

Chapter_10

Haloalkanes and Haloarenes

Practice Questions

1. Which of the following is not an allylic halide?

- (a) 5-bromo pent-1-ene
- (b) 4-bromopent-2-ene
- (c) 3-bromo-2-methylbut-1-ene
- (d) 1-bromobut-2-ene

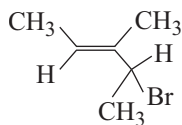
2. Which of the following is benzyl halogen compound?

- (a) $\text{Br} - \text{C}_6\text{H}_4\text{CH}(\text{CH}_3)\text{CH}_2\text{CH}_3$
- (b) $(\text{CH}_3)_3\text{CCH}_2\text{CH}(\text{Br})\text{C}_6\text{H}_5$
- (c) $(\text{CH}_3)_2\text{CHCH}(\text{Cl})\text{CH}_3$
- (d) None of the above

3. Which of the following is an example of *vic*-dihalide?

- (a) Dichloromethane
- (b) 1,2-dichloroethane
- (c) Ethylidene chloride
- (d) Allyl chloride

4. What is the IUPAC name of the following compound?



- (a) 3-bromo-3-methyl-1,2-dimethylprop-1-ene
- (b) 3-bromo-1,2-dimethylbut-1-ene
- (c) 2-bromo-3-methylpent-3-ene
- (d) 4-bromo-3-methylpent-2-ene

5. Which of the following is best for preparation of alkyl halides?

- (a) Alcohol
- (b) Alkene
- (c) Alkane
- (d) Alkyne

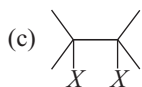
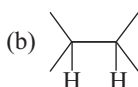
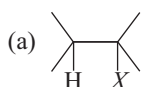
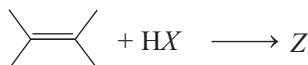
6. Which of the following is used to prepare alkyl chloride in presence of alcohol?

- (a) H_2SO_4
- (b) HCl solution (dilute)
- (c) dry HCl gas
- (d) None of these

7. The alkane that gives only one monochloro product on chlorination with Cl_2 in presence of diffused sunlight is

- (a) 2, 2-dimethylbutane
- (b) *neo*-pentane
- (c) *n*-pentane
- (d) isopentane

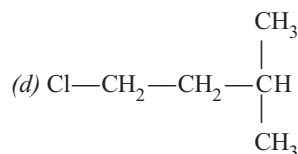
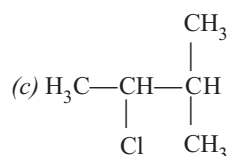
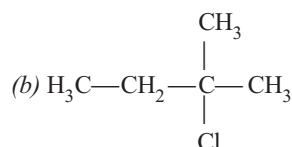
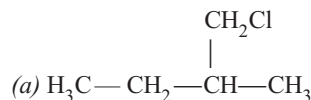
8. Identify the compound Z in the reaction,



(d) All of these

9. An alkene 'A' on reaction with O_3 and $\text{Zn-H}_2\text{O}$ gives propanone and ethanal in equimolar ratio. Addition of HCl to alkene 'A' gives 'B' as the major product.

The structure of product 'B' is



10. When a primary aromatic amine dissolved in cold aqueous mineral acid (HCl) is treated with sodium nitrite, the product formed is

- (a) aryl halide
- (b) diazonium salt
- (c) 2° aromatic amine
- (d) None of these

11. Which of the following has no dipole moment?

- (a) CH_3Cl
- (b) CHCl_3
- (c) CH_2Cl_2
- (d) CCl_4

12. Which of the following alkyl halides has maximum density?

- (a) $\text{C}_3\text{H}_7\text{I}$
- (b) $\text{C}_2\text{H}_5\text{I}$
- (c) CH_3Br
- (d) CH_3I

13. Which of the following has the highest melting point but least solubility in a given solvent?

- (a) *o*-dichlorobenzene
- (b) *p*-dichlorobenzene
- (c) *m*-dichlorobenzene
- (d) chlorobenzene

14. Which of the following reaction(s) is not given by haloalkanes?

- (a) Nucleophilic substitution reactions
- (b) Elimination reaction
- (c) Reaction with metals
- (d) Addition reactions

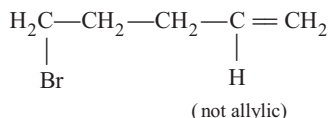
15. What is the nature of KCN and AgCN compounds?
 (a) Ionic and covalent (b) Ionic and ionic
 (c) Covalent and ionic (d) Covalent and covalent
16. The correct order of reactivity of alkyl halides toward S_N1 is as follows.
 (a) 2° halide $>$ 3° halide $>$ 1° halide $>$ CH_3X
 (b) 3° halide $>$ 1° halide $>$ 2° halide $>$ CH_3X
 (c) 3° halide $>$ 2° halide $>$ 1° halide $>$ CH_3X
 (d) $CH_3X > 1^\circ$ halide $>$ 2° halide $>$ 3° halide
17. The allylic and benzylic halides follow
 (a) S_N1 mechanism
 (b) S_N2 mechanism
 (c) Both S_N1 and S_N2 mechanism
 (d) None of the above
18. Which of the following is not correct?
 (a) $PhCH_2Br > PhCHBrCH_3 > PhCBr(CH_3)_2 (S_N1)$
 (b) $R-I > R-Br > R-Cl (S_N2)$
 (c) $CH_2=CH-Cl < CH_2=CH-CH_2-Cl < PhCH_2-Cl (S_N1)$
 (d) $R-Cl < R-Br < R-I (S_N1)$
19. $CH_3-CH_2-CH_2-Br \xrightarrow{Alc. KOH}$.
 Final product is
 (a) propene (b) propanol
 (c) cyclopropane (d) propan-1, 2-diol
20. Which of the following is correct order for the ease of dehydrohalogenation of alkyl halide with alc. KOH?
 (a) $3^\circ < 2^\circ < 1^\circ$ (b) $3^\circ > 2^\circ < 1^\circ$
 (c) $3^\circ > 2^\circ > 1^\circ$ (d) $3^\circ < 2^\circ > 1^\circ$
21. Among the following, the suitable reagent for Wurtz reaction is
 (a) Na/alcohol (b) Na/ether
 (c) Zn/ether (d) Zn/alcohol
22. Which of the following represents Wurtz-Fittig reaction?
 (a) $C_6H_5I + 2Na + CH_3I \longrightarrow C_6H_5CH_3 + 2NaI$
 (b) $2C_6H_5I + 2Na \longrightarrow C_6H_5C_6H_5 + 2NaI$
 (c) $2CH_3CH_2I + 2Na \longrightarrow CH_3CH_2CH_2CH_3 + 2NaI$
 (d) $CH_3Br + AgF \longrightarrow CH_3F + AgBr$
23. Consider the following reaction,
 $2CHCl_3 + O_2 \longrightarrow A + B$
 The products A and B of above reaction respectively are
 (a) CO_2 and HCl (b) $COCl_2$ and HCl
 (c) CO and HCl (d) None of these
24. When freon is manufactured by tetrachloromethane, the reaction involved in this process is called
 (a) Sandmeyer reaction
 (b) Swarts reaction
 (c) Finkelstein reaction
 (d) All of these
25. Which of the following compound is used as an organic insecticide?
 (a) Chloroform
 (b) Freon-12
 (c) Carbon tetrachloride
 (d) DDT

ANSWERS

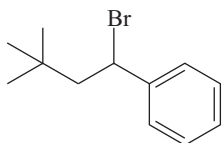
1. (a)	2. (b)	3. (b)	4. (d)	5. (a)	6. (c)	7. (b)	8. (a)	9. (b)	10. (b)
11. (d)	12. (d)	13. (b)	14. (d)	15. (a)	16. (c)	17. (a)	18. (a)	19. (a)	20. (c)
21. (b)	22. (a)	23. (b)	24. (b)	25. (d)					

Hints & Solutions

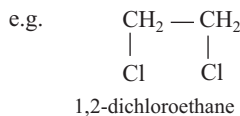
1. (a) 5-bromopent-1-ene is not an allylic halide, whereas option (b), (c) and (d) are allylic halide, because in these compounds, the halogen atom is bonded to an sp^3 hybridised carbon atom adjacent to C—C double bond.



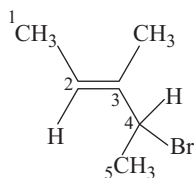
2. (b) Compound (b) represent the benzyl halogen compound. It is the one in which halogen atom is bonded to sp^3 -hybridised carbon atom next to an aromatic ring. Structural formula of compound (b) is as follows :



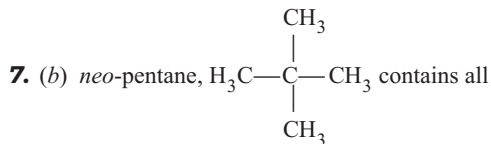
3. (b) 1, 2-dichloroethane is an example of 1, 2-dichloro ethane. In *vic*-dihalide, the halogen atoms are present at adjacent C-atoms.



4. (d) While naming the compound, alkene gets priority over functional group (—Br) and numbering starts from alkene side. Hence, IUPAC name: 4-bromo-3methyl pent-2-ene.



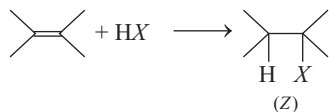
6. (c) Dry HCl (hydrogen chloride) gas is used to prepare alkyl chloride in presence of alcohol. In this method, dry HCl gas is passed through a solution of alcohol.



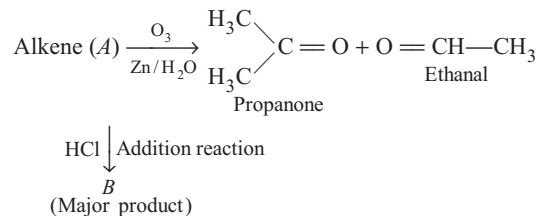
equivalent hydrogen atoms. So, it will give only one monochloro derivative on chlorination with Cl_2 in the presence of diffused sunlight.

8. (a) The compound (Z) is alkyl halide given in option (a). An alkene is converted to corresponding alkyl halide by reacting with hydrogen chloride, hydrogen bromide or hydrogen iodide.

Complete reaction is as follows :

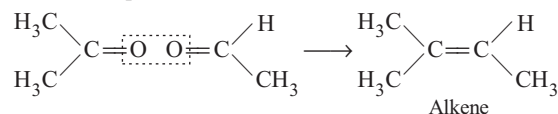


9. (b) The sequence of reactions is as follows :

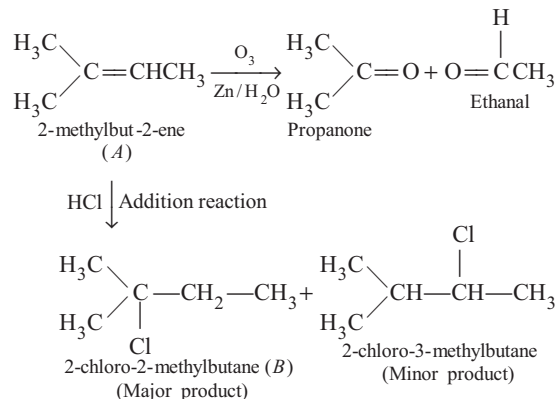


The products of first reaction, i.e. ozonolysis can give an idea about the probable alkene as $\text{C}=\text{O}$ group is obtained from the π -bonds of alkene.

Thus, most probable alkene will be



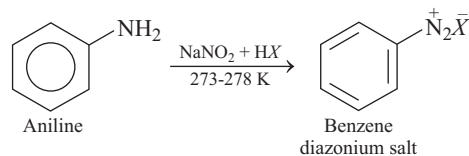
The complete sequence of reaction taking place will be :



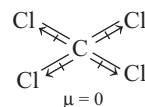
Therefore, A is 2-methylbut-2-ene and B is 2-chloro-2-methylbutane.

10. (b) When a primary aromatic amine, dissolved or suspended in cold aqueous mineral acid (HCl) is treated with sodium nitrite, a diazonium salt is formed.

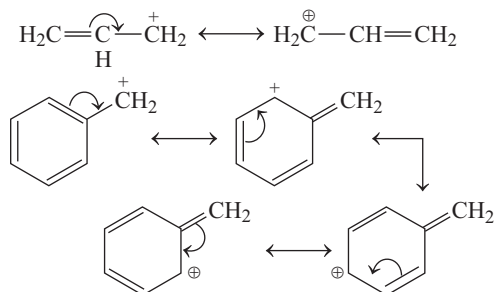
Complete reaction is as follows :



11. (d) CCl_4 being symmetrical has no dipole moment.

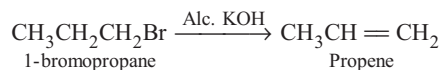


12. (d) CH_3I has maximum density because of smallest hydrocarbon part (i.e. CH_3) and contain heaviest halogen (i.e. I).
13. (b) Due to symmetry, the molecule of *p*-dichlorobenzene fits closely in the lattice. As a result, intermolecular forces are strongest in *p*-dichlorobenzene and, hence, it has highest melting point and least solubility.
14. (d) Addition reactions are not given by haloalkanes, whereas nucleophilic substitution, elimination reactions and reaction with metals are given by haloalkanes.
17. (a) Allylic and benzylic halides show high reactivity towards $\text{S}_{\text{N}}1$ mechanism because carbocation formed are stable. It gets stabilised through resonance.



19. (a) When haloalkane containing β -hydrogen atom is heated with alc. KOH solution, then alkene is formed as a result of elimination.

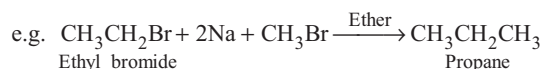
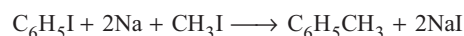
Reaction involved is as follows :



In this reaction, hydrogen is eliminated from β -carbon and the halogen is lost from α -carbon atom.

As a result, propene is formed as a product.

20. (c) The correct order for the ease of dehydrohalogenation of alkyl halide with conc. KOH is $3^\circ > 2^\circ > 1^\circ$, because 3° carbocation is more stable.
21. (b) The suitable reagent for Wurtz reaction is Na/ether. An ethereal solution of an alkyl halide is treated with sodium to produce higher alkanes. This reaction involves the formation of new C—C bond.
22. (a) The Wurtz-Fittig reaction is the reaction of an aryl halide with alkyl halide and sodium metal to give substituted aromatic compound. Thus, correct representation of Wurtz-Fittig reaction is option (a).



23. (b) The products A and B in the given reaction are COCl_2 and HCl. Chloroform is slowly oxidised by air in the presence of light to an extremely poisonous gas, carbonyl chloride (phosgene).

