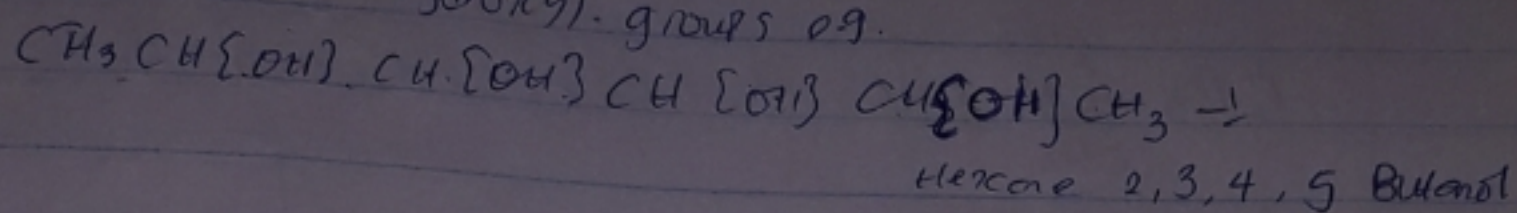


Polyhydric Alcohols - also called Polyols, they have more than three hydroxyl groups e.g.



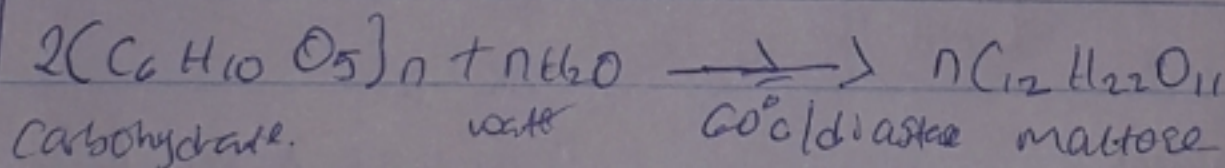
2. Discuss the solubility of alcohols in water, organic solvents.

Lower Alcohols with up to three carbon atoms in their molecules are soluble in water because lower 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.

3. Show the three steps in the industrial manufacture of ethanol.

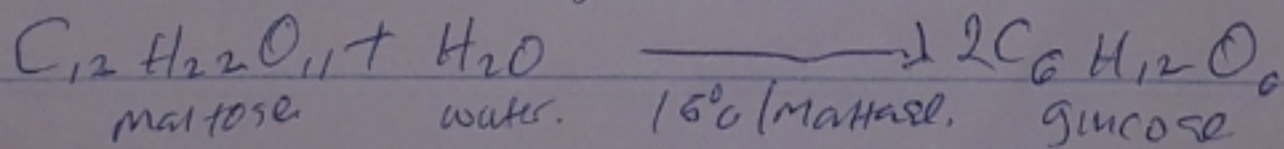
Step 1

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



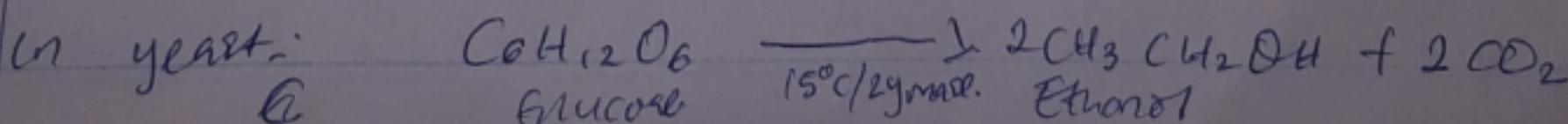
Step 2

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



Step 3

The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme zymase contained also



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

Classification 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 bearing the hydroxyl group are three it is called a primary alcohol ( $1^\circ$ ) eg  $\text{CH}_3\text{OH}$  - Methanol.

If it is one hydrogen atom that is attached to the carbon bearing the hydroxyl group, it is called secondary alcohol eg  $\text{CH}_3\underset{\text{OH}}{\text{CH}}\text{CH}_3$  - Propan-2-ol.

If no hydrogen is attached to the carbon atom bearing the hydroxyl group it is called a tertiary alcohol ( $3^\circ$ )

$\text{CH}_3-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}-\text{OH}$  - 2 methyl Propan-2-ol

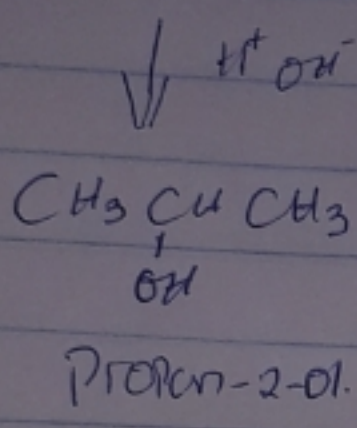
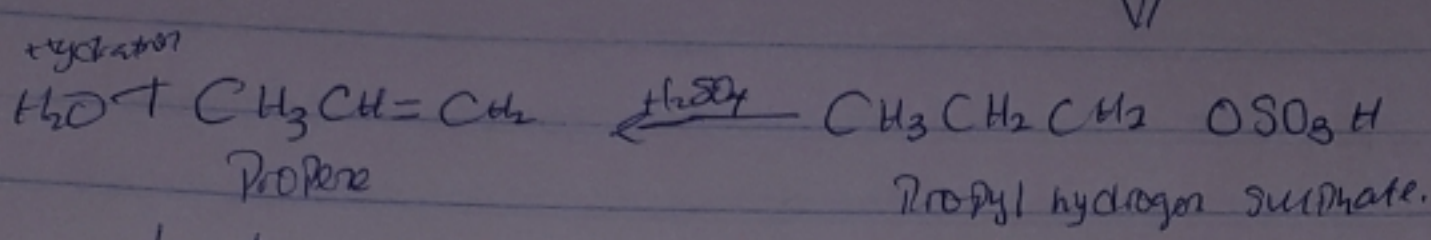
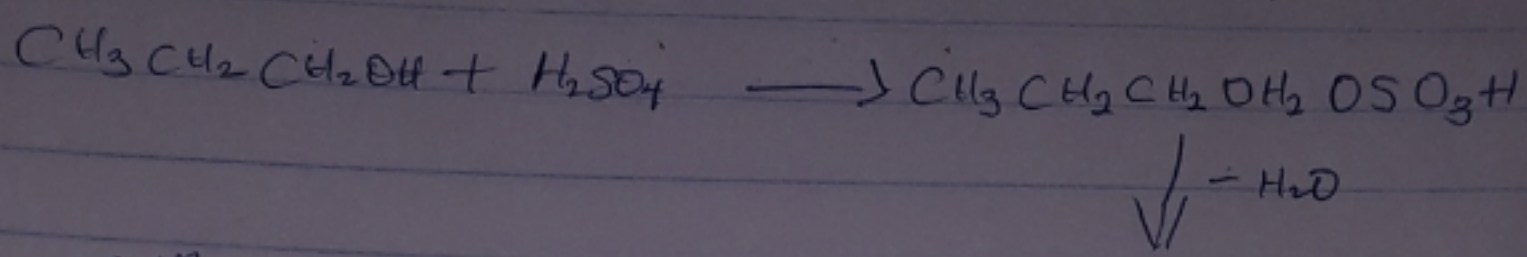
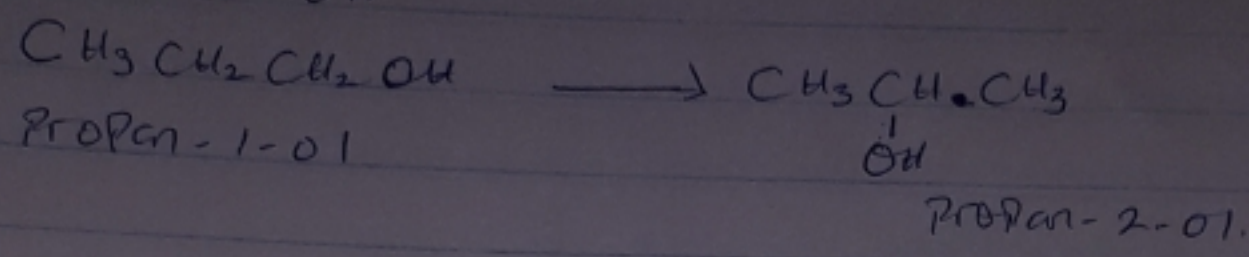
- ii) Classification based on the number of hydroxyl groups they possess.

Monohydric alcohols have one hydroxyl group present in the alcohol structure. eg -  $\text{CH}_3\text{CH}_2\text{OH}$  Ethanol.

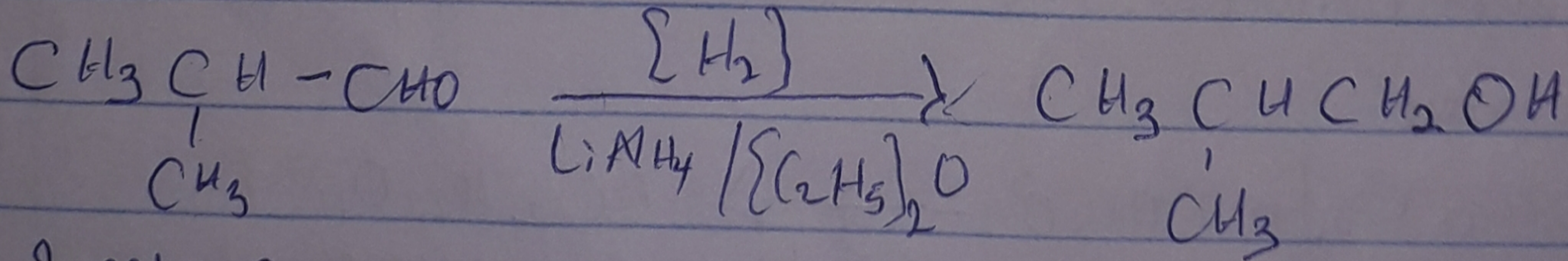
Dihydric alcohols are also called Glycols have two hydroxyl groups present in the alcohol structure eg  $\text{HOCH}_2\text{CH}_2\text{OH}$  Ethane 1,2, diol

Trihydric alcohol also called Triols, they have three hydroxyl groups present in the structure of the alcohol eg  $\text{OHCH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$  - Propan 1,2,3 triol.

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



7 Show the reduction reaction of 2 methyl propanal.



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If the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three it is called a Primary Alcohol [ $1^\circ$ ] eg  $\text{CH}_3\text{OH}$  - Methanol.

If it is one hydrogen atom that is attached to the carbon bearing the hydroxyl group, it is called Secondary alcohol eg  $\text{CH}_3\underset{\text{OH}}{\text{CH}}\text{CH}_3$  - Propan-2-ol.

If no hydrogen is attached to the carbon atom bearing the hydroxyl group it is called a Tertiary Alcohol [ $3^\circ$ ]  
 $\text{CH}_3-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}-\text{OH}$  - 2 methyl Propan-2-ol

- ii) Classification based on the number of hydroxyl groups they possess.

Monohydric alcohols have one hydroxyl group present in the alcohol structure. eg -  $\text{C}_2\text{H}_5\text{OH}$  Ethanol.

Dihydric Alcohols are also called Glycols have two hydroxyl groups present in the alcohol structure. eg  $\text{HOCH}_2\text{CH}_2\text{OH}$  Ethane-1,2-diol

Trihydric Alcohol also called Triols, they have three hydroxyl groups present in the structure of the Alcohol eg  $\text{OHCH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$  - Propan-1,2,3-triol.