

### ASSIGNMENT

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

The two major classification of Alcohols are:

- I. The first one is based on the numbers of hydrogen atoms that are attached to the carbon atoms that is bonded to the hydroxyl group. If the numbers of hydrogen atoms that are bonded they the carbon atom bearing the hydroxyl group are, it is known as a primary alcohol ( $1^\circ$ ). If it is one hydrogen atom then it is known as a secondary alcohol ( $2^\circ$ ), and if there are no hydrogen atom bonded to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol ( $3^\circ$ ).

Example:  $\text{CH}_3\text{OH}$  Methanol ( $1^\circ$ )

- II. The second classification is based on the number of hydroxyl groups they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols have two hydroxyl groups present in the alcohol structure and they are also known as Glycols, while trihydric alcohols or triple have three hydroxyl groups present in the alcohol structure. Polyhydric alcohols also know as polyols have more than three hydroxyl groups.

Example:  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$  Propanol (Monohydric alcohol)

2. **Discuss the solubility of alcohols in water, organic solvents**

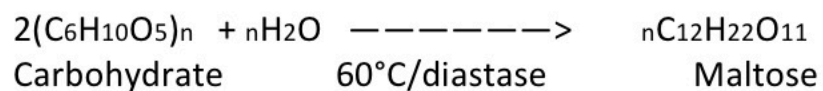
Lower alcohols that have up to three carbon atoms in their molecules are soluble in **water**. This is due to the fact that these lower alcohols are able to form hydrogen bonds with water molecules. The solubility of alcohols decreases with increasing relative molecular mass.

All monohydric alcohols are soluble in **organic solvents**. The solubility of simple alcohol as well as polyhedron alcohols are largely due to their ability to form hydrogen bonds with water molecules.

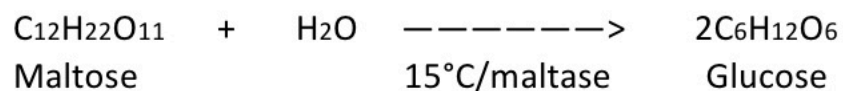
3. **Show the three steps in the industrial manufacture of ethanol. Equations of reaction are mandatory**

Carbohydrates such as starch can be used to yield ethanol through the process of fermentation. The enzymes found in yeast enables the breaking down of of the carbohydrates molecules into ethanol to give a yield of 95%.

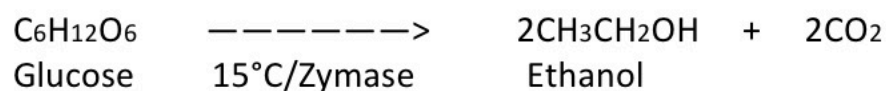
The starch is warmed with malt to 60°C for a period of time, which is then converted into maltose by the enzyme known as diastase contained in malt.



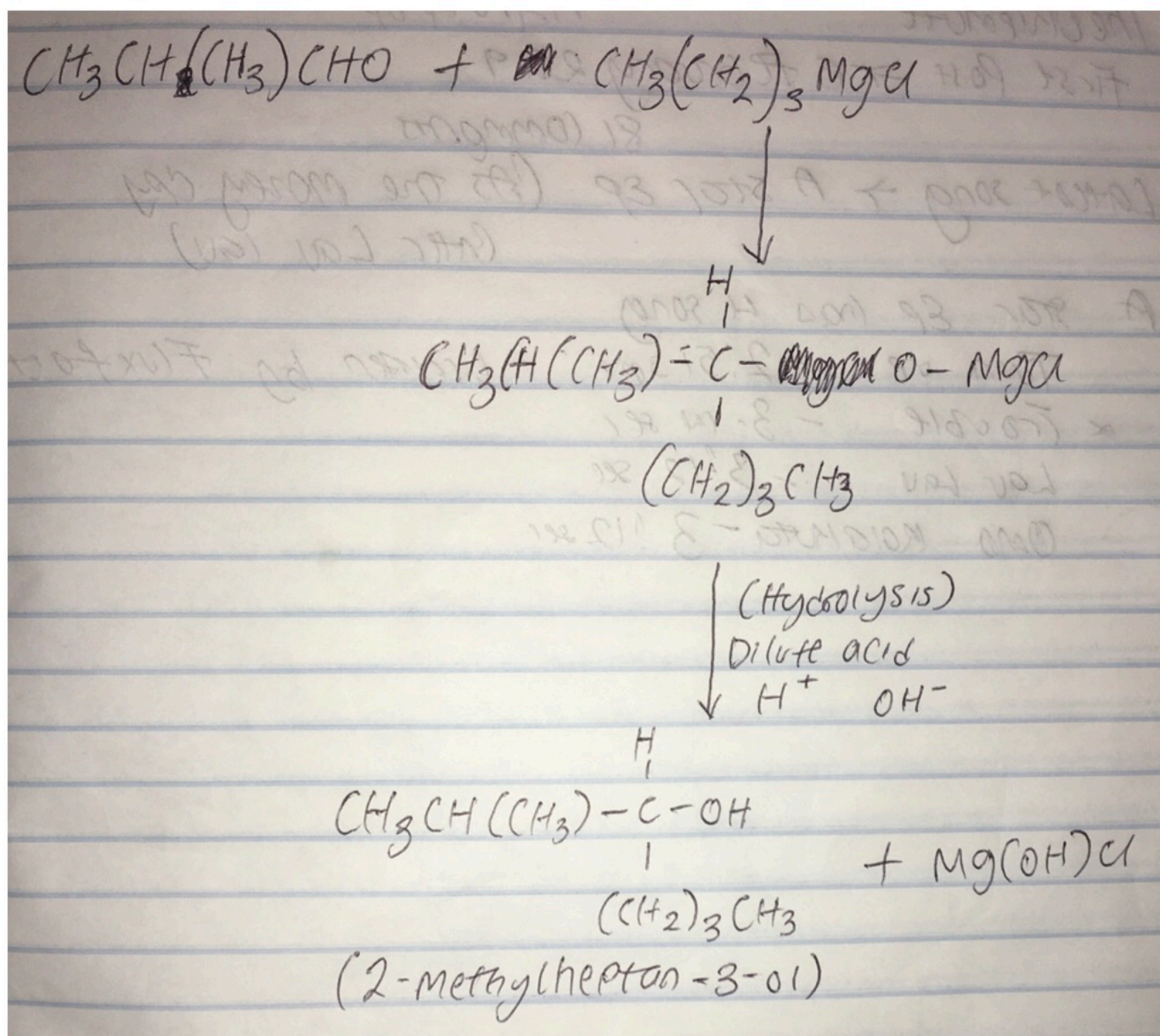
The maltose is then broken down into glucose when yeast is added to it, as yeast contains the enzyme maltase and at a temperature of 15°C



The glucose at a constant temperature of 15°C is then converted into alcohol by the enzyme known as Zymase which is also contained in yeast.

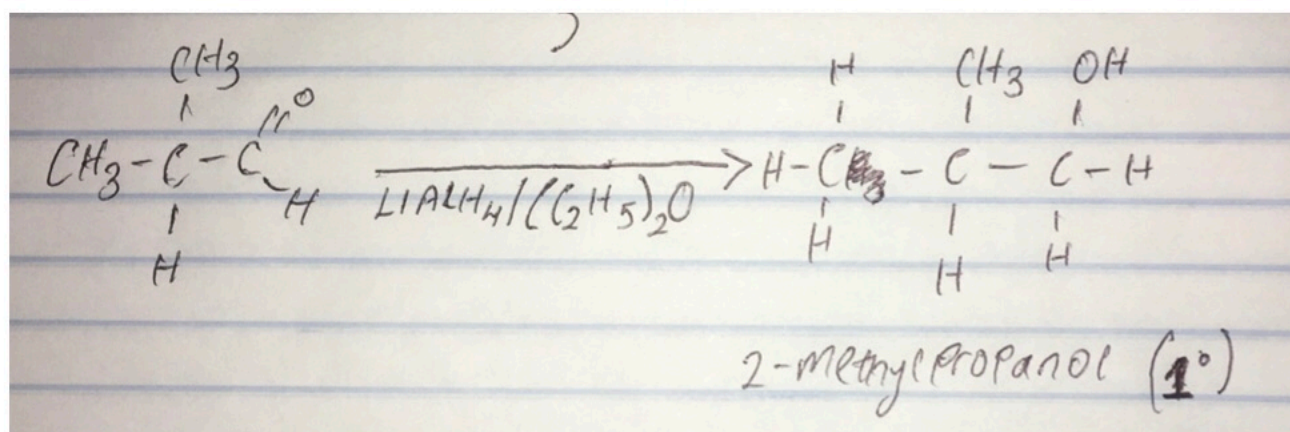


4. Show the reaction between 2-methylpropanal and butylmagnesiumchloride





5 Show the reduction reaction of 2-methylpropanal



6 Propose a scheme for the conversion of propan-1-ol to propan-2-ol

