

### ASSIGNMENT

**1. Give the IUPAC names of the following organic compounds:**

$\text{CH}_3\text{OCH}_3 \longrightarrow$  Methoxymethane

$\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3 \longrightarrow$  Ethoxyethane

$(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O} \longrightarrow$  Butoxymethane

$\text{CH}_3\text{CH}_2\text{OCH}_3 \longrightarrow$  Methoxyethane

$\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3 \longrightarrow$  Ethoxypropane

**2. Discuss the properties of ethers**

- I. Physical states: ethers are colourless, neutral liquids with pleasant odours at room temperature. The lower aliphatic ethers are highly flammable gases or volatile liquids.
- II. Solubility: ethers are less soluble in water compared to the corresponding alcohols. Lower molecular weight ethers are fairly soluble in water due to the facts that the molecules are able to form hydrogen bonds with the water molecules. However as the hydrogen content of the molecules increases, there is a rapid decline in the solubility of the ethers. They are miscible with most organic solvents.
- III. Density: majority of the simple ethers are less dense than water, although the density increases as the relative molecular mass increases 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. However, ethers containing alkyl radicals larger than the four carbon atoms have a higher boiling point.
- V. Reactivity: ethers are inert at moderate temperature, which results in their wide use as a reaction media.

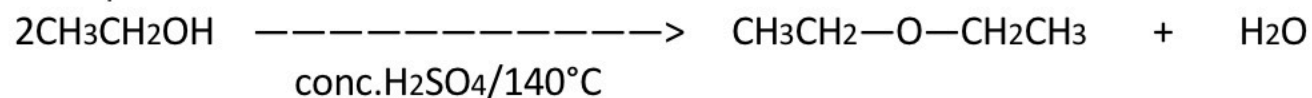
**3. Discuss explicitly two methods of preparing ethers and show equations or reaction**

I. Partial dehydration of alcohols:

Simple ethers can be manufactured from alcohols through the process of catalytic dehydration. The alcohol in excess and concentrated tetraoxosulphate(vi) acid is heated at a cautiously maintained temperature of  $140^\circ\text{C}$ . This process is called "continuous etherification"

However, further dehydration to yield Allene can occur if excess alcohol is not used as well as if the temperature is as high as 170-180°C.

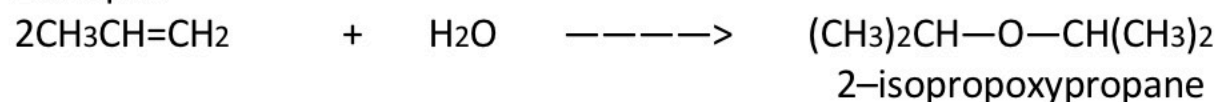
Example:



II. **Controlled catalytic hydration of olefins:**

This involves the addition of water to alkenes which are also known as olefins in order to manufacture ethers.

Example:



4. **State 3 uses of ethylene oxide**

- It can be used as an intermediate in the hydrolytic manufacture of ethylene glycol
- It can be used for the preparation of non ionic emulsifying agents, plastics, plasticisers as well as several synthetic textiles.
- Ethylene oxide can be used as a gaseous sterilising agent.

