

NAME: Nwokorie PASCAL CHINAMDI

DEPARTMENT: MECHATRONICS ENGINEERING

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COURSE CODE: CHEM 102

01. Alcohols are very important organic compounds - Discuss briefly their classification and give ~~an~~ one example of each

A. Based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group: If the number of hydrogen attached to the carbon atom containing the hydroxyl group are three or two, it's a primary alcohol (1°), if it's one hydrogen atom, it's a secondary alcohol (2°) and if no hydrogen atom is attached, it's a tertiary alcohol (3°) e.g.
 $\text{CH}_3\text{CH}_2\text{OH}$ Ethanol (1°)

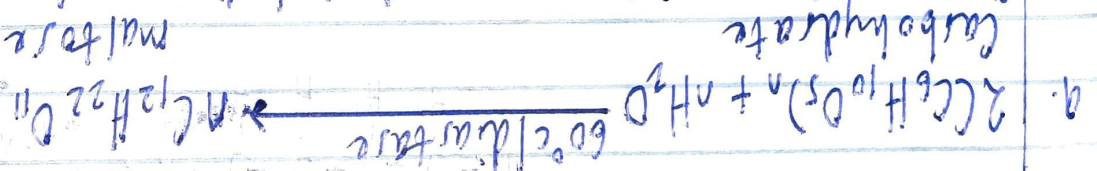
B. Based on the number of Hydroxyl groups they possess:

Monohydric alcohols have one hydroxyl group present in the alcohol structure, dihydric alcohol also known as Glycols have two hydroxyl group present in the alcohol structure while trihydric alcohols or triols have three hydroxyl group in the structure and polyhydric alcohols or polyols have more than three hydroxyl groups. E.g. $\text{HOCH}_2\text{CH}_2\text{OH}$ Ethane-1,2-diol (Dihydric alcohol)

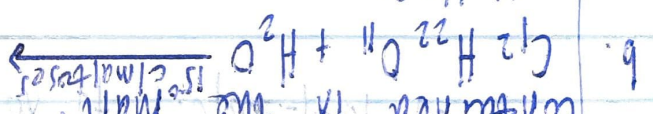
02. Discuss the solubility of alcohols in water, organic solvent
Water: Lower alcohols have up to three carbon atoms in their molecules are soluble in water because these lower alcohols can form hydrogen bonds with water molecules. The water solubility of alcohols decreases with increasing relative molecular mass.

Organic Solvents: All monohydric alcohols are soluble in organic solvent. The solubility of simple alcohols and polyhydric alcohol is largely due to their ability to form hydrogen bonds with water molecules.

03. Show the three steps in the industrial manufacture of ethanol. Equation of reaction are mandatory.



The starch containing materials including molasses, potatoes, cereals, rice and on warming with malt to $60^\circ C$ for a specific period of time are converted into maltose by the enzyme diastase.

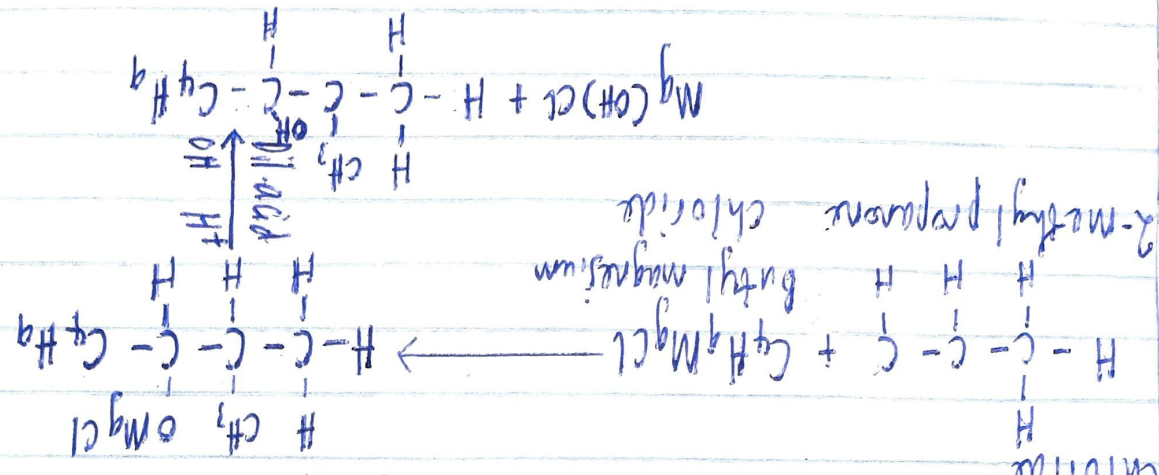


The maltose is broken down into glucose on addition of yeast which contains the enzyme, maltase, at a temperature of $15^\circ C$.

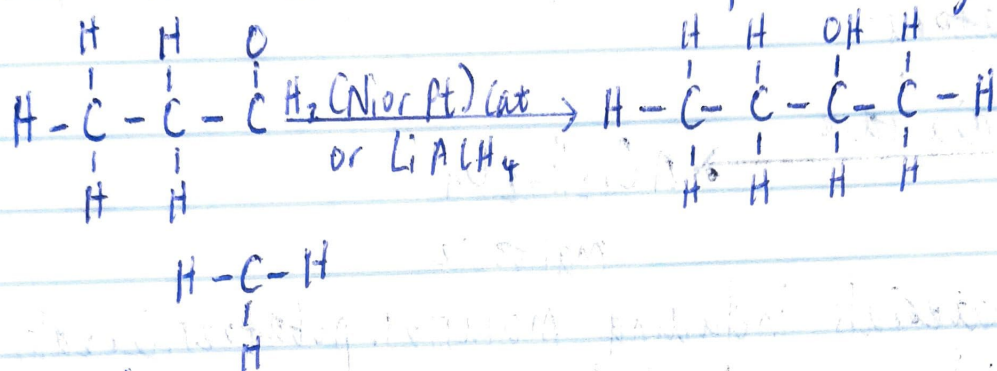


The glucose at constant temperature of $15^\circ C$ is then converted into alcohol by the enzyme, zymase contained also in yeast.

04. Show the reaction between 2-methylpropanone and butylmagnesium chloride.



07. Show the reduction reaction of 2-methyl propanal



$\begin{array}{c} \text{H}-\text{C}-\text{H} \\ | \\ \text{H} \end{array}$
 2-methyl propanal

08. Propose a scheme for the conversion of Propan-1-ol to propan-2-ol

