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 atom 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 $OHCH_2CH(OH)CH_2OH$
* 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 H_2O 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

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

carbohydrate → maltose

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

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

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

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

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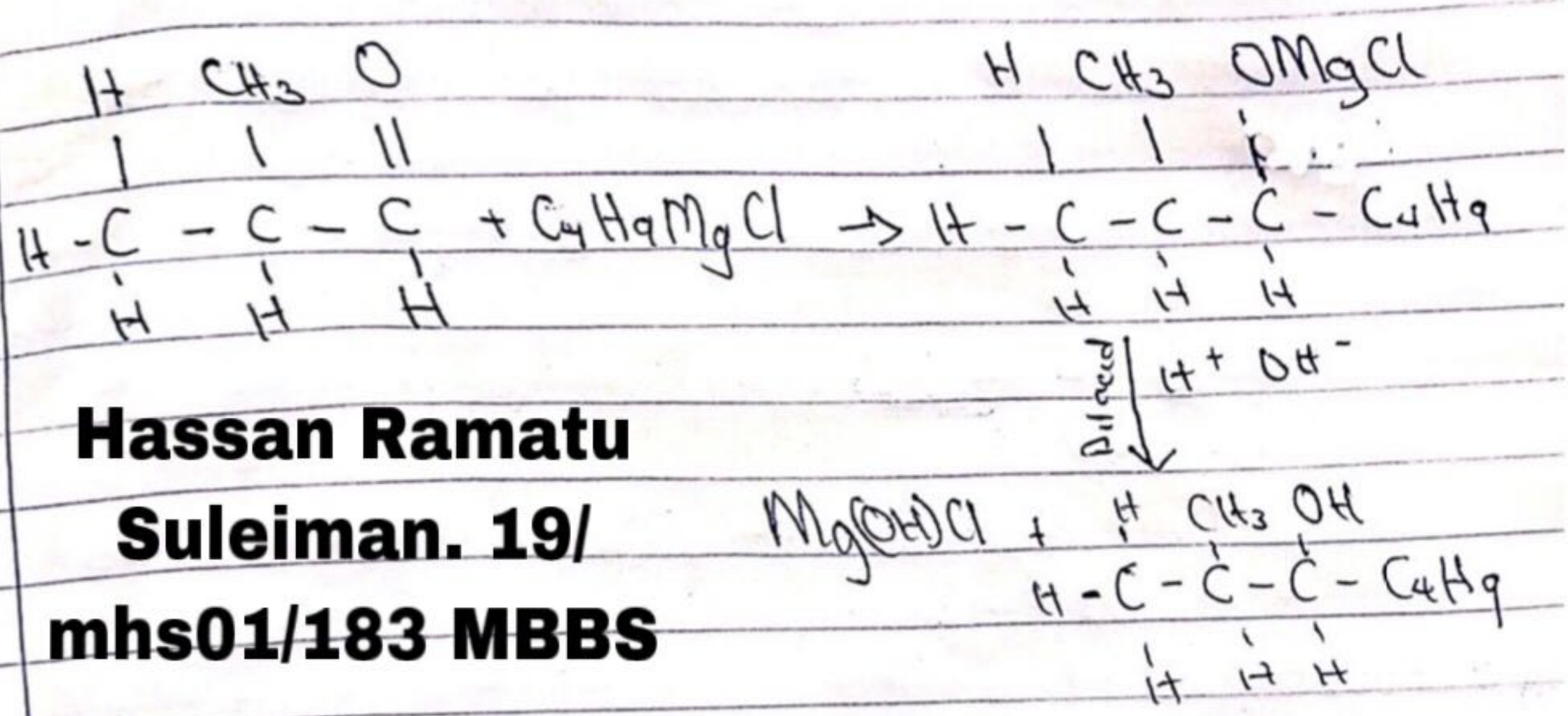

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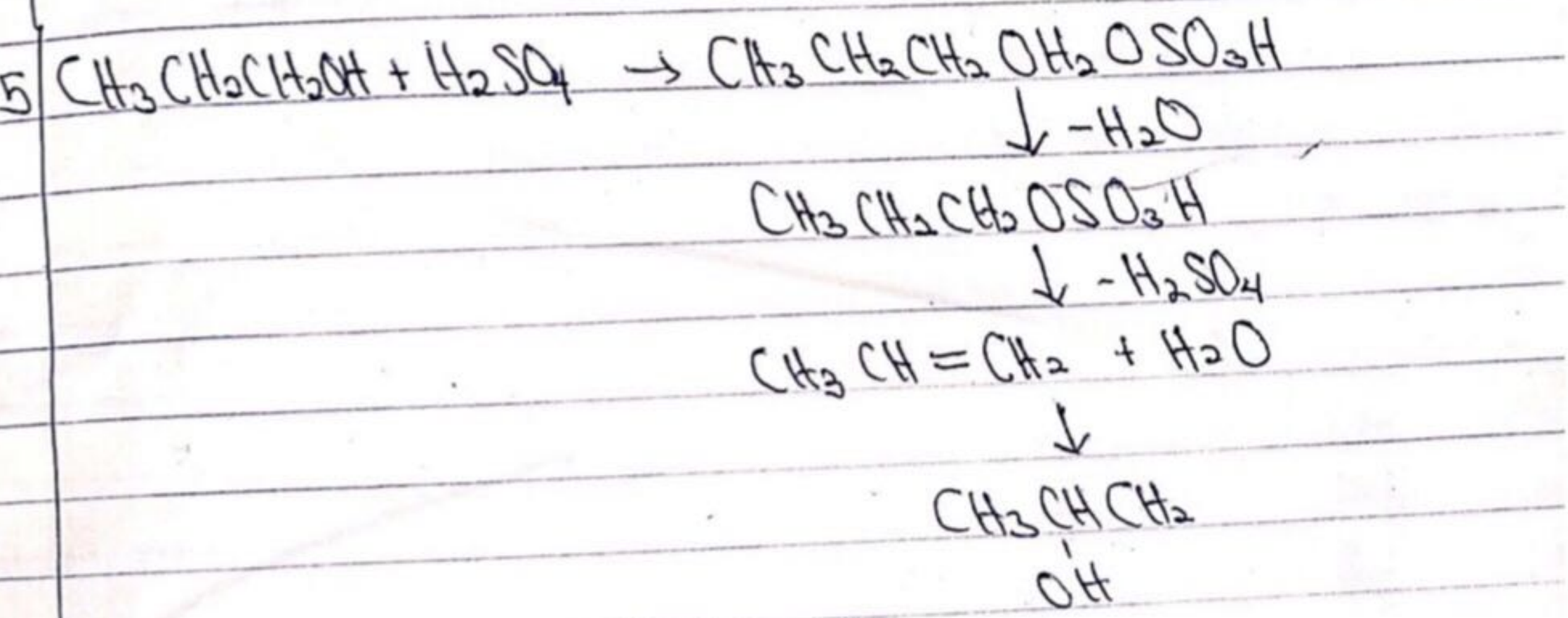
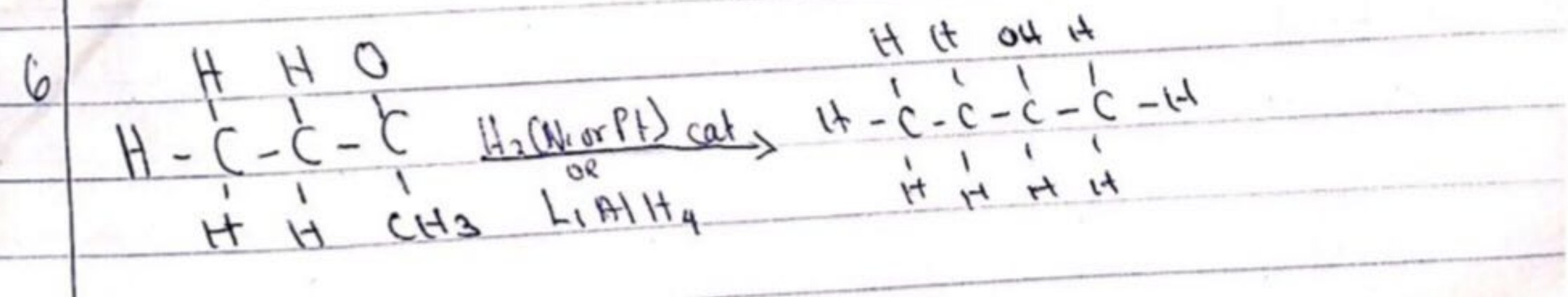
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