BARANGO OBELEM EMMANUELLA
PHARMACY
CHM 102
19/MHS11/039

1) Alcohol are very important organic compound. Discuss briefly their classification and give one example each

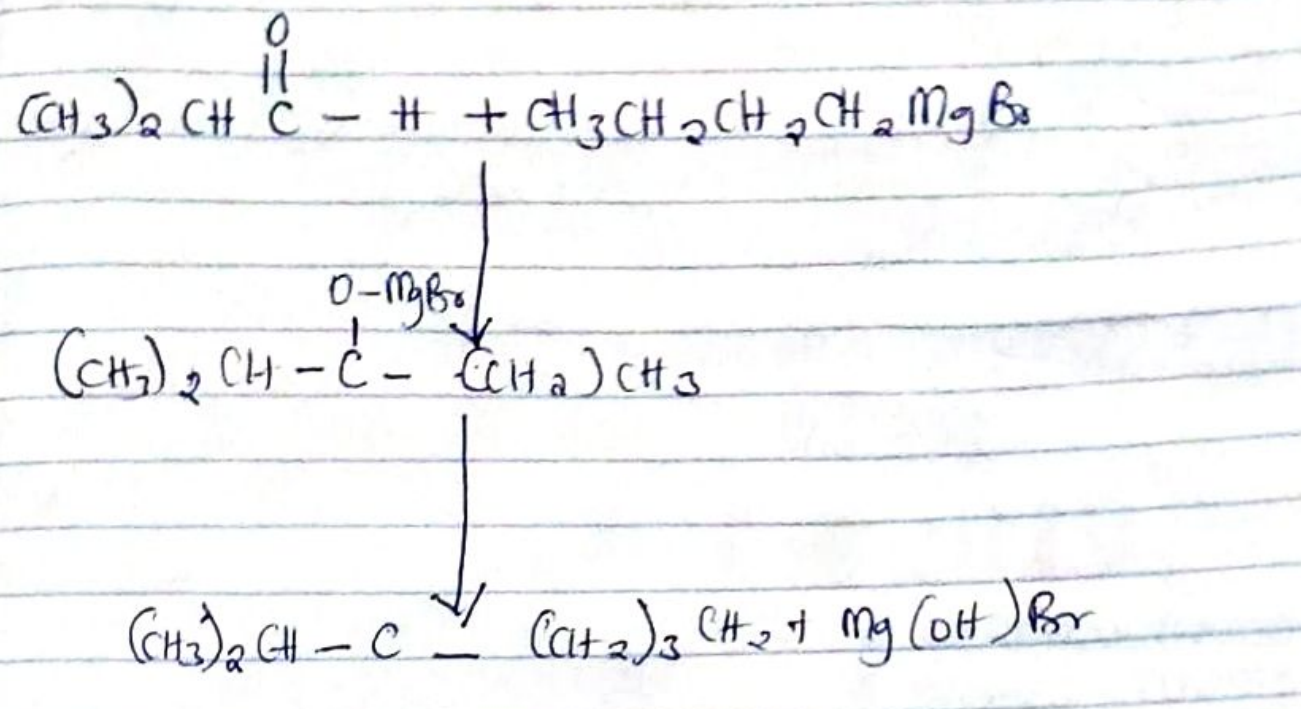
a) Based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group :- If the numbers of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three or two, it ~~contain~~ is called a primary alcohol (1°) If it is one hydrogen atom, it is called Secondary alcohol (2°) and if no hydrogen atom is attached to the Carbon atom bearing the hydroxyl group, it is called Secondary alcohol (2°) and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol (5°) e.g $CH_3CH(OH)CH_3$ → (Propan-2-ol)

b) Based on the number of hydroxyl group they posses: Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols also known as glycols have two hydroxyl groups present in the alcohol structure while ~~tri~~ hydric alcohols or triols have three hydroxyl groups present in the alcohol structure. polyhydric alcohols or polyols have more than three hydroxyl alcohols. E.g, $CH_3CH_2CH_2OH$ (Propanol)

c) Discuss the solubility of ~~water~~ alcohols in water, organic solvent

Alcohols are soluble in water. This is due to the lower alcohols with up to three carbon atoms in their molecules because those lower alcohols come from hydrogen bond with water molecules. As the lenght of the hydrocarbon chain increases, the solubility in water decreases. All monohydric alcohols are soluble in organic solvents. The solubility of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molec

1. Show the reaction between 2-methyl propanal and butyl magnesium chloride. Hint: Grignard synthesis. Note: Show all structures



3 Show the three steps in the industrial manufacture of ethanol. Equation of reaction are mandatory.

Production of Ethanol:-

Carbohydrates such as starch are major group of natural compounds that can be made to yield ethanol by the biological process of fermentation. The biological catalysts, enzymes found in yeast break down the carbohydrate molecules into ethanol to give a yield of 95%. The starch containing materials include molasses, potatoes, cereals, rice and on warming with malt to 60°C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.

$$\underset{\text{carbohydrate}}{2(C_6H_{10}O_5)_n} + H_2O \xrightarrow[\text{diastase}]{60^\circ C} \underset{\text{maltose}}{nC_{12}H_{22}O_{11}}$$

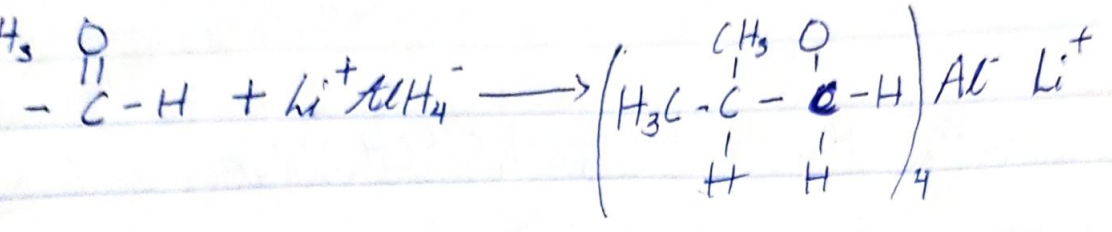
The maltose is broken down into glucose in addition of yeast which contains the enzyme maltase and at a temperature of 15°C.

$$\underset{\text{maltose}}{C_{12}H_{22}O_{11}} + H_2O \xrightarrow[\text{maltase}]{15^\circ C} \underset{\text{glucose}}{2C_6H_{12}O_6}$$

The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme Zymase contained also in yeast.

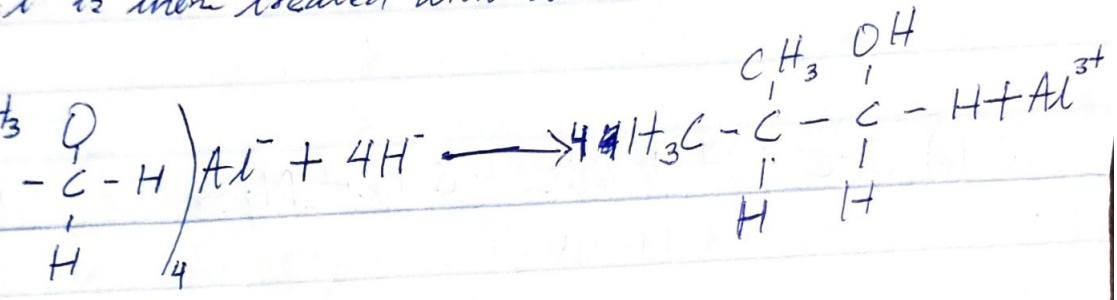
$$\underset{\text{glucose}}{C_6H_{12}O_6} \xrightarrow[\text{zymase}]{15^\circ C} \underset{\text{Ethanol}}{2CH_3CH_2OH} + 2CO_2$$

7 Show the reduction reaction of 2-methyl propanal.
Using lithium tetra hydridoaluminate ($LiAlH_4$)



2-methyl propanal

Product is then treated with dilute acid



Product => 2 methyl propanol.

8 Propose a scheme ~~of~~ for the conversion of propan-1-ol to propan-2-ol.