Medicine and Surgery

1 Classification of alcohols

a Based on the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group

* Primary alcohol: has 2 or 3 hydrogen atom attached to the carbon bearing the hydroxyl group e.g CH_3OH
* Secondary alcohol: has 1 hydrogen atom attached to the carbon atom bearing the hydroxyl group e.g $CH_3CH(OH)CH_3$
* Tertiary alcohol: has no hydrogen atom attached to the carbon bearing the hydroxyl group e.g $(CH_3)_3C-OH$.

b Based on the number of hydroxyl group they possess

* Monohydric alcohol: has one OH group present in the alcohol structure e.g $CH_3CH_2CH_2OH$
* Dihydric alcohol/glycol: has two OH group present in the alcohol structure e.g $HOCH_2CH_2OH$
* Trihydric alcohol/triol: has three OH group present in the alcohol structure e.g $CH_2(OH)CH(OH)CH_2OH$
* Polyhydric alcohols/polyols: has more than three hydroxyl groups e.g $CH_3CH(OH)CH(OH)CH(OH)CH(OH)CH(OH)CH_3$

2 Solubility of alcohols in water: lower alcohols with up to three carbon atoms in their molecules are soluble in water because they are able to form hydrogen bond with the molecules. The solubility of alcohols decreases with increasing Rmm. The solubility of simple alcohols and polyhric alcohols is largely due to their ability to form Hydrogen bonds with H_2O

Solubility in organic solvents: All monohydric alcohols are soluble in organic solvent.

3 Production of ethanol

1 The starch containing materials include molasses, potatoes etc and on warming with malt to 60°C for a specific period is converted into maltose by the enzyme diastase in malt

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

carbohydrate maltose

Medicine & Surgery

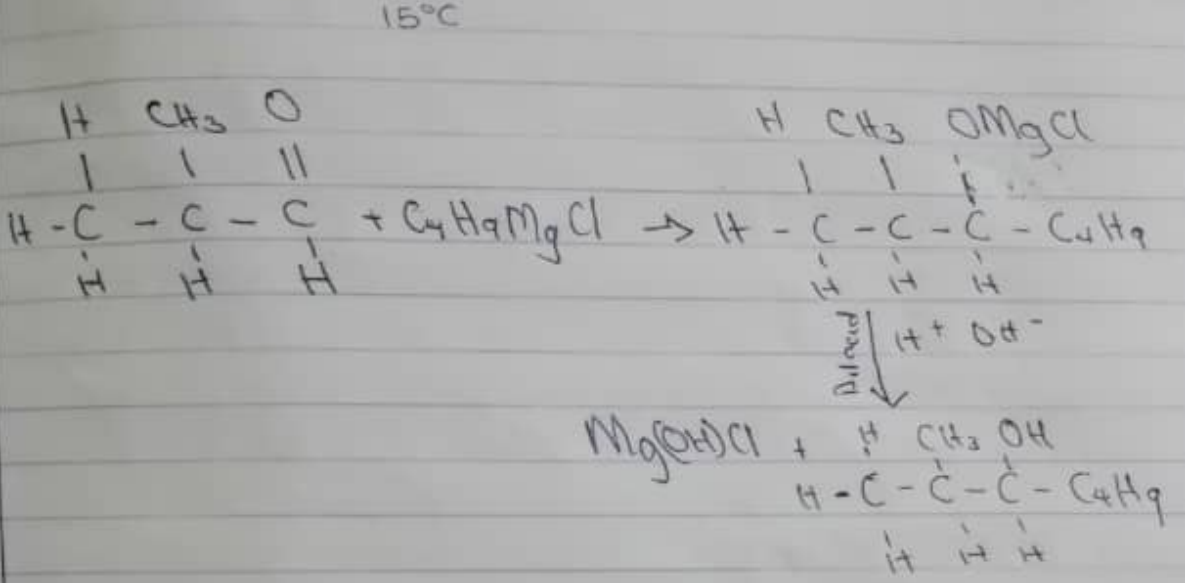
ii) Maltose is then converted into glucose using yeast which contain the enzyme maltase and at a temperature of 15°C

$$nC_{12}H_{22}O_{11} + H_2O \xrightarrow[15°C]{\text{maltase}} 2C_6H_{12}O_6$$

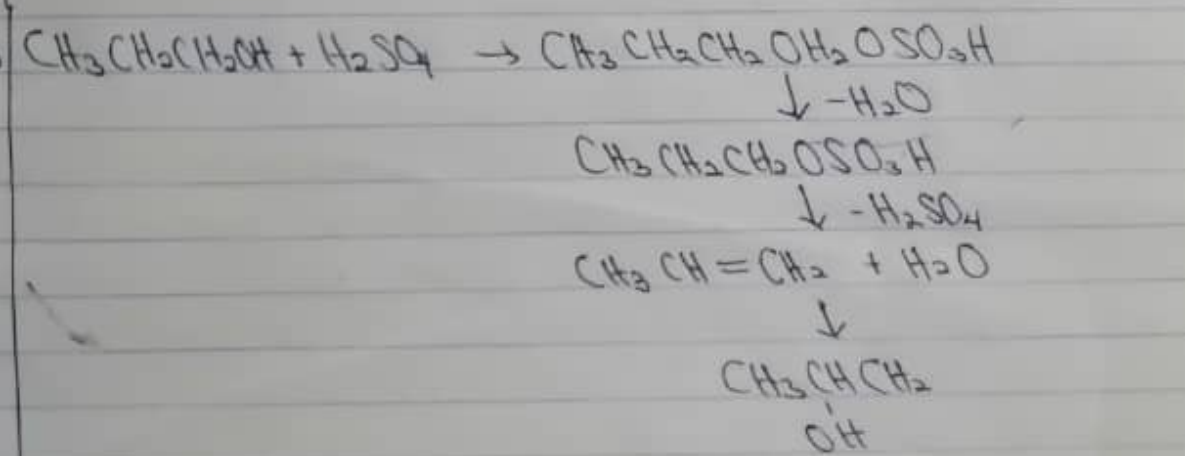
iii) The glucose at a constant temperature of 15°C is converted to ethanol by the enzyme zymase contained also in yeast

$$C_6H_{12}O_6 \xrightarrow[15°C]{\text{Zymase}} 2CH_3CH_2OH + 2CO_2$$

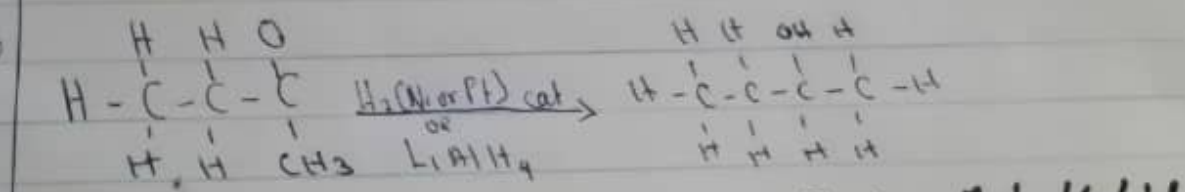
4



5



6



BABAKANO RABIATU ALIYU
19/MHS01/113