

## Assignment on Ethers

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### Assignment

1 Give the IUPAC names of the following organic compounds

i  $\text{CH}_3\text{OCH}_3$  — Methoxymethane

ii  $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$  — Ethoxyethane

iii  $(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O}$  — Dibutylmethane

iv  $\text{CH}_3\text{CH}_2\text{OCH}_3$  — Methoxyethane

v  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$  — Ethoxypropane

2 Discuss the properties of ethers.

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

b Solubility: They are less soluble in water than the corresponding alcohols. Lower molecular weight ethers are fairly soluble in water because the molecules are able to form hydrogen bonds with the water molecules but as the hydrogen carbon content of the molecules increases, solubility reduces. They are miscible with most organic solvents.

c 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.

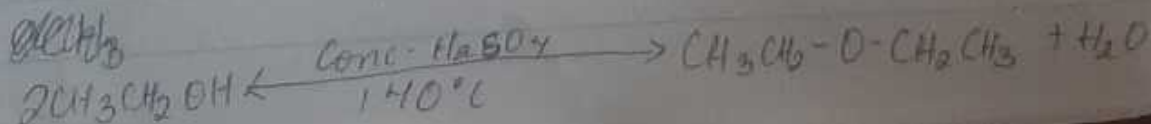
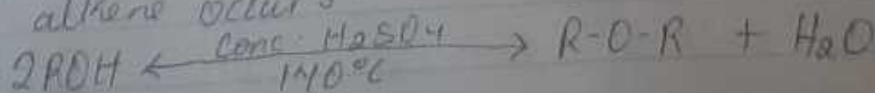
d) Boiling point: low molecular mass ethers have a lower boiling point than the corresponding alcohols but those ethers containing alkyl radicals larger than four carbon atoms, the reverse is true. The boiling points of ethers tend to approximate those of hydrocarbons of same relative molecular mass from which it can be concluded that the molecules are not associated in the liquid phase as there are no suitably available hydrogen for association through hydrogen bonds.

e) Reactivity: Ethers are inert at moderate temperatures. Their inertness at moderate temperatures leads to their wide use as a reaction media.

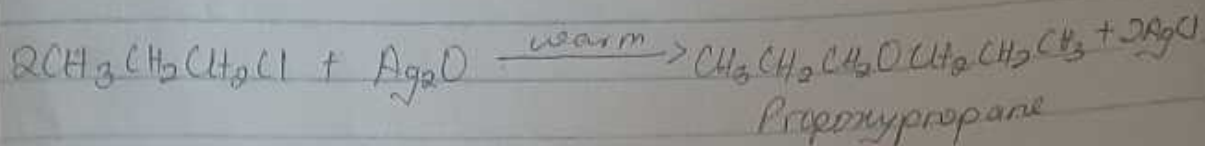
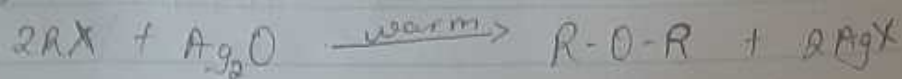
3) Discuss explicitly two methods of preparing ethers and show equations of reaction.

a) Partial dehydration of alcohols:

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



b From haloalkanes and dry silver oxide:  
Haloalkanes are heated with dry silver oxide to form ether



7 State 3 uses of ethylene oxide.

a It is used as a gaseous sterilizing agent.

b It is used as an intermediate in the hydrolytic manufacture of ethylene glycol.

c It is used in the preparation of <sup>non ionic</sup> non-ionic emulsifying agents, plastic, plasticizers and several synthetic textiles.

