Q) Write structures of different chain isomers of alkanes corresponding to the molecular formula C₆H₁₄. Also, write their IUPAC names.

A) C₆H₁₄ has five different chain isomers:

(i)
$$CH_3-CH_2-CH_2-CH_2-CH_3$$
 (Hexane)
(ii) $CH_3-CH-CH_2-CH_2-CH_3$
| CH₃ (2-Methylpentane)
(iii) $CH_3-CH_2-CH-CH_2-CH_3$
| CH₃ (3-Methylpentane)

(v)
$$CH_3 - C - CH_2 - CH_3$$

 CH_3

(2, 2-Dimethylbutane)

How will you convert ethyl chloride into (i) ethane (ii) n-butane?

SOLUTION

i) Ethyl chloride reacts with alc. KOH to yeild ethene which on hydrogenation with Nickel gives ethane.

$$\begin{array}{c} CH_3CH_2Cl \xrightarrow[-HCl]{alcKOH} CH_2 = CH_2 \xrightarrow[Ethene]{H_2/N_i} CH_3 - CH_3 \\ Ethyl-chloride \xrightarrow[-HCl]{alcKOH} CH_2 = CH_2 \xrightarrow[Ethene]{H_2/N_i} CH_3 - CH_3 \end{array}$$

 $m{ii})$ Ethyl chloride can be converted to $m{n}-m{butane}$ by wurtz reaction.

$$2CH_3CH_2Cl + 2Na \xrightarrow[ether]{anhydrous} CH_3CH_2CH_2CH_3 + 2NaCl$$