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PHARMACY

1.  $\text{CH}_3\text{OCH}_3 \rightarrow$  Methoxymethane
2.  $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3 \rightarrow$  Ethoxyethane
3.  $(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O} \rightarrow$  Butoxymethane
4.  $\text{CH}_3\text{CH}_2\text{OCH}_3 \rightarrow$  Methoxyethane
5.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3 \rightarrow$  Ethoxypropane

2. Discuss the properties of ethers

i. Physical States:

At room temperature, ethers are colourless, neutral liquids with pleasant odours. The lower aliphatic ethers are highly flammable gases or volatile liquids.

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

iii. Density: Most of the simple ethers are less dense than water, although the density increases with increasing relative molecular mass and some of the aromatic ethers are in fact denser than water.

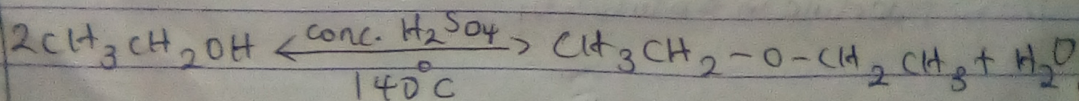
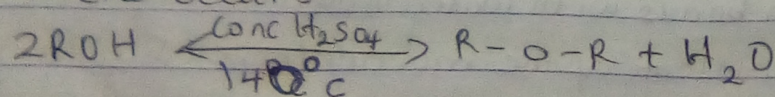
iv. Boiling point: low molecular mass ethers have a lower boiling point than the corresponding alcohols but those ethers containing alkyl radicals larger than four

carbon atoms, the reverse is true. The boiling point of ethers tend to approximate those of hydrocarbons of same relative molecular mass from which it can be concluded that the molecules are not associated in the liquid phase as there are no suitably available hydrogen for associating through hydrogen bonds.

2. Reactivity! Ethers are inert at moderate temperature. Their inertness at moderate temperature leads to their wide use as reaction media.

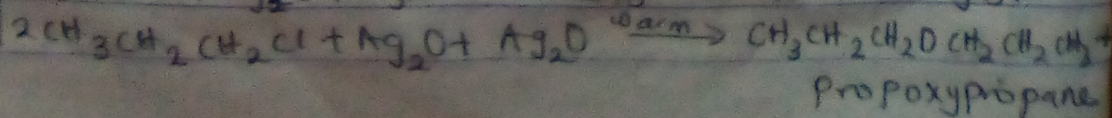
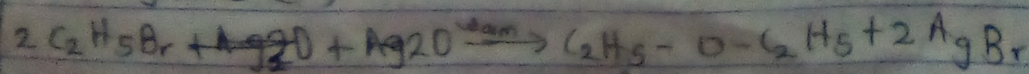
3. The methods of preparing ethers include;

→ partial dehydration of alcohols: Simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol in excess and concentrated  $H_2SO_4$  acid is heated at a carefully maintained temperature of  $140^\circ C$ . This process is known as continuous etherification. If excess alcohol is not used, the temperature is as high as  $170^\circ - 180^\circ C$ , further dehydration to yield alkene occurs



⇒ From Haloalkanes and dry Silver(I) oxide

Ethers can be prepared by the reaction of alkyl halide with silver oxide. For example, when ethyl bromide is heated with silver oxide it forms diethylether i.e.



#### 4. Uses of ethylene oxide

- Ethylene oxide is used as a gaseous sterilizing agent
- Ethylene oxide is used as an intermediate in the hydrolytic manufacture of ethylene glycol.