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Department of Nursing
CHEM 102
Assignment

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

(a) CH_3OCH_3 - Methoxymethane

(b) $CH_3CH_2OCH_2CH_3$ - Ethoxyethane.

(c) $CH_3CH_2CH_2CH_2)_2O$ - Butoxymethane.

(d) $CH_3CH_2OCH_3$ - Methoxyethane.

(e) $CH_3CH_2CH_2OCH_2CH_3$ - Ethoxypropane.

(2) Discuss the properties of ethers
There are physical and chemical properties of Ethers.

(a) Physical Properties
- Ether molecule has a net dipole moment due to the polarity of C-O bonds.
- The boiling point of ethers is comparable to the alkanes but much lower that that of alcohols of comparable molecular mass despite the polarity of the C-O bons. The miscibility of ethers with water resembles those of alcohols./
- Ether molecules are miscible in water. This is attributed to the fact that have alcohol, the oxygen atom of either can also form hydrogen bonds with a water molecule.

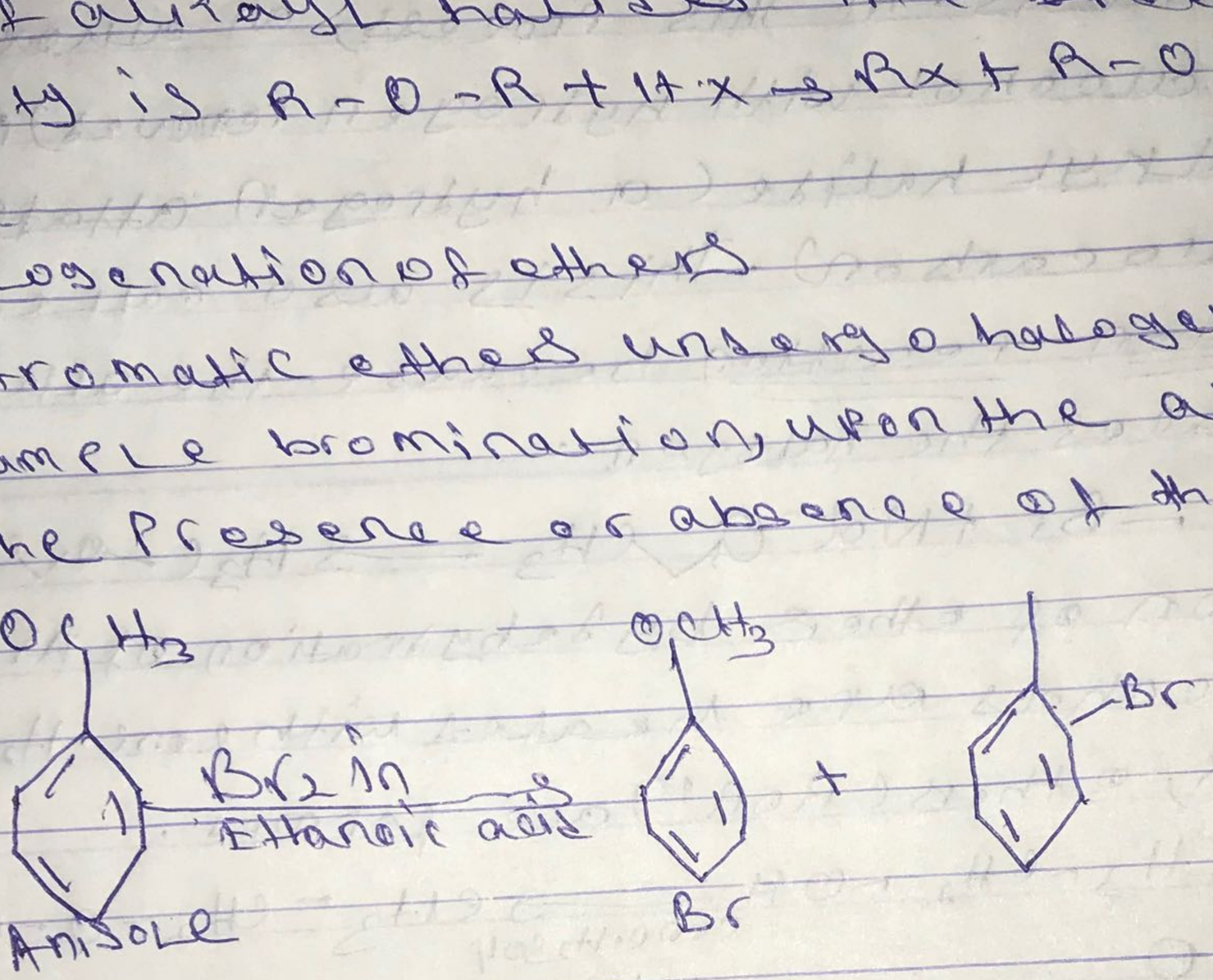
(b) Chemical properties

- Cleavage of C-O bonds.

Ethers are generally very unreactive in nature. when an excess of hydrogen halide is added to the ether cleavage of C-O bons takes Place Leading to the formation of alkayl halides. The order of reacti-vity is R-O-R + HX → RX + R-OH.

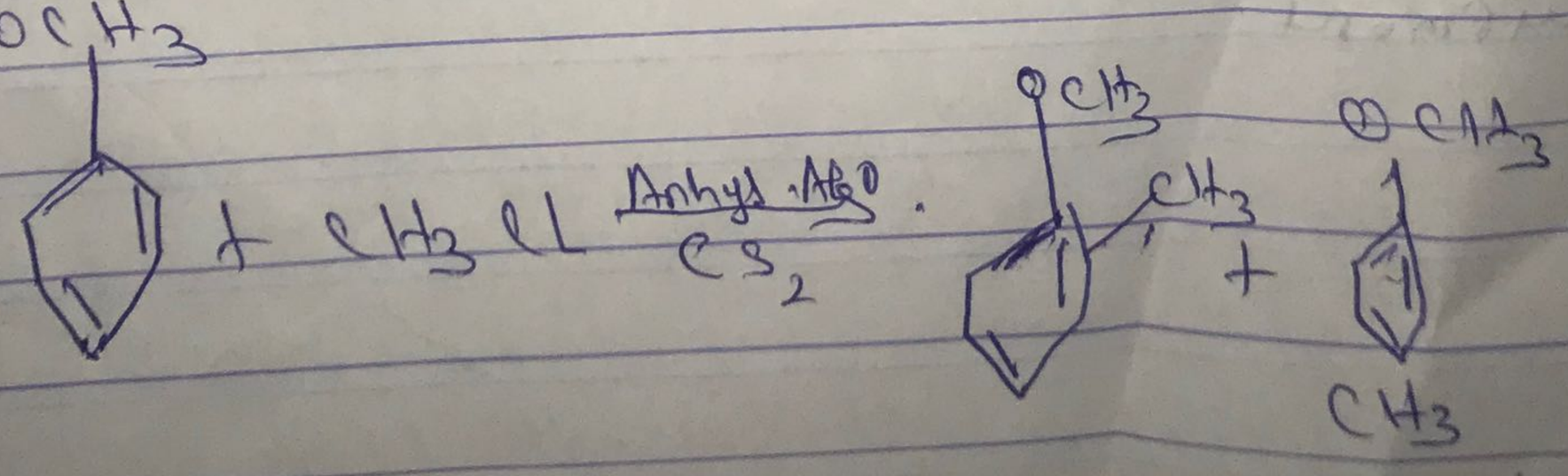
Halogenation of ethers

Aromatic ethers undergo halogenation for example bromination, upon the addition halogen in the Presence or absence of the catalyst.



- Friedel Crafts Reaction of Ethers.

Aromatic ethers undergo friedel crafts reaction for example addition of alkyl or acyl group upon the reaction with alkyl or acyl halide in the presence of a lewis acid as catalyst.



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

William Ether synthesis

Ethers can be made or synthesized using a method discoverers by Alexander Williamson, which is ally names the William Ether Synthesis. In this process, an alkoxide ion (an alcohol with hydrogen removes) reacts with an alkyl halide (a hydrogen attaches to a hydrocarbon). This is also called substitution reaction because the alkoxide ion replaces the halogen.

$$H_3C-Br + NaO-CH_3 \longrightarrow H_3C-O-CH_3 + NaBr$$

(b) Preparation of ethers by dehydration of Alcohols

When alcohols are heated with conc. H_2SO_4 at 413K, ethers (ROR^1) are formed.

$$2CH_3-CH_2-OH \xrightarrow[413K]{\text{conc. } H_2SO_4} CH_3-CH_2-O-CH_2-CH_3 + H_2O$$

(4) uses of ~~ether~~ ethylene oxide

(1) it is used as a raw material for industrial manufacture of ethylene glycol

(2) it is used as a fumigant for foods and textile.

(3) It is also used as a sterilant for medical equipment.