CBSE Class 12 physics
Important Questions
Chapter 10
Haloalkanes and Haloarenes

2 Marks Questions

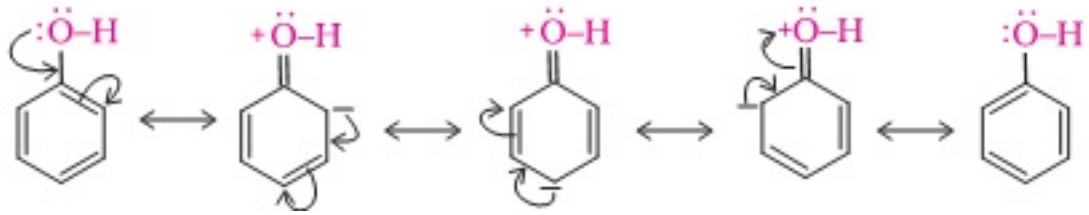
1. Thionyl chloride is preferred for converting alcohol to haloalkane.

Ans. Thionyl chloride is preferred for converting alcohol to haloalkane because the bi-products formed are all gases which escape into the atmosphere.

$$R-OH + SOCl_2 \rightarrow RCl + SO_2 + HCl$$

2. Phenol cannot be converted to chlorobenzene by reacting with HCl.

Ans. In phenol, due to resonance, the carbon –oxygen bond has a partial double bond character and is difficult to break being stronger than a single bond. Therefore it can not be converted to chlorobenzene by reacting with HCl.

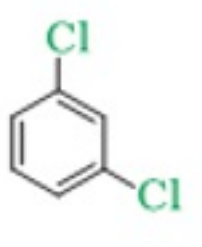


3. HNO_3 is added during iodination of benzene.

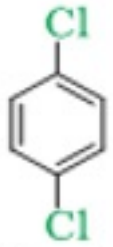
Ans. When benzene is reacted with iodine, the reaction is reversible in nature. It leads to the formation of reactants back. Therefore and oxidizing agent like HNO_3 oxidizes the HI formed in the reaction and keeps the reaction in forward direction.

4. p- dichlorobenzene has higher melting point than meta – dichlorobenzene.

Ans.



m – dichlorobenzene

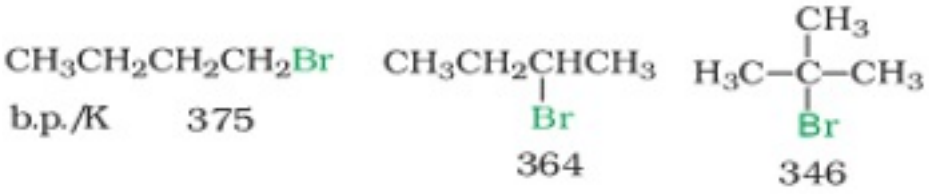


p - dichlorobenzene

p- dichlorebenzene is having symmetrical structure therefore it can fit better into the crystal lattice which increases its melting point.

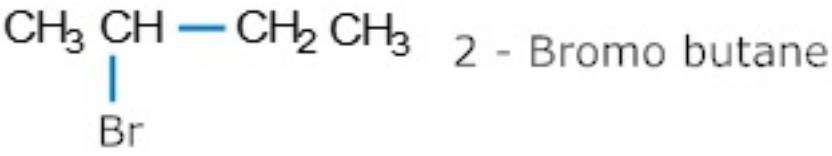
5. The boiling points of isomeric haloalkenes decrease with increase in branching.

Ans. The boiling points of isomeric haloakanes decreases with branching due to decrease in surface areas with branching. As branching increasing the structure becomes more spherical and the surface area decreases. e.g. the boiling points of isomers of C_4H_9 Br follows the order.

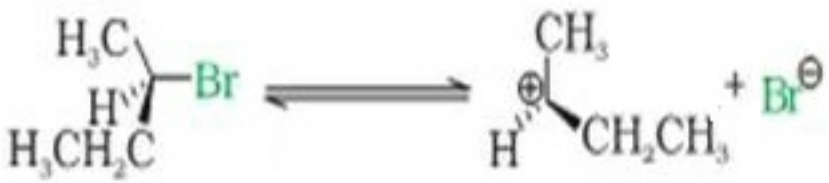


6. Hydrolysis of optically active 2- bromobutane forms optically inactive butan - 2 - ol.

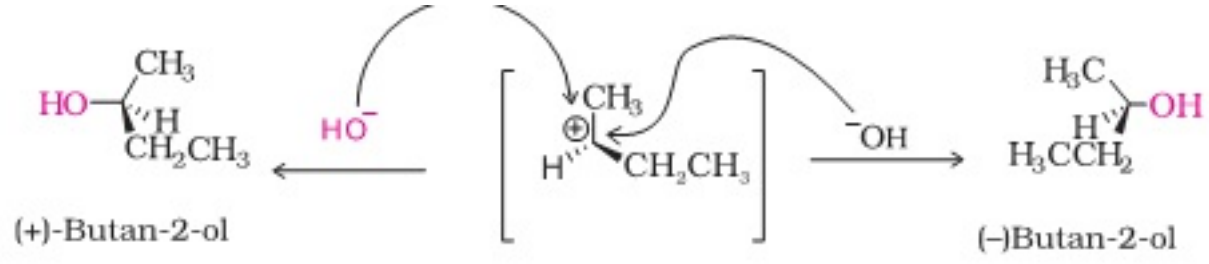
Ans.



The compound undergoes hydrolysis by S_N1 mechanism via the formation of carbocation which is planar.



The attack of nucleophile can result in product which is a mixture of compounds both with same configuration and inverted configuration.

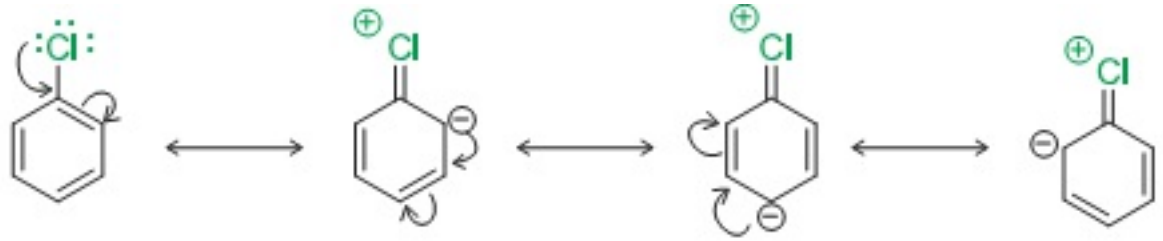


Therefore it results in the formation of racemic mixture which is optically inactive.

7. Chlorobenzene is less reactive towards nucleophilic substitution reaction.

Ans. Chlorobenzene is less reactive towards nucleophillic substitution due to –

i. resonance, C- Cl bond acquires a double bond character and becomes stronger than a single bond.



ii. SP^2 hybridisation in C of C-X bond, the carbon becomes more electronegative and holds the electron pair of C-X bond more tightly decreasing the bond length .
iii. Instability of phenyl cation.
iv. Repulsion for incoming nucleophile from electron rich ring.

8. Chloroform is stored in dark coloured bottles.

Ans. Chloroform gets oxidsed slowly by air in the presence of light to an extremely poisonous gas phosgene. Therefore to avoid any exposure to air and sunlight, it is kept in dark coloured bottles.

$$2CHCl_3 + O_2 \xrightarrow[light]{} 2COCl_2 + 2HCl$$

9. The order of boiling points is RCl < RBr < RI.

Ans. The boiling points of alkyl halides depends on dipole and van-der-waal's interaction.

These attractions get stronger as the molecules get bigger in size and have more electrons. As the size of halogens increases in the order –

$Cl < Br < I$

The boiling points also follow the order

RCl < RBr <RI

10. Vinyl chloride is less reactive than allyl chloride.

Ans. Due to resonance C- Cl bond gets double bond character and becomes stronger than a single bond, making vinyl chloride less reactive than allyl chloride.

11. What happens when

a) Thionyl chloride acts upon I - propanol.

b) Ethanol reacts with PBr_3

Ans. (a) When thionyl chloride acts upon 1- propanol chloropropane is formed .

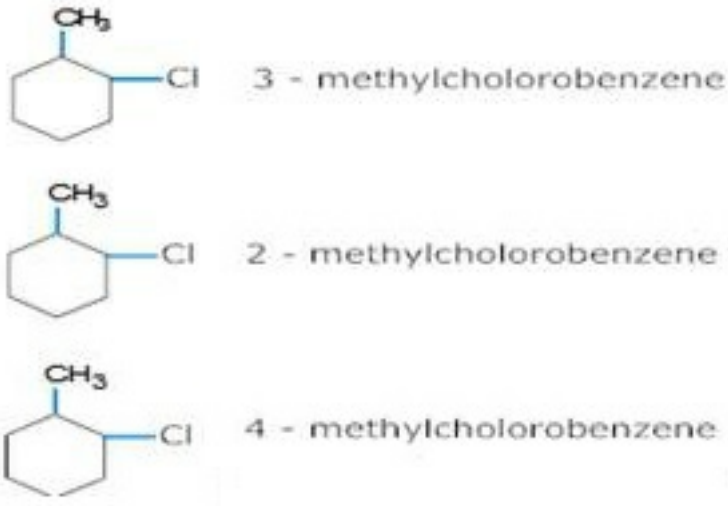
$$CH_3CH_2CH_2OH + SOCl_2 \rightarrow CH_3CH_2CH_2Cl + SO_2 + HCl$$

(b) When ethanol reacts with PBr_3, bromoethane is formed.

$$3CH_3CH_2OH + PBr_3 \rightarrow 3CH_3CH_2Br + H_3PO_3$$

12. How many aromatic isomers are possible for the formula C_7H_7Cl ? Write the structure and names.

Ans. C_7H_7Cl -Three aromatic isomers are possible.

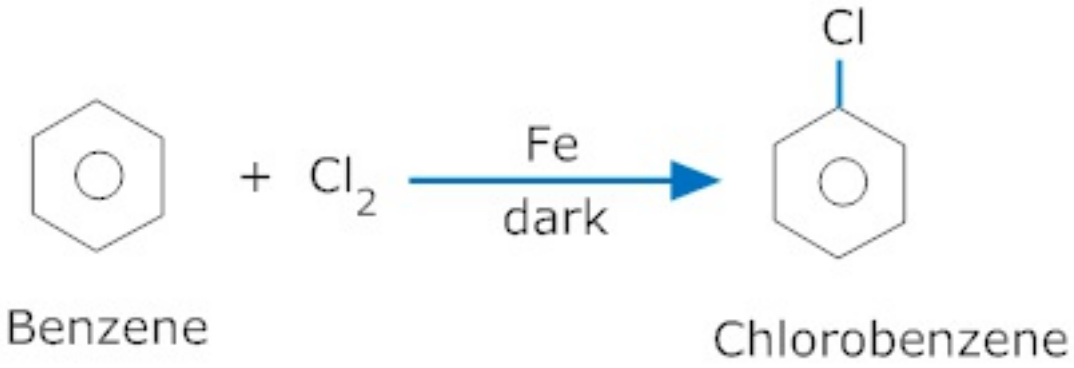


13. How is chlorobenzene prepared by

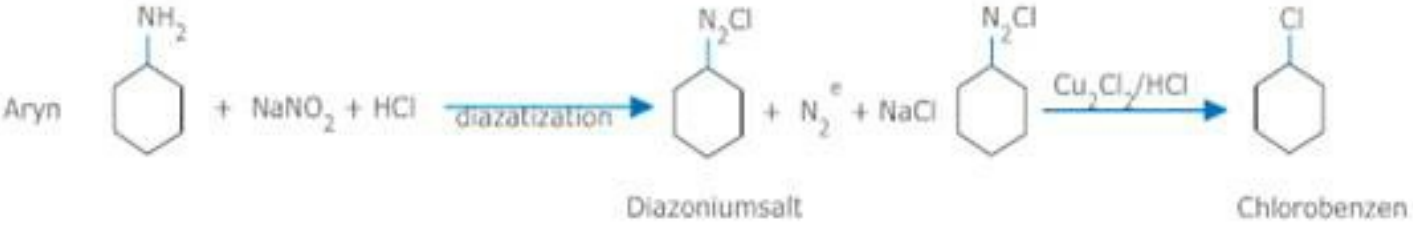
(a) direct chlorination

(b) diazotization method?

Ans. (a) by direct chlorination-



(b) by diazotization method.



14. How can we distinguish between an alkyl halide and aryl halide?

Ans. Alkyl halide e.g. C_2H_5X, $C_6H_5CH_2X$ etc. can be distinguished from aryl halide, C_6H_5X, by $AgNO_3$ test.