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MATRIC NUMBER: 19/MHS02/062

DEPARTMENT: NURSING

COURSE CODE: CHM 102

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

- Alcohols are classified based on the number of hydrogen atoms that are attached to the carbon atom containing the hydroxyl group. If the number of hydrogen atom attached to the carbon atom bearing the hydroxyl group is two or three then it is called a primary alcohol, then if it is one hydrogen atom it is called a secondary alcohol, if there is no hydrogen at all that is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol. Example; $\text{CH}_3\text{CH}_2\text{OH}$ (Ethanol).
- Alcohols are also classified based on the number of hydroxyl group present. If it is one hydroxyl group, it is called monohydric. If it is two hydroxyl group, it is called dihydric or glycols, if there are three hydroxyl group, it is called trihydric then if there are more than three hydroxyl group, it is called polyhydric alcohol or polyols. Example; $\text{HOCH}_2\text{CH}_2\text{OH}$ ethane 1,2- diol (dihydric alcohol).

2) Discuss the solubility of alcohols in water and organic solvents.

- Solubility of alcohols in water:

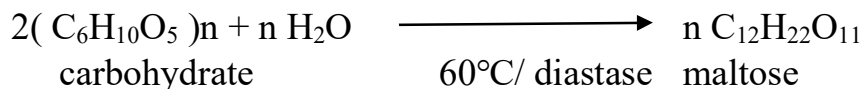
Lower alcohols with up to three carbon atom in their molecules are soluble in water because the lower alcohol can form hydrogen bond with molecules of water. The water solubility of alcohols decreases with increase of relative molecular mass.

- Solubility of alcohols in organic solvents:

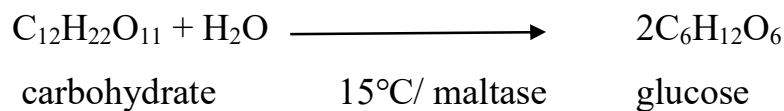
Monohydric alcohols are soluble in organic solvents. The solubility of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bond with water molecule.

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

Starch containing materials like potatoes, yam, cereal, rice e.t.c is warmed with malt to 60°C for a specific period of time the enzyme called diastase in the malt, converts it to maltose.



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



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

