

1) Give the IUPAC names:

(i)  $\text{CH}_3\text{OCH}_3$  - Methoxy methane

(ii)  $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$  - Ethoxy ethane

(iii)  $(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O}$  - Butoxy butane

(iv)  $\text{CH}_3\text{CH}_2\text{OCH}_3$  - Methoxy ethane

(v)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$  - Ethoxy propane

2) Properties of ethers

(i) At room temperature ethers are colorless, neutral liquids with pleasant odors. The lower aliphatic ethers are highly flammable gases or volatile liquids.

(ii) Ethers are less soluble in water than their corresponding alcohols. They are most miscible in organic solvents and only low weight ethers like methoxy methane and methoxy ethane are fairly soluble.

(iii) Most simple ethers are less dense than water, although density increases with increasing molecular mass and most aromatic ethers are denser than water.

(iv) Boiling point of lower molecular mass are lower than corresponding alcohol but those containing alkyl radicals larger than 4 show the reverse.

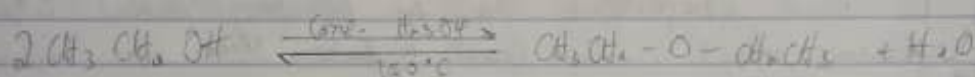
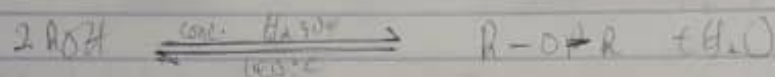
(v) ethers are inert at moderate temperature.

(3) 2 methods of ether production

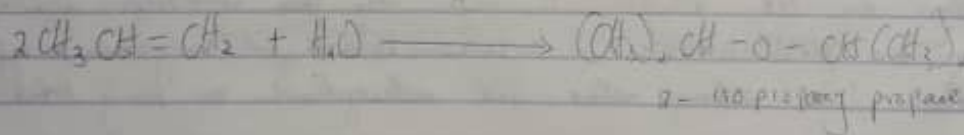
(i) partial hydration of alcohols

Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol is excess and concentrated acid is heated at a carefully maintained temperature of  $140^{\circ}\text{C}$ .

This method is also known as continuous etherification.



(ii) Controlled catalytic hydration of alkenes



(3) uses of ethylene oxide

(i) It is used as an intermediate in the hydrolytic manufacture of ethylene glycol.

(ii) Ethylene oxide is used as a gaseous sterilizing agent.

(10) Ethylene oxide is used in the production of  
non-laminate emulsifying agents, plasticizers and  
general synthetic auxiliaries.