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## DEPARTMENT/COLLEGE: Dentistry/ MHS

## MATRIC NUMBER: 19/MHS09/004

## COURSE: CHM102, Chemistry

**ASSIGNMENT QUESTIONs**

1. Give the IUPAC names of the following organic compounds
2. CH3OCH3
3. CH3CH2OCH2CH3
4. (CH3CH2CH2CH2)2O
5. CH3CH2 OCH3
6. CH3CH2CH2OCH2CH3
7. Discuss the properties of ethers
8. Discuss explicitly two methods of preparing ethers and show equations of reaction
9. State three uses of ethylene oxide

**ANSWERS**

1i. CH3OCH3: Methoxymethane

ii. CH3CH2OCH2CH3: Ethoxyethane

iii. (CH3CH2CH2CH2): Pentanamide

iv. CH3CH2 OCH3: Ethoxproane

v. CH3CH2CH2OCH2CH3: Ethoxrproane

2a. **Physical properties:**

1. An ether molecule has a net dipole moment due to the polarity of C-O bonds
2. The miscibility of ethers with water resembles those of alcohols
3. The boiling point of ethers is comparable to the alkanes but much lowers than that of alcohols of comparable molecular mass despite the polarity of C-O bond
4. Ether molecules are miscible in water

b. **Chemical properties:**

1. Does not react with bases, active metals, oxidizing agents and reducing agents
2. Strong acids will cleave ethers at elevated temperatures
3. When stored in presence of oxygen, ethers will form explosive peroxides such as; diethyl ether peroxide

3a. **Preparation of ethers with acid anhydrides**

This reaction can again be used to make esters from both alcohols and phenols. The reactions are slower than corresponding reactions with acyl chlorides, and you usually need to warm the mixture. In the case of a Phenol, you can react the phenol with sodium hydroxide solution first, producing the more reactive phenoxide ion.

Taking ethanol reacting with ethanoic anhydride as a typical reaction involving an alcohol; There is a slow reaction at room temperature or faster on warming. There is no visible change in the colourless liquids, but a mixture of ethyl ethanoate and ethanoic acid is formed.

(CH3CO)2O+CH3CH2OH------>CH3COOCH2CH3+CH3COOH(2)

b. **Partial dehydration of alcohols:** simple ethers are manufactured from alcohols by catalytic dehydration. The alcohol in excess and concentrated tetraoxosulphate(vi) acid is heated at carefully maintained temperature of 140oc. This process is known as continuous etherification.

2ROH conc. H2SO4/140Oc CR-O-R+ H2O.

E.g 2CH3CH2OH conc. H2SO4/140Oc CH3CH2-O-CH2CH3+H2O

**4 USES OF ETHYLENE OXIDE.**

It is used to make antifreeze, adhesives, detergents, polyester, fumigants and pesticides, and also sterilization agents for medical equipments.