

1 Give IUPAC names of the following

a CH_3OCH_3 - Methoxymethane

b $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxyethane

c $(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O}$ - Butoxybutane

d $\text{CH}_3\text{CH}_2\text{OCH}_3$ - Methoxyethane

e $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxypropane

2 Discuss the properties of ethers

Physical Properties

- i Ethers at room temperature are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable.
- ii Ethers are less soluble in water than corresponding alcohols. However they are miscible with most organic solvents. But, as hydrocarbon content of the molecules increases, there is rapid decline in their solubility in water.
- iii Most simple ethers are less dense than water, but density increases with increasing relative molecular mass.
- iv Low molecular mass ethers have lower boiling points than their corresponding alcohols but the reverse is true for ethers with larger than 4 carbon atoms.
- v Ethers are inert at moderate temperature.

B Chemical Properties

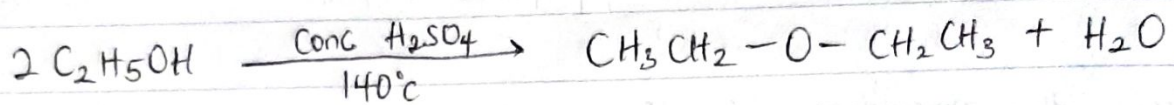
- i Ethers decompose with heat in presence of alumina catalysts to yield alkenes and water.
- ii Ethers undergo carbon-oxygen fission on heating with strong acids to form alkyl derivatives.

iii In presence of oxygen, ethers undergo self oxidation to yield unstable peroxides prone to explosion.

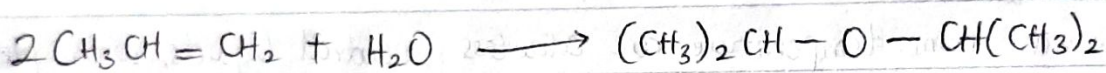
3 2 methods of preparing ethers

i Partial dehydration of alcohols

Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol in excess and conc H_2SO_4 acid is heated at a carefully maintained temperature of $140^\circ C$ in a process known as continuous etherification



ii Controlled catalytic hydration of olefins (alkenes)



4 List 3 uses of ethylene oxide

i Ethylene oxide is used as intermediate in the hydrolytic manufacture of ethylene glycol

ii Ethylene oxide is used as a gaseous sterilizing agent

iii It is used in preparation of plastics, plasticizers and several synthetic textiles.