19/MHS02/068

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Matric no: 19/MHS02/068
Dept: Nursing
COURSE: CHM 102 Assignment:

1a) Based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. If the number of hydrogen atoms attached to the carbon atom bearing hydroxyl group are 5 or 2, it is called secondary alcohol (C^2) and if not hydrogen atom is attached to the atom bearing the hydroxyl group, it is called a tertiary alcohol (C^3)

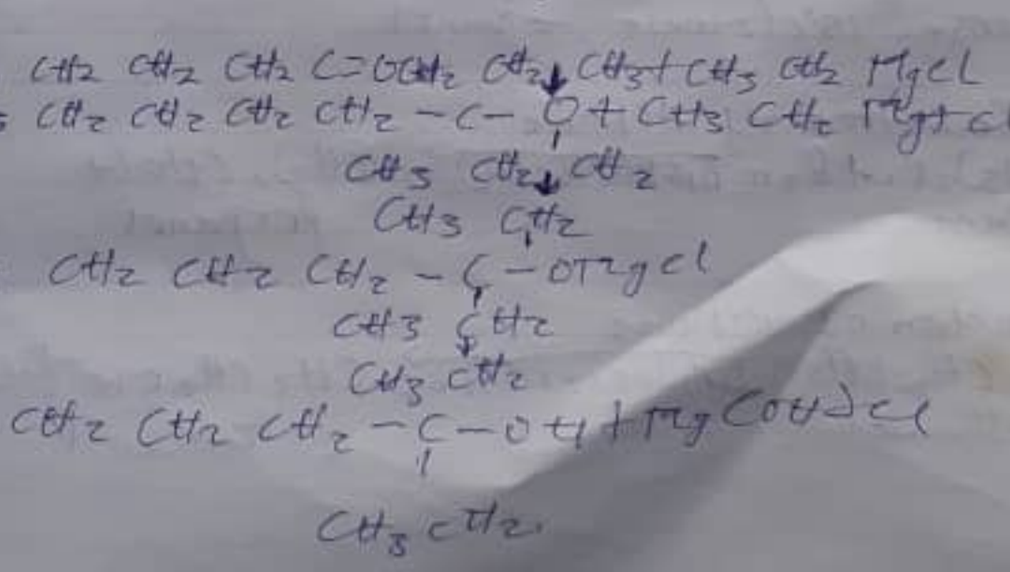
e.g (i) CH_3OH - Methanol (C^1)

(ii) $CH_3CH(OH)CH_3$ Propan-2-ol (C^2)

1b) Based on the number of hydroxyl group they posses monohydric alcohol that have one hydroxyl group present in the alcohol structure. Dihydric alcohol are also called glycols, they have two hydroxyl group present in the alcohol structure while trihydric or triols have 3 hydroxyl group present in the structure of the alcohol. polyhydric alcohols or polyols have more than three hydroxyl groups e.g (i) $CH_3CH_2CH_2CH_2OH$ propanol (monohydric)

(ii) $HOCH_2CH_2OH$ ethane-1,2 (dihydric alcohol)

2)



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

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

Carbohydrate maltose

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

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) Reduction of Alkane

$$(CH_3)_2CO + H_2 \xrightarrow{LiAlH_4/(C_2H_5)_2O} (CH_3)_2CHOH$$

Propane Propanol

Reduction of alkanes

$$CH_3CHO + H_2 \xrightarrow{LiAlH_4/(C_2H_5)_2O} CH_3CH_2OH + H_2O$$

Ethanal Ethanol