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Department :- COMPUTER ENGINEERING | Course :- CHM 102

Assignment

1) This is 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 is called a primary (1°) alcohol. If it is one hydrogen atom, It is called secondary (2°) alcohol and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary (3°) alcohol.

Example

CH_3OH Methanol (1°)

ii) This is based on the number of hydroxyl groups they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols are also called Glycols have two hydroxyl groups present in the alcohol structure while trihydric alcohols or triols have three hydroxyl groups present in the structure of the alcohol. Polyhydric alcohols or polyols have more than three hydroxyl groups.

Example.

$CH_3CH_2CH_2OH$ propanol (Monohydric alcohol)

2) Lower alcohols with up to three carbon atoms in their molecules are soluble in water because these lower alcohols can form hydrogen bond with water molecules. The water solubility of alcohols decreases with increasing relative molecular mass. All monohydric alcohols are soluble in organic solvents. The solubility of simple alcohols are polyhydric alcohols is largely

due to their ability to form hydrogen bonds with water molecules.

3) Carbohydrates such as starch are major group of natural compounds that can be made to yield ethanol by the biological process of fermentatotion. The biological catalysts, enzymes found in yeast breaks down the carbohydrate molecules into ethanol to give a yield of 95%.

STEP 1

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.

$$2(C_6H_{10}O_5)_n + nH_2O \xrightarrow{60^\circ C/\text{diastase}} nC_{12}H_{22}O_{11}$$

Carbonhydrate. Maltose

STEP II

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

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow{15^\circ C/\text{maltase}} 2C_6H_{12}O_6$$

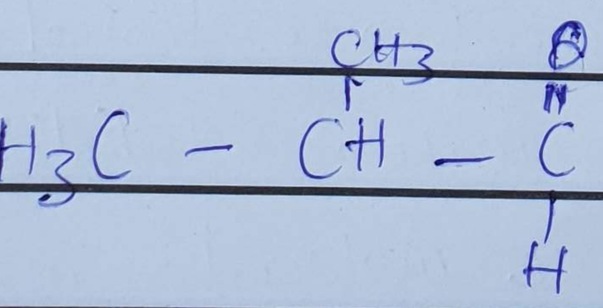
Maltose glucose.

STEP III

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

$$C_6H_{12}O_6 \xrightarrow{15^\circ C/\text{Zymase}} 2CH_3CH_2OH + 2CO_2$$

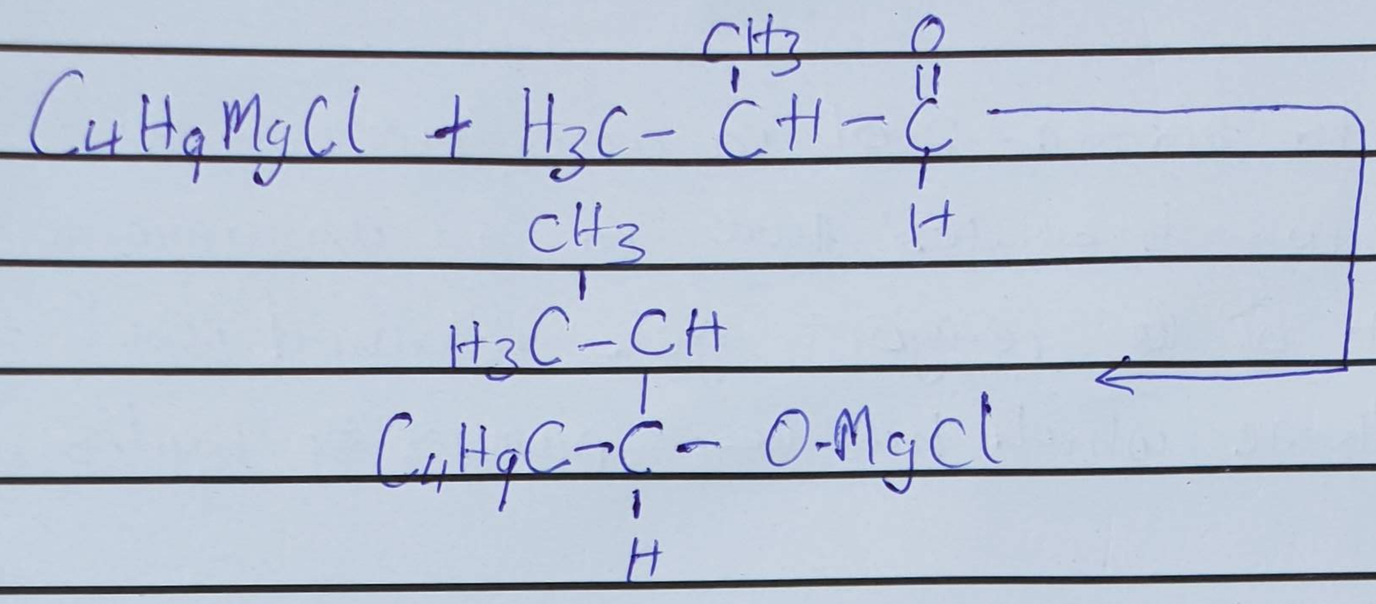
Glucose Ethanol.

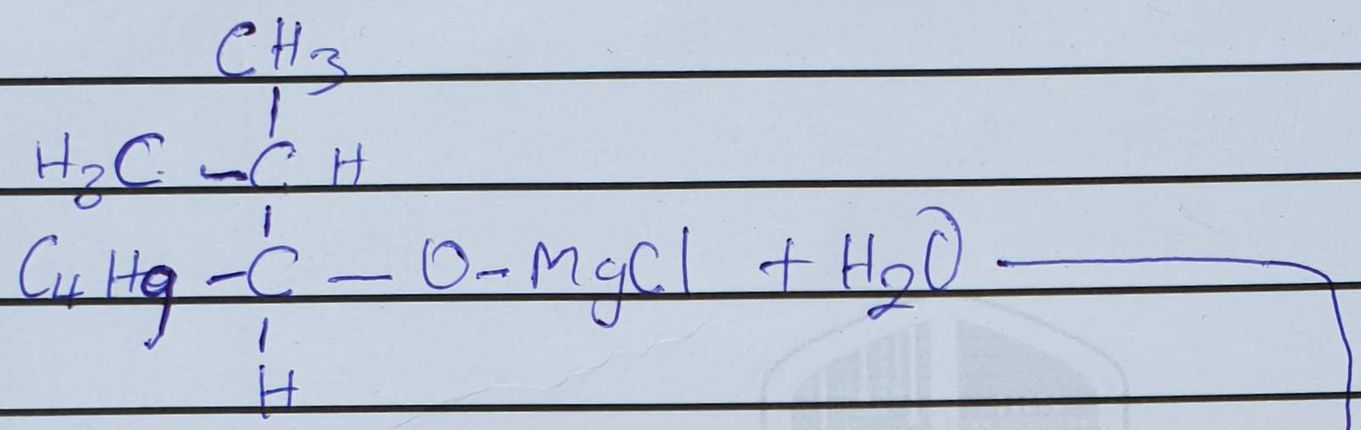
4) 

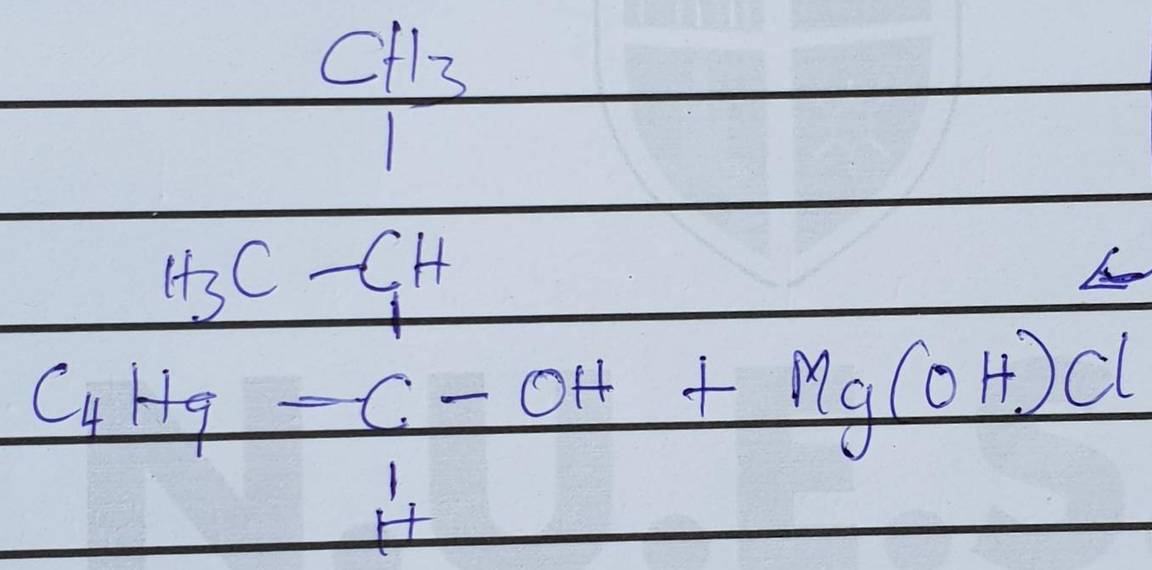
2-methyl propanal

$C_4H_9 - MgCl$

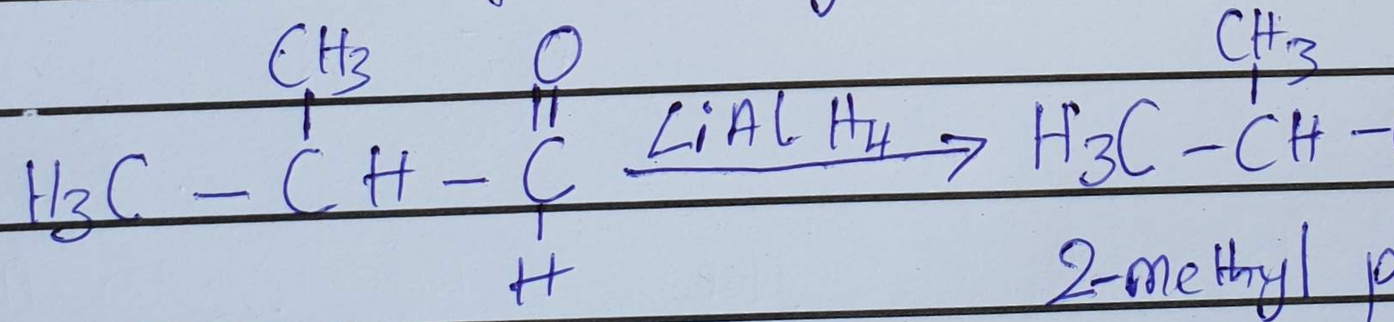
Butylmagnesiumchloride.







7) Reduction of 2-methyl propanal



2-methyl propan-1-ol.

8i) Dehydration of propan-1 ol

$CH_3CH_2CH_2OH \xrightarrow{Conc.\ H_2SO_4} CH_3CH = CH_2 + H_2O$

ii) Hydrolysis of propene

$CH_3 - CH = CH_2 \xrightarrow{H_2O} CH_3 - CH_2 - OH - CH_3$

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Propene is hydrolyzed to propan-2-ol in accordance with Markownikoffs addition which states that in an unsymmetrical reagent the negative part of the reagent gets attached itself to the carbon atom of the alkene which has less number of hydrogen atoms.