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Dept: MBBS

Course: CHTM 102

(1) Give the organic IUPAC names of the following organic compounds

- $C_2H_5OCH_3$  - Dimethyl ether
- $CH_3OCH_3$
- $CH_3CH_2OCH_2CH_3$  - Methoxyethane / Ethoxyethane
- $(CH_3CH_2CH_2)_2O$  - Butoxyethane
- $CH_3CH_2OCH_2CH_3$  - Methoxyethane
- $CH_3CH_2CH_2OCH_2CH_2CH_3$  - Ethoxy pentane

(2) Discuss the properties of ethers

- 1- An ether molecule has a net dipole moment - We can attribute this to the polarity of C-O bonds
- 2- The boiling point of ethers is comparable to that of alkenes
- 3- The miscibility of ethers with water resembles those of alcohols
- 4- Ether molecules are miscible in water
- 5- Most simple ethers are less dense than water.

Chemical properties

(1) Cleavage of C-O Bond: Ethers are generally very unreactive in nature when an excess of hydrogen halide is added to the ether, changing the C-O bond the place leading to the formation of alkyl halides. The order of reactivity is given as  $HCl > HBr > HI$

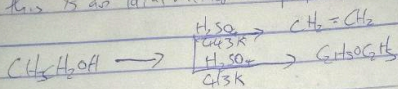
(2) Electrophilic substitution: The alkyl group in ether activates the aromatic ring at ortho and para positions for electrophilic substitution reactions or Halogenation

(3) Halogenation of Ethers: - Aromatic ether undergoes halogenation, for example bromination, upon the addition of halogen in the presence or absence of catalyst -

⑤ Discuss explicitly two methods of preparing ethers and show equations of reactions.

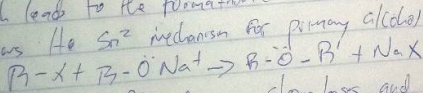
① preparation of ether by dehydration of alcohols: In the presence of protic acids (Sulphuric acid), alcohols undergo dehydration to produce alkenes and ethers under different conditions.

For example in the presence of Sulphuric acid, dehydration of ethanol at 413K yields ethene whereas it yields ethoxyethane at 413K. This is an ideal method of preparation through primary alcohols.



② Preparation of ethers by Williamson Synthesis:

Williamson Synthesis is an important method for the preparation of symmetrical and unsymmetrical ethers in laboratories. In this method, an alkyl halide is reacted with sodium alkoxide which leads to the formation of ether. The reaction generally follows the  $\text{S}_\text{N}2$  mechanism for primary alcohol.



As we know Alkoxides are strong bases and they can react with alkyl halides leading to elimination reactions.

③ State 3 uses of ethylene oxide

① it is used to make antifreeze

② it is used to make sterilization agents for medical equipment

③ it is used as a fumigant and pesticide