

19/ENG 061005

Mechanical Engineering

1.) IUPAC names of the following compounds

- CH_3OCH_3 - Methoxymethane
- $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxyethane
- $(\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2)_2\text{O}$ - Dibutyl ether
- $\text{CH}_3\text{CH}_2\text{OCH}_3$ - Methoxyethane
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{OCH}_2\text{CH}_3$ - Ethoxypropane

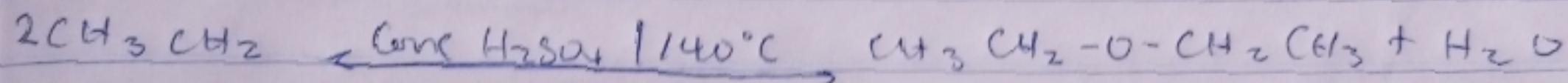
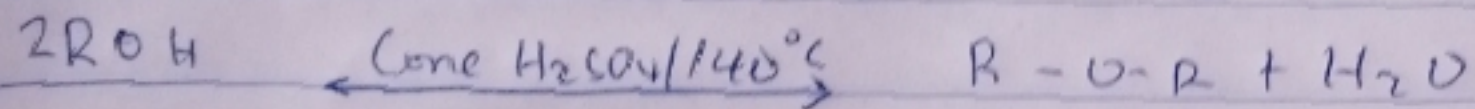
2.) Properties of ethers

- Physical State: At room temperature, they are colourless, neutral liquids. Lower aliphatic ethers are highly flammable gases.
- Solubility: Less soluble in water than alcohols. Lower weight ones are fairly soluble because they form hydrogen bonds with water, they are miscible with organic solvents.
- Density: Most simple ones are less dense than water, though density increases with increasing relative molecular mass, some aromatic are less dense than water.
- Boiling Point: Low molecular mass ethers have lower B.P than alcohols, the B.P of ethers approximate those of hydrocarbon with same relative molecular mass.
- Reactivity: They are inert at moderate temperature, this leads to their wide use as solvent reaction media.

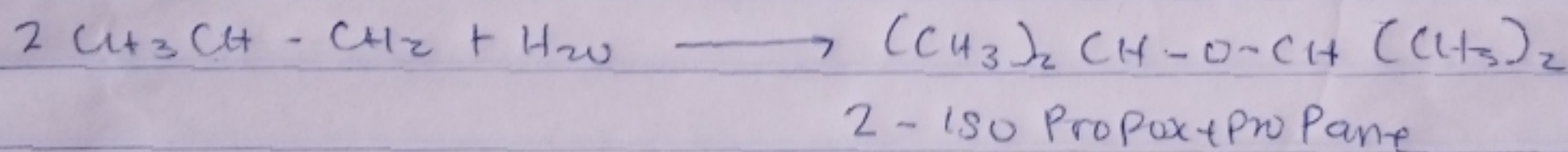
3) Two methods of preparing ethers and reaction equation

- Partial dehydration of alcohols - Simple ethers are manufactured

b) Catalytic dehydration, excess alcohol and conc H_2SO_4 is heated carefully to $140^\circ C$. This process is known as ethenification, temperature may rise to $170 - 180^\circ C$ if excess alcohol is not used further dehydration yields alkene



- Continued catalytic hydration of alkenes



4) Three uses of ethylene oxide

- Used as an intermediate in the hydrolytic manufacture of ethylene glycol

- It is used in the preparation of nonionic emulsifying agents, plastics, plasticizers and several synthetic textiles

- Ethylene oxide is used as a gaseous sterilizing agent