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Dept : Zoology

a) Classification based on the number of hydrogen atoms attached to the carbon containing the hydroxyl group.

If the numbers of hydrogen atoms attached to the carbon atom bearing the OH group are two or three, called a "primary alcohol (1°)". If it is one hydrogen atom, it is called a "Secondary alcohol (2°)", but if there is no hydrogen attached to the carbon atom, it is called a "tertiary alcohol (3°)". It is characterized by $>C-OH$.

I) CH_3CH_2OH - Ethanol (1°)

II) $CH_3CH(OH)CH_3$ - Propan-2-ol (2°)

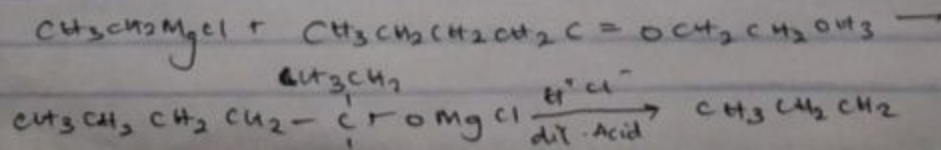
b) Classification based on the number of hydroxyl groups they possess. Monohydric alcohols possess one hydroxyl group per molecule present in the alcohol structure. Dihydric alcohols have two hydroxyl groups, they are also called "glycols". While trihydric alcohols or tritols have three hydroxyl groups in the alcohol structure. Polyhydric alcohols or polyols have more than one hydroxyl group.

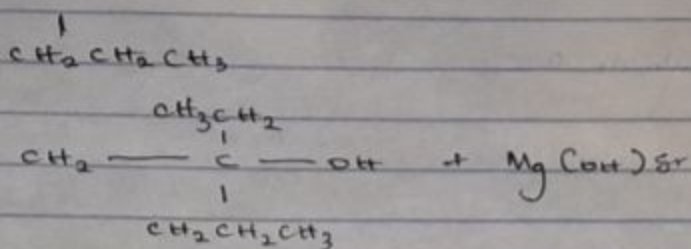
i) $CH_3CH_2CH_2OH$ - propanol (Monohydric)

ii) $CH_3CH(OH)CH_2CH_2CH_2OH$ - Hexane 3,4-diol (Dihydric)

I) In the Grignard synthesis of alcohols, react a named Grignard reagent with $CH_3CH_2CH_2CH_2C=OCH_2CH_2OH$. Show the reaction steps.

Grignard reagent: CH_3CH_2MgCl
(ethyl magnesium chloride)

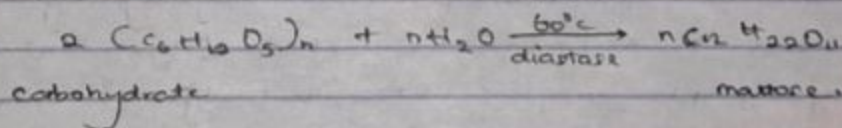




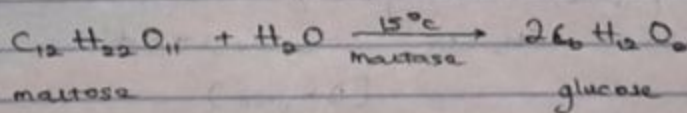
3) Industrial manufacture of ethanol.

Carbohydrates such as starch are major groups of natural compounds that can be made to yield ethanol by the biological process of fermentation. Yeast breaks it down (carbohydrate molecules) into ethanol to give a yield of 95%.

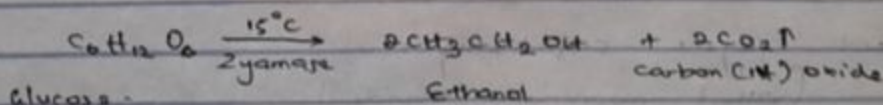
1) The starch containing materials include molasses, potatoes, rice, etc. Warming with malt at 60°C for a specific time are converted into maltose by the enzyme diastase contained in the malt.



2) The maltose is broken down into glucose and addition of yeast at a temperature of 15°C



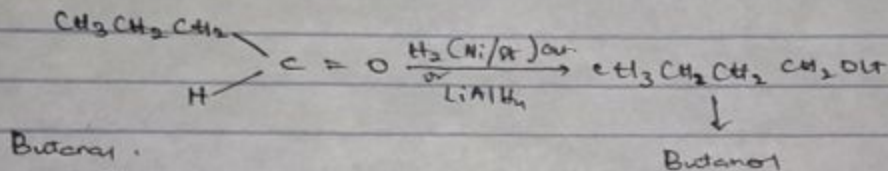
3) The glucose at constant temp^o of 15°C is converted into alcohol by zymase in yeast.



4) Determine the product obtained in the reduction of alkenone and Alkanal.

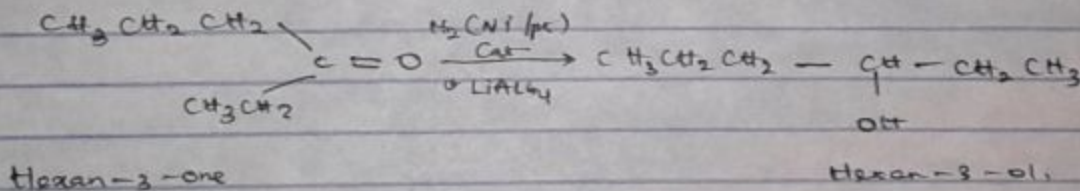
The reduction of Alkenone and Alkanal using Meerwein-Ponndorf reaction

i) Alkanal



The reaction above shows the reduction of an alkanal (butanal) to an alcohol (butanol).

Alkenone.



The reaction above shows the reduction of the alkenone [Hexan-3-one] to an alcohol [Hexan-3-ol].