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### Question 1

#### Classification of Alcohols.

1. Based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group.

(1°) Primary alcohol → When two or three hydrogen atoms are attached.

(2°) Secondary alcohol → When only one hydrogen is attached.

(3°) Tertiary alcohol → When no hydrogen atom is attached.

Example.  $\text{CH}_3\text{OH}$  Methanol (primary alcohol)

2. Based on the number of hydroxyl groups they possess.

Monohydric alcohols have only one hydroxyl group present in the structure.

Dihydric (Glycols) have Two hydroxyl group present in the structure.

Trihydric alcohols have three hydroxyl group present in the structure.

Polyhydric have more than three hydroxyl group present.

Examples  $\text{HOCH}_2\text{CH}_2\text{OH}$  Ethane-1,2-diol (Dihydric)

### Question 2 :- Solubility of alcohol

Lower alcohols with up to three carbon atoms in their molecules are soluble in water because these alcohols can form hydrogen bond with water molecules. The water solubility of alcohols decreases with increasing relative molecular mass.

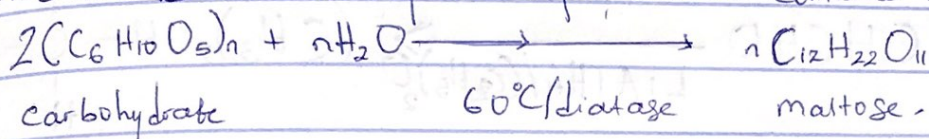
All monohydric alcohols are soluble in organic solvents. The solubility of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules.



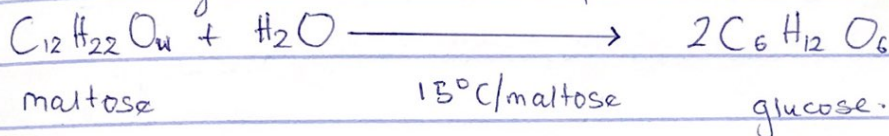
### Question 3 :- Industrial preparation of Ethanol.

#### Step 1 :-

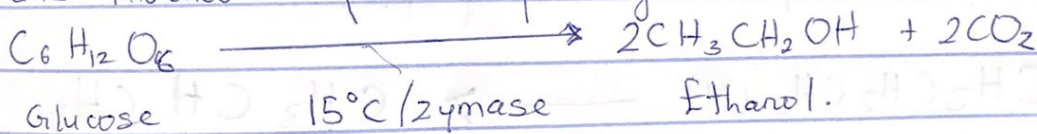
The starch containing material include molasses, potatoes, cereals, rice and on warming with malt to  $60^{\circ}\text{C}$  for a specific period of time are converted into  $\alpha$ -D-glucose by the enzyme diastase contained in the malt.



Step 2 :- The maltose is broken down into glucose on addition of yeast contains the enzyme maltase at a temperature of  $15^{\circ}\text{C}$ .

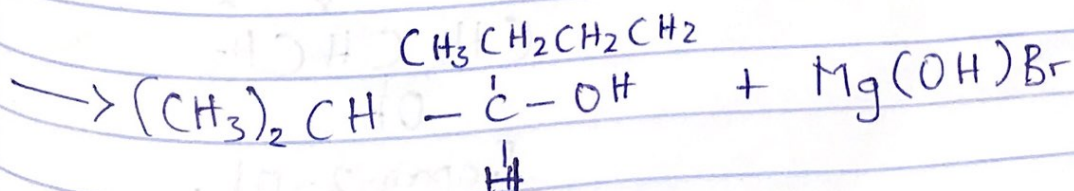
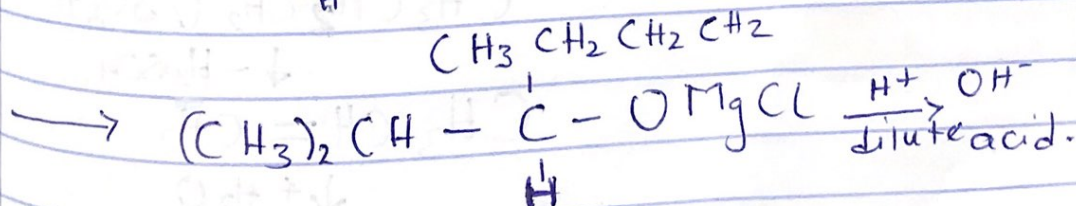
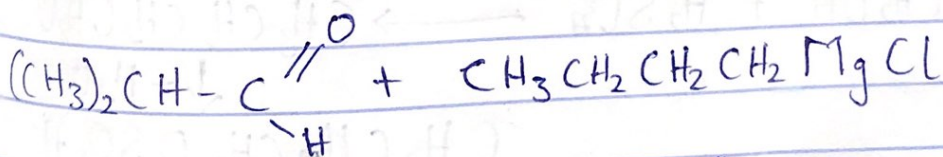


Step 3 :- The glucose at constant temperature of  $15^{\circ}\text{C}$  is then converted into alcohol by the enzyme Zymase contained is also in yeast.



### Question 4

Reaction between 2-methylpropanal and butylmagnesium chloride



Secondary Alcohol

