^\circ > 2^\circ$

7. (a) $CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-CH_3 \xrightarrow{PCl_5}$ 'A' $\xrightarrow{AgCN}$ 'B' CBSE-23

(b) $CH_3CH_2CH_2Cl + KOH \xrightarrow{ethanol}$ 'A' $\xrightarrow{HBr}$ 'B'

Identify 'A' and 'B' in the above reactions.

8 · Write main product formed when : CBSE - 2021

(a) Methyl chloride is treated with NaI/Acetone.

(b) 2,4,6-trinitrochlorobenzene is subjected to hydrolysis.

(c) n-Butyl chloride is treated with alcoholic KOH.

CBSE 2020

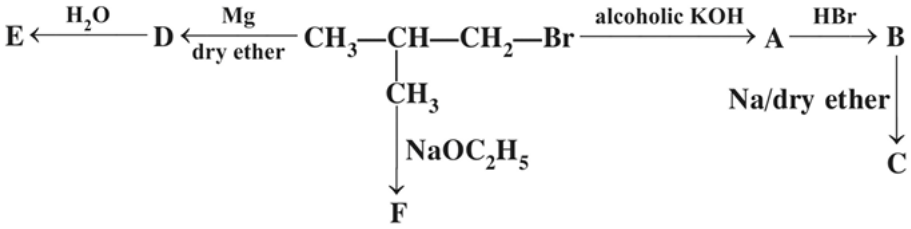
1. **The conversion of an alkyl halide into an alcohol by aqueous NaOH is classified as** CBSE - 2020

(*a*) **a dehydrohalogenation reaction** (*b*) **a substitution reaction**

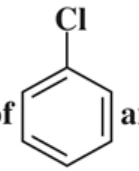
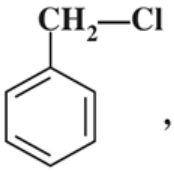
(*c*) **an addition reaction** (*d*) **a dehydration reaction**

(*b*) $RX + NaOH(aq) \longrightarrow ROH + NaX$ (substitution reaction)

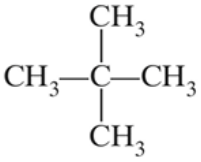
2. **Identify A, B, C, D, E and F in the following:** CBSE - 2020



6×½=3

3. **Out of**  **and**  **, which will undergo S_N1 reaction faster with OH^-?**

4. **A hydrocarbon C_5H_{12} gives only one monochloride on photochemical chlorination. Identify the compound.** CBSE - 2020



(2,2-dimethyl propane)

CBSE 2019

1. (*i*) **Out of $(CH_3)_3C—Br$ and $(CH_3)_3C—I$, which one is more reactive towards S_NI and why?**

(*ii*) **Write the product formed when *p*-nitrochlorobenzene is heated with aqueous NaOH at 443 K followed by acidification.**

(*iii*) **Why *dextro* and *laevo* – rotatory isomers of Butan-2-ol are difficult to separate by fractional distillation?** CBSE - 2019

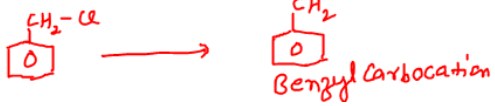
2. **Write one stereochemical difference between S_N1 and S_N2 reactions.** CBSE - 2019

In S_N1, racemisation takes place, whereas in S_N2 mechanism stereochemical inversion (optical inversion) takes place.

CBSE 2018

1. **Out of chlorobenzene and benzyl chloride, which one gets easily hydrolysed by aqueous NaOH and why?** CBSE - 2018 **1**

Ans Benzyl chloride is easily hydrolysed because benzyl carbocation is stabilized by resonance.



2. (*a*) **Identify the chiral molecule in the following pair:** CBSE - 2018 **3**

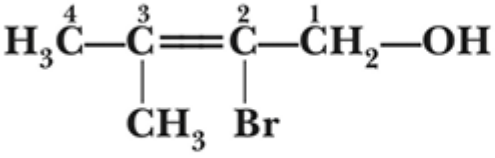
(*i*) (*ii*)

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

(*c*) **Write the structure of the alkene formed by dehydrohalogenation of 1-bromo-1-methylcyclohexane with alcoholic KOH.**

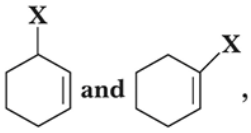
CBSE 2017

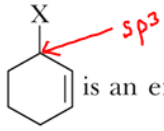
1. **Write the IUPAC name of the following compound:**

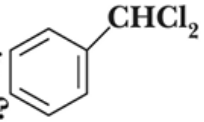
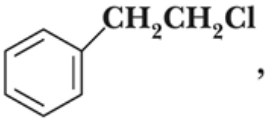


CBSE - 2017

Ans - 2-Bromo-3-methyl but-2-en-1-ol

2. **Out of**  **and** **, which is an example of allylic halide?**

Ans  is an example of allylic halide.

3. **Out of**  **and**  **, which is an example of a benzylic halide?** CBSE - 2017 **[1]**

4. **The following compounds are given to you:** CBSE - 2017

2-bromopentane, 2-bromo-2-methylbutane, 1-Bromopentane

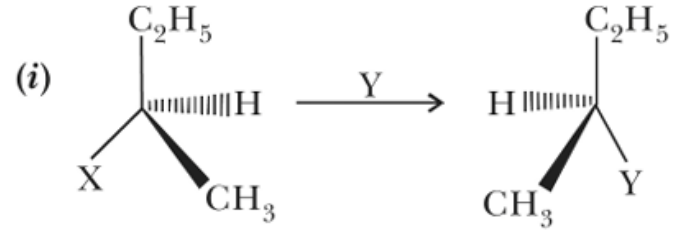
(*a*) **Write the compound which is most reactive towards S_N2 reaction.**

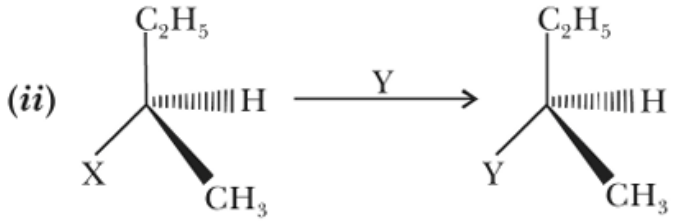
(*b*) **Write the compound which is most reactive towards β-elimination reaction.**

(*c*) **Write the compound which is most reactive towards β-elimination reaction.** **[3]**

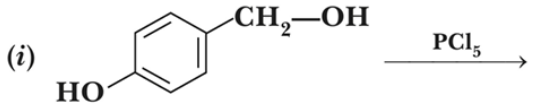
CBSE 2016

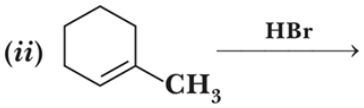
1. **Which of the following reactions is S_N1 type?**





2. **Write the major products(s) in the following reactions:** CBSE-2016





(iii) $CH_3CH_2Cl \xrightarrow{KNO_2}$?

CBSE 2015

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

$CH_3—CH_2—CH_2—Br$ and $CH_3—\underset{\displaystyle Br}{\underset{|}{CH}}—CH_3$ CBSE-2015

2. How can the following conversions be carried out: CBSE-2015

(i) Aniline to bromobenzene

(ii) Chlorobenzene to 2-chloroacetophenone

(iii) Chloroethane to butane

Or

What happens 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 equations in support of your answer.