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**COURSE CODE: CHM 102**

**COURSE TITLE: GENRAL CHEMISTRY II**

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

a. CH3OCH3          b. CH3CH2OCH2CH3

c. (CH3CH2CH2CH2)2O          d. CH3CH2 OCH3

e. CH3CH2CH2OCH2CH3

**ANSWER**

1. CH3OCH3 =methoxymethane
2. CH3CH2OCH2CH3 = diethyl ether
3. (CH3CH2CH2CH2)2O = pent-1-ene
4. CH3CH2 OCH3 =methoxy propanoate
5. CH3CH2CH2OCH2CH3 = ethoxy propane

**QUESTION: 2.** Discuss the properties of ethers

**ANSWER**

* The lower ethers are highly volatile and flammable.
* Lower ethers also act as [anaesthetics](https://en.wikipedia.org/wiki/Anaesthetics).
* Ethers are good organic solvents.
* Simple ethers (such as diethyl ether) are tasteless.

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

**ANSWER**

**1) Preparation of Ethers 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 443 K yields ethene. On the other hand, it yields ethoxyethane at 413 K. This is an ideal method of preparation for primary alcohols.

The preparation of ethers by dehydration of an alcohol is a nucleophilic substitution reaction. There are two major roles of the alcohol that we find in this reaction. One is that the alcohol molecule can act as the substrate while the other is that it acts as a nucleophile. It can follow either SN1 or SN2 mechanism.

The choice of mechanism is dependent on whether the protonated alcohol loses water before or simultaneously upon the attack of a second alcohol molecule. Generally, we will find that the secondary and tertiary alcohols follow SN1 mechanism. While on the other hand, the primary alcohols follow SN2 mechanism.

**2) Preparations of Ethers by Williamson Synthesis**

Williamson synthesis is an important method for the preparation of symmetrical and asymmetrical ethers in laboratories. In this method, we carry out a reaction of an alkyl halide with sodium alkoxide which leads to the formation of ether. The reaction generally follows SN2 mechanism for primary alcohol.

As we know alkoxides are strong bases and they can react with alkyl halides. Thus, they take part in elimination reactions. Williamson synthesis exhibits higher productivity in case of primary alkyl halides.

**QUESTION:** 4.  State three uses of ethylene oxide

**ANSWER**

1. Used for sterilization
2. Used in the production of fiberglass
3. Used in the synthesis of ethylene glycol