

CHAPTER - 18 HALOALKANES AND HALOARENES

- Order of reactivity with alcohols is HI > HBr > HCI
- 2. 2 Finkelstein reaction
 - -CI is better leaving group than -F
- 3. 4 Reagents (1), (2) and (3) are suitable for preparation of bromo, chloro and fluorobenzene, respectively
- 4. 1 C-X bond in aryl halides and vinylic halides are much stronger, thus difficult to cleave.
- Reactivity of alkyl halides in S_N1 reactions is governed by carbocation stability. Stability of carbocations follows the order

$$CH_3$$
 CH_2 CH_2 CH_2 CH_3

- Reactivity of alkyl halides in S_N2 reactions decreases with increase in steric hindrance
 Least hindered alkyl halide is (2)
- 7. 2 aq. KOH does nucleophilic substitution; alc. KOH does elimination
- 8. 3

$$\begin{array}{c} \text{CH}_3 \\ \text{H}_3\text{C} - \begin{array}{c} \text{CH}_3 \\ \text{C} - \\ \text{C} \end{array} \\ \text{CH}_3 \end{array} \xrightarrow{\text{Elimination CH}_3\text{CH}_2\text{ONa}} \begin{array}{c} \text{CH}_3 \\ \text{H}_3\text{C} - \\ \text{C} - \\ \text{CH}_3 \end{array}$$

$$\begin{array}{c} \mathsf{CH_3} \\ \mathsf{H_3C-C-Br} \\ \mathsf{CH_3} \\ \mathsf{CH_3} \\ \\ \mathsf{CH_3} \end{array} \xrightarrow{\mathsf{CCH_3CH_2OH})} \quad \mathsf{H_3C-C-OCH_2CH_3} \\ \mathsf{CH_3} \\ \\ \mathsf{CH_3} \\ \end{array}$$

9. 4 Alkyl halide reacts with KCN to form nitriles whereas it reacts with AgCN to form isonitriles

10. 2
$$\xrightarrow{\text{HCI}}$$
 $\xrightarrow{\text{CI}}$ $\xrightarrow{\text{alc.KOH}}$ $\xrightarrow{\text{HBr, peroxide}}$ $\xrightarrow{\text{Br}}$

(Hofmann product)

- 11. 4 Optically active haloalkanes (i and iv) undergo racemisation
- 12. 1 (IV) can give aromatic product, thus its reaction will be the fastest
- 4 —NO₂ placed at ortho and para positions of chlorobenzene promotes the reaction by withdrawing electrons by –R effect.
- 14. 4 Dipole moment follows the order, $CH_3-CI > CH_3-F > CH_3-Br > CH_3-I$
- 15. 1 Phosgene (Carbonyl chloride)
- 16. 3 Pent-1-ene and cis/trans-pent-2-ene are the products
- 17. 6 "Yellow" precipitate

Compounds 3, 5, 7, 8, 9 and 10 would give yellow precipitate of AgBr with AgNO₃

18. 0
$$\xrightarrow{\text{HBr}}$$
 (contains no secondary carbon atom)

Brilliant STUDY CENTRE

19. 13
$$Q = \bigcirc$$
; $R = \bigcirc$ COCH₃

Q contains six sp2 carbons, R contains seven sp2 carbons

20. 4
$$CH_{3}CH_{2}OH \xrightarrow{P/I_{2}, \Delta} CH_{3}CH_{2}I \xrightarrow{KOH(alc), \Delta} CH_{2}Ethanol Iodoethane (Dehydrohalogenation)}$$

$$CH_{2} = CH_{2} \xrightarrow{Br_{2}/CH_{4}} CH_{2} \xrightarrow{CH_{2} - CH_{2}} CH_{2} \xrightarrow{KOH(alc.), \Delta} CH_{2} \xrightarrow{Ethene} Br$$

$$Ethene (B) Br Br$$

$$CC = CH \xrightarrow{NaNH_{2}, liq. NH_{3}} Na^{+}C^{-} \equiv C^{-}Na^{+}$$

$$Ethyne (D) Disodium acetylide (E)$$

$$CH_{3}I \text{ (excess)} CH_{3} - C \equiv C - CH_{3}$$

$$(Nucleophilic substitution) CH_{3} - C \equiv C - CH_{3}$$

The number of carbon atom in (F) is 4.

21. 3 'A' is saytzeff product; 'B' is Hafmann product (N(C₂H₂)₃ is a bulkier base)

22. (B)
$$\beta$$
 - elimin β - eli

- A More stable conjugated alkene is the major product
- 24. 4 E_1 mechanism $CH_3\text{-Shift}$ H

27. C S_N2 reactions are favoured by polar aprotic solvents (ex - DMSO)

28. D Ph
$$CH_3$$
 CH_2 CH_2 CH_3 CO_3 CO_3 CO_3 CO_3 $Chiral$ CO_3

- 29. A The given reaction involves retention of configuration as nucleophilic attack has occured at a carbon other than the chiral carbon.
- 30. B Rate of S_N^1 reaction $\alpha[RC1]$

31. BD ICI
$$\xrightarrow{\text{AlCl}_3}$$
 $\overset{\oplus}{\text{I}}$ + [AlCl]₄

Iodobenzene

Brilliant STUDY CENTRE

32. AB Nucleophilic substitution is difficult at vinylic and bridge head positions

33. BC
$$\xrightarrow{CH_2}$$
 $\xrightarrow{CH_2}$ $\xrightarrow{CH_2}$

34. AB $CH_3 \longrightarrow CHCl_2 \xrightarrow{\Theta} CH_3 \longrightarrow CH(OH)_2 \xrightarrow{-H_2O} CH_3 \longrightarrow CHO$ Ethylidene chloride

$$CH_2CI$$
 — CH_2CI $\xrightarrow{\Theta}$ CH_2OH — CH_2OH

Ethylenedichloride

- 35. (5) Chlorobenzenes substituted with electron donating groups will be slower than chlorobenzene in nucleophilic substitution (Here, compounds 3,4,5, 6 and 7)
- 36 (3) $C_2H_5OH + SOCI_2 \longrightarrow C_2H_5CI(g) + SO_2(g) + HCI(g)$
- 37. 1.00 Cl Na dryether (only one monochloroderivative is possible)
- 38. 1.00 Ar GH3 (only one alkene product formed)

3			Δ
J	"		$\boldsymbol{\Lambda}$

Reaction Product

$$T$$
 U_3
 U_3
 U_3
 U_3
 U_4
 U_5
 U_5
 U_5
 U_7
 U_7