(b) at high at 170°C to 180°C further dehydration to yield alkene occurs

$2ROH \xrightarrow[140°C]{\text{conc } H_2SO_4} R-O-R + H_2O$

Example

$2CH_3CH_2OH \xrightarrow[140°C]{\text{conc } H_2SO_4} CH_3CH_2OCH_2CH_3 + H_2O$

(iii) Controlled catalytic hydration of alkyne

$2CH_3CH \equiv CH_2 + H_2O \rightarrow (CH_3)_2CHOCH(CH_3)_2$

(iv) from dihalo alkanes and dry silver oxide

$2RX + Ag_2O \xrightarrow{\text{warm}} R-O-R + 2AgX$

Example

$2CH_3CH_2CH_2Cl + Ag_2O \xrightarrow{\text{warm}} CH_3CH_2CH_2OCH_2CH_2CH_3 + 2AgCl$

Propoxypropane.

(d) State three uses of ethylene oxide.

(i) Ethylene oxide is used as gaseous sterilizing agent

(ii) Ethylene oxide is used in the preparation of non-ionic emulsifying agent, plastic, plasticizers and several synthetic textiles

(iii) Ethylene oxide is used as intermediate in hydrolytic manufacture of ethylene glycol.

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CHM 102

① Give the IUPAC names of the following Organic compounds

i. CH_3OCH_3 - Methoxymethane

ii. $CH_3CH_2OCH_2CH_3$ - Ethoxyethane

iii. $(CH_3CH_2CH_2CH_2)_2O$ - Butoxybutane

iv. $CH_3CH_2OCH_3$ - Methoxymethane.

v. $CH_3CH_2CH_2OCH_2CH_3$ - Ethoxypropane.

2. Discuss the properties of ethers.

* Solubility: Ethers are less soluble in water than the corresponding alcohols. Lower molecular weight ethers such as methoxymethane and ethoxyethane are freely soluble in water since the molecules are able to form hydrogen bonds with the water molecule but as the hydrocarbon content of the molecule increases there is a rapid decline in solubility.

* Density: Most of the simple ethers are less dense than water although the density increases with increasing relative molecular mass. But some of the aromatic ethers are indeed denser than water.

* Boiling point: Lower molecular mass ethers have lower boiling points than corresponding alcohol. But those ethers contain alkyl radicals longer than four carbon atoms, the reverse is true.

* Reactivity: Ethers are inert at molecular temperature. Their inertness at molecular temperature leads to their wide use as reaction media.

③ Discuss explicitly two methods of preparing ethers and show equations of reactions.

① Partial dehydration of alcohols.

Simple ethers are manufactured from alcohol by catalytic dehydration. The alcohol and concentrated tetraoxosulphate (VI) acid is heated carefully maintained temperature. at 140°C This process is known as continuous etherification. If excess alcohol is not used, the temperature