

ASSIGNMENT ON ETHER  
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19/MHS01/344  
MEDICINE AND SURGERY

1 Give the IUPAC names of the following  
a  $\text{CH}_3\text{OCH}_3 \Rightarrow$  Methoxymethane

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

c  $(\text{CCH}_2\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O} \Rightarrow$  Butoxybutane

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

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

2 Discuss the properties of ethers

a Physical States: Ethers at room temperature are colourless, neutral liquids with pleasant odours. The lower alkyl chain ethers are highly flammable gases or volatile liquids.

b Solubility: In water ethers are ~~more~~ less soluble than alcohols of the same RMM because they do not possess hydrogen bonds. The higher the hydrocarbon content of ethers the lower the

solubility. Ethers though are soluble with most organic solvents.

c Density: Most simple ethers are less dense than water but the density of ethers increases with increasing RMM so some aromatic ethers are denser than water.

d Boiling Point: Lower mass ethers have lower boiling points than corresponding alcohols but for ethers containing alkyl radicals larger than four atoms become reverse as they have higher boiling points than alcohols.

e Reactivity: Ethers are very inert compounds at moderate temperatures and this leads to them being widely used as reaction media.

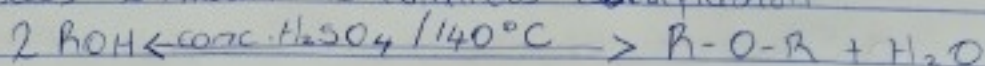
f Halogenation: Ethers undergo halogenation e.g. bromination upon the addition of a halogen in the presence or absence of catalyst.

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

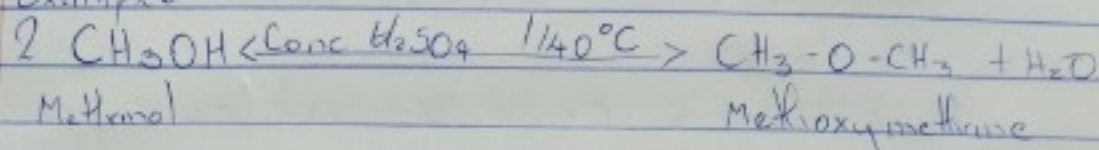
a Partial dehydration of alcohols

Simple ethers can be manufactured from alcohols by dehydration in presence of a catalyst. The alcohol in excess concentrated  $H_2SO_4$  acid is heated at a maintained temperature of  $140^\circ C$ . This

process is known as continuous esterification



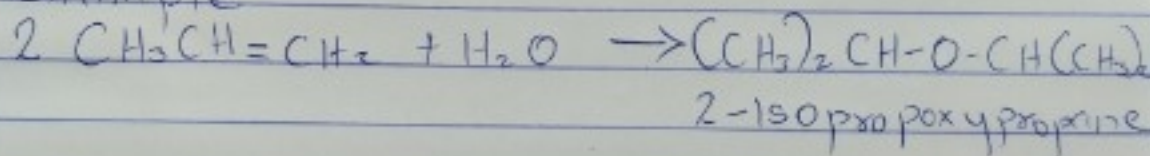
Example



b Controlled Catalytic hydration of Olefins

Alkenes (olefins) are hydrated with water to produce ethers the reaction is controlled.

Example



Olefins are quite easily hydrated to produce ethers but this is not a very common method practiced. The more commonly used methods are partial dehydration of alcohols and from haloalkanes.

If the reaction is not controlled the alkene could hydrate into an alcohol

4 State 3 uses of ethylene oxide

- a Ethylene oxide is used as an intermediate in the hydrolytic manufacture of ethylene glycol which is a precursor in the preparation of drugs
- b Ethylene oxide is used as a gaseous sterilizing agent
- c Ethylene oxide is used in the preparation of non-ionic emulsifying agents, plastics, plasticizers and several synthetic textiles