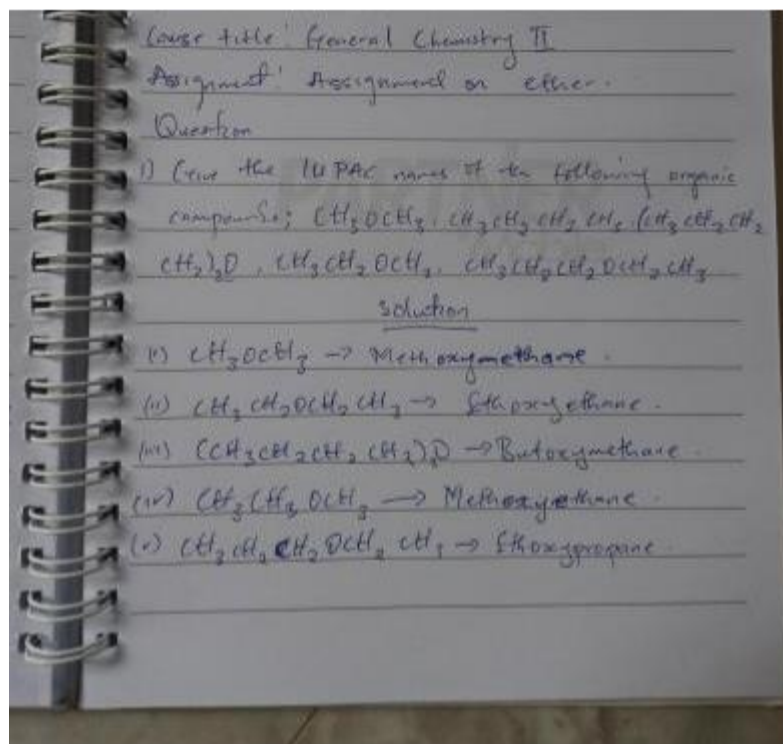


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DEPT : AERONAUTICAL & ASTRONAUTICAL ENGINEERING

MATRIC NO : 19/ENG 09/003

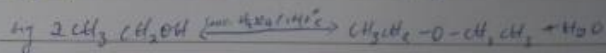
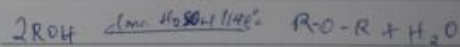


3) Discuss explicitly two methods of preparing ethers and show equations of reaction.

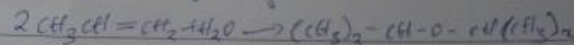
Solution

1. Partial dehydration of alcohol

Simple ether are manufactured from alcohol by catalytic dehydration. The alcohol is excess and concentrated sulphuric (vi) acid is heated at a carefully maintained temperature of 140°C . This process is known as continuous etherification. If excess alcohol is not used the temperature is as high as $170-180^{\circ}\text{C}$, further dehydration to yield alkenes occurs.



2. Controlled catalytic hydration of alkenes



2-Isopropoxypropane

EVI

4) State three uses of Ethylene oxide
Solution

- (1) Ethylene oxide is used as an intermediate in the hydrolytic manufacture of Ethylene glycol.
- (2) Ethylene oxide is used in the preparation of non-toxic emulsifying agents, plastics, and several synthetic textiles.
- (3) Ethylene oxide is used as a gaseous sterilizing agent.

EVI

2) Discuss the properties of ethers.
Solution

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

1) Solubility: Ethers are less soluble in water than the corresponding alcohols. Lower molecular weight ethers such as methoxy methane and methyl ethane are fairly soluble in water. Since the molecules are able to form hydrogen bonds with the water molecules but not the hydrogen content of the molecules increases, there is a rapid decline in solubility. They are miscible with most organic solvents.

3) Density: Most of the simple ethers are less dense than water, although the liquids become more dense with increasing