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19/MHS01/088

CHEMISTRY 102

ASSIGNMENT

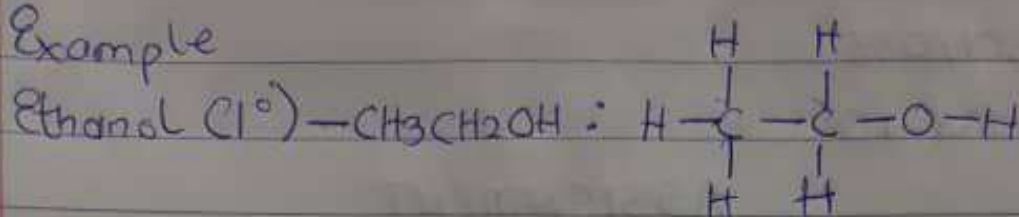
1) Alcohols are very important organic compounds. Discuss briefly their classification and give one example each.

a) Classification based on 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°). In a primary alcohol, the hydroxyl group is attached to a primary (or terminal) carbon atom in the molecule, it is characterized by $-\text{CH}_2\text{OH}$. If it is one hydrogen attached to the carbon atom bearing the hydroxyl group it is called secondary alcohol (2°). In a secondary alcohol, the $-\text{OH}$ group is on a secondary carbon atom; it is characterized by $>(\text{HOH})$ and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a "tertiary" alcohol (3°). [In a tertiary alcohol, the $-\text{OH}$ group is on a tertiary carbon. It is characterized by $>(\text{C}-\text{OH})$]

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Example

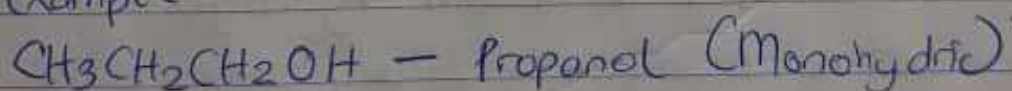


b) Classification based on the number of hydroxyl groups they possess

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

Dihydric alcohol ~~also~~ also called glycols have 2 hydroxyl groups present in the alcohol structure while trihydric alcohols ~~or~~ or triols have 3 hydroxyl groups present in the structure of the alcohol. Polyhydric alcohols or polyols have more than 3 hydroxyl groups.

Example

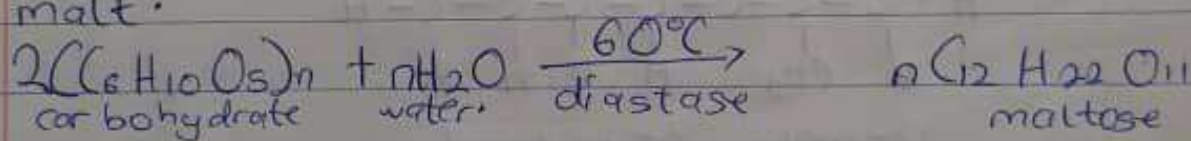


2) a Solubility in water: Lower ^{alcohols} ~~alcohols~~ with up to 3 carbon atoms in their molecules are soluble in water because these lower alcohols can form hydrogen bond with water molecules. The water solubility of alcohols decreases with increasing relative molecular mass.

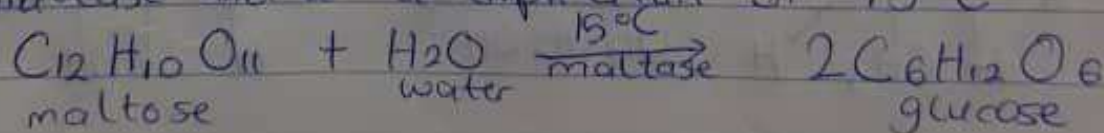
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b) Solubility in organic solvents: All monohydric alcohols are soluble in organic solvents. The solubility of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules.

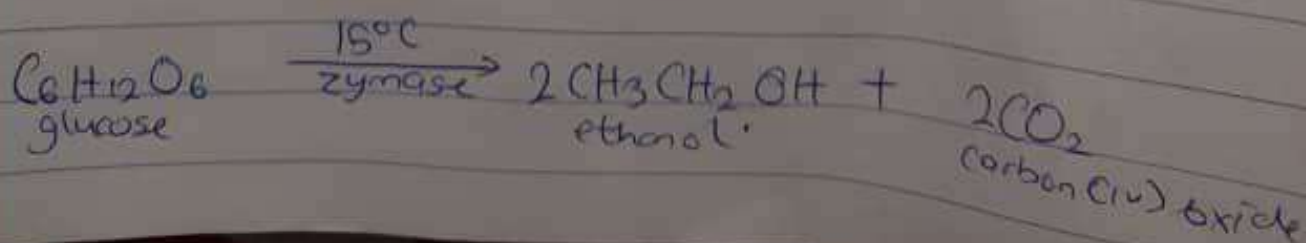
3) Step 1: Starch containing materials include potatoes, rice on warming with malt to 60°C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.



STEP 2: Maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 15°C

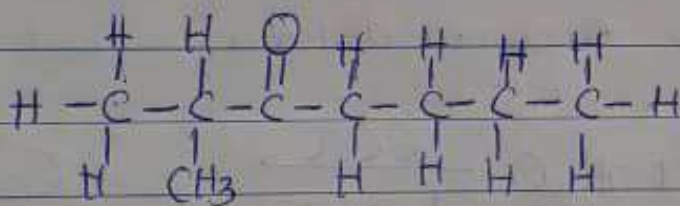
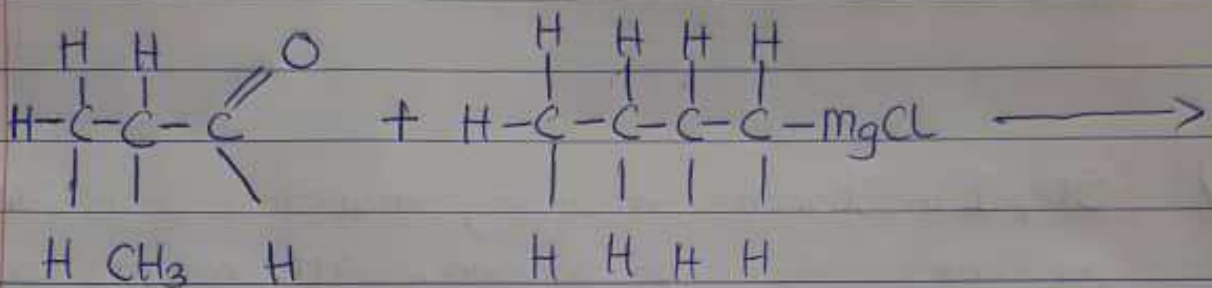
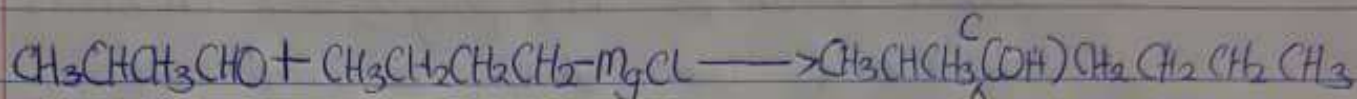


STEP 3: The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme zymase contained also in yeast.



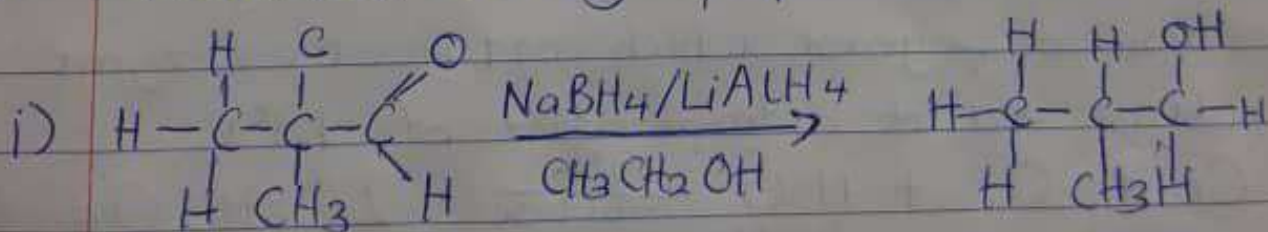
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4 Reaction between 2-methyl propanal and butyl magnesium chloride.



2-methyl 3-heptanol.

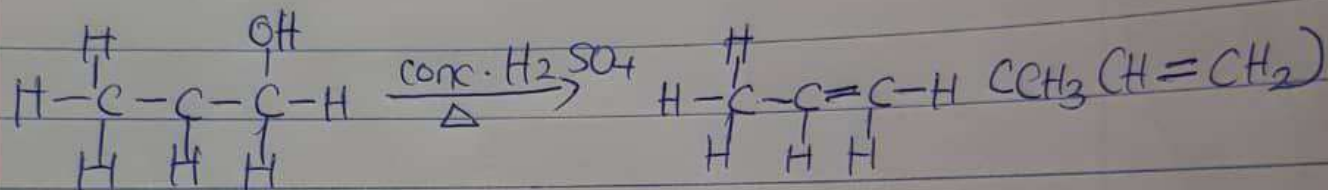
7 Reduction of 2-methyl propanal.



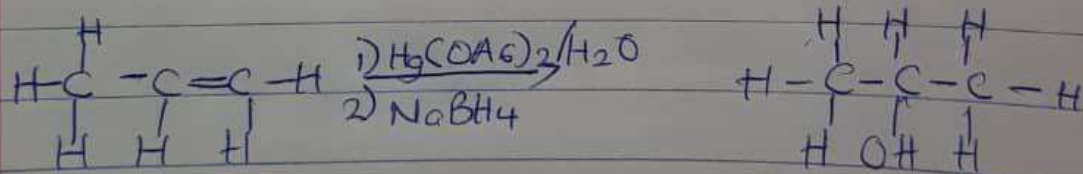
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8 A scheme for the conversion of propan-1-ol to propan-2-ol:

STEP 1: Dehydration of Propan-1-ol to propene using conc H_2SO_4



Step 2: You can use either
Oxymercuration ~~or~~ Demercuration



or

propan-2-ol