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Chemistry 102 assignment

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

Alcohol can be classified in two ways:

A) Based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. If the numbers of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three or two, it is called a primary alcohol ( $1^\circ$ ). If it is one hydrogen atom, it is called secondary alcohol ( $2^\circ$ ) and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol ( $3^\circ$ ).

Examples of primary, secondary and tertiary alcohol are  $\text{CH}_3\text{CH}_2\text{OH}$  (ethanol),  $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$  (propan-2-ol) and  $(\text{CH}_3)_3\text{COH}$  (2-methylpropan-2-ol) respectively.

B) Based on the number of hydroxyl groups they possess. If they have one hydroxyl group, it is called monohydric alcohol, if it has two, it is called dihydric alcohol, if it has three hydroxyl group it is called trihydric alcohol and if it has more than three hydroxyl group it is called polyhydric alcohols. Examples of monohydric alcohol, dihydric, trihydric and polyhydric are propanol, ethane-1,2-diol, propane-1,2,3-triol.

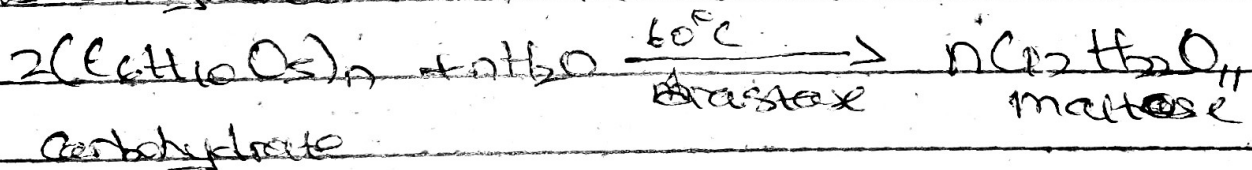
11, 12, 13, 14, 15, 16 - pentanol respectively.

Discuss the solubility of alcohols in water/organic solvents.

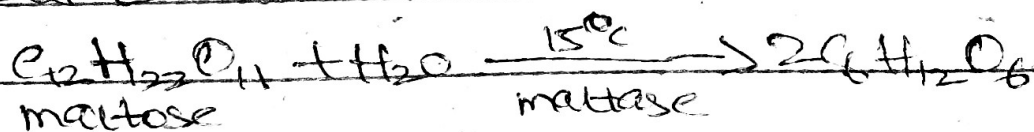
Alcohols are very soluble in organic solvents. But in water not all alcohols are soluble in water. Lower alcohols with low molecular mass and up to three carbon atoms in their molecules are soluble in water due to their ability to form hydrogen bonds with water molecules. But as the number of carbon atoms increases and relative molecular mass increases the solubility of alcohols decrease.

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

a) The starch containing is warmed with maltose at  $60^{\circ}\text{C}$  for a specific period of time. It is then converted maltose by the enzyme contained in the malt called diastase.

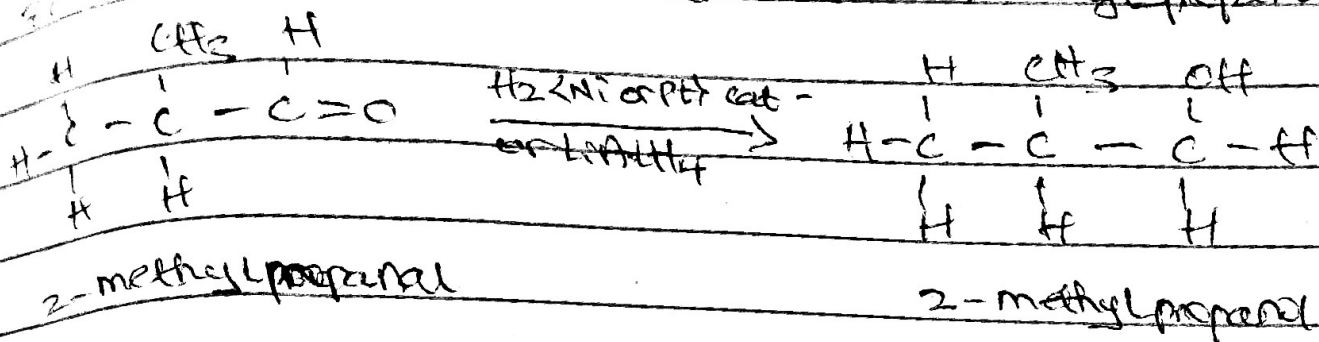


b) The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of  $15^{\circ}\text{C}$ .





Q7) Show the reduction reaction of 2-methyl propanal.



Q8) Propose a scheme for the conversion of propan-1-ol to propan-2-ol.

