

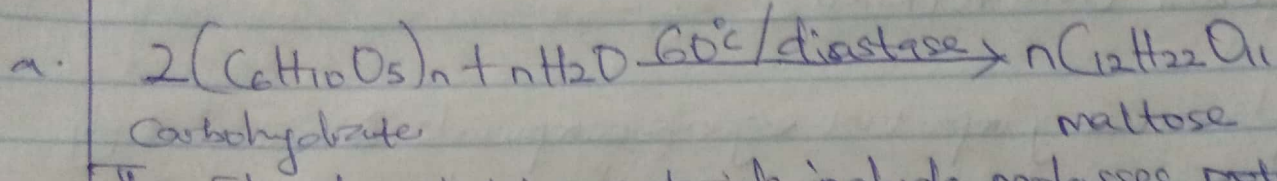
- Alcohols are very important organic compounds. Discuss briefly their classification and give one example each.
  - Based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group: If the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group are three or two, it is a primary alcohol ( $1^\circ$ ), if it is one hydrogen atom, it is secondary alcohol ( $2^\circ$ ) and if no hydrogen atom is attached, it is a tertiary alcohol ( $3^\circ$ ). e.g.  $\text{CH}_3\text{CH}_2\text{OH}$  Ethanol ( $1^\circ$ )
  - 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 groups present in the alcohol structure while trihydric alcohols or triols have three hydroxyl groups 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).
- Discuss the solubility of alcohols in water, organic solvent.

Water: Lower alcohols with 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.

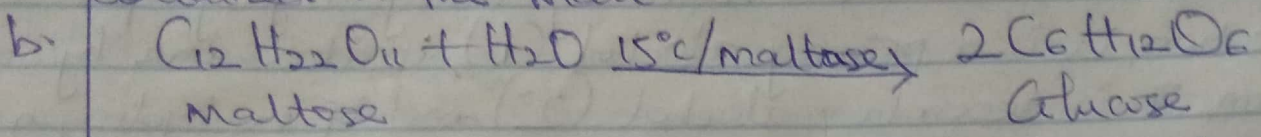
Organic Solvents: All monohydric alcohols are soluble in organic solvent. The solubility of simple alcohols and polyhydric alcohol is largely due to their ability to form hydrogen bonds with water molecules.



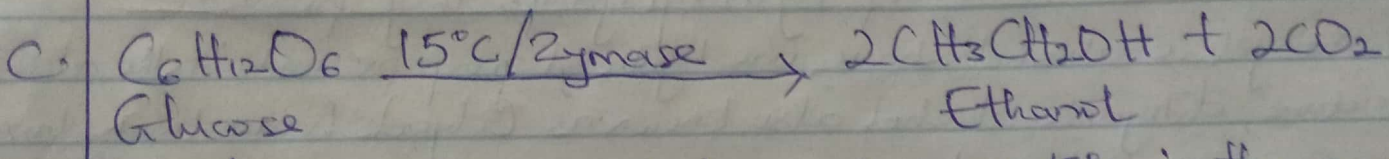
3. Show the three steps in the industrial manufacture of ethanol. Equations of reaction are mandatory



The starch containing materials include molasses, potatoes, cereals, rice and on warming with malt to 60°C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.

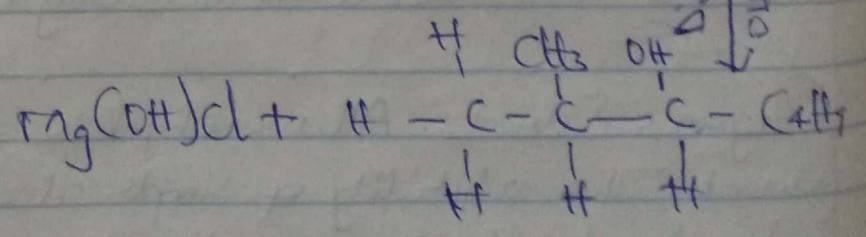
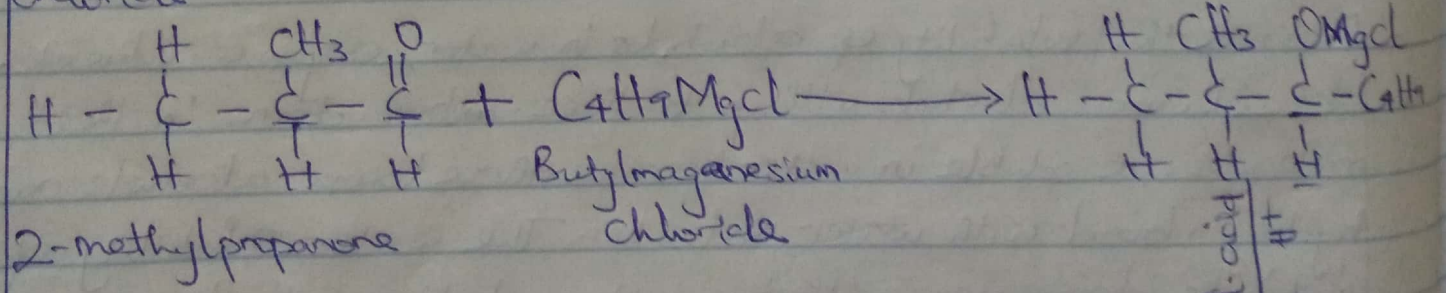


The maltose is broken down into glucose on addition of yeast which contains the enzyme, maltase and at a temperature of 15°C.

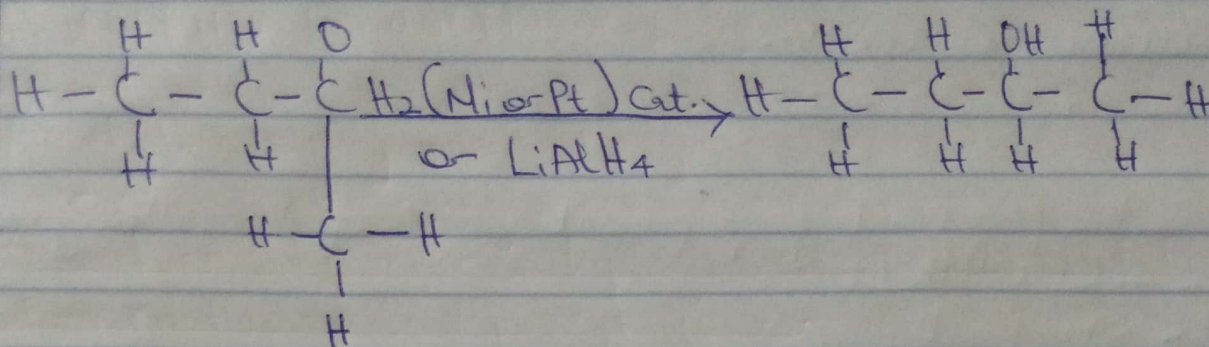


The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme, Zymase contained also in yeast.

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



7. Show the reduction reaction of 2-methylpropanal.



2-methylpropanal

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

