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Mechatronics Engineering
EHEM 102

~~18~~ 19/ENG05/018

1 Discuss the two major classifications of alkanols. Give 2 examples each for each class

a) Primary Alkanols - In a primary alcohol, the carbon atom is connected to the hydroxyl group. it is defined as a molecule containing a "$-CH_2OH$"

Examples of Primary Alkanol include Ethanol and Butanol

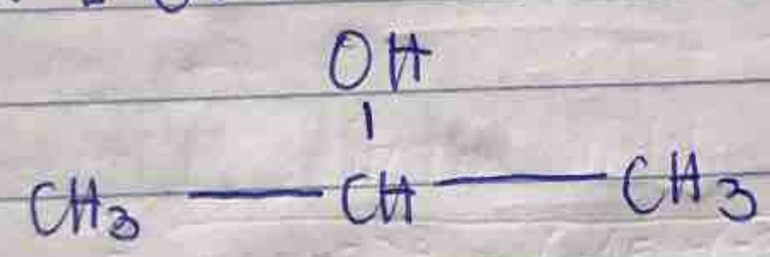
Ethanol → CH_3CH_2OH

~~b)~~ Propanol → $CH_3CH_2CH_2OH$

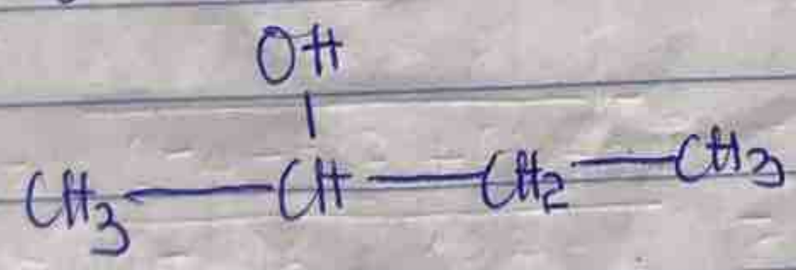
b) Secondary Alkanols - In a secondary Alcohol, the hydroxy group OH is attached to a saturated carbon atom which has 2 or more carbon atoms attached to it.

Examples of Secondary Alkanol include

1) Propan-2-ol



2) Butan-2-ol



~~2)~~ 3) Discuss the industrial manufacture of ethanol showing all reaction equations and necessary enzymes and temperature of reaction.

Aqueous solutions of ethanol can be produced when sugar solutions are fermented using yeast. When yeast is added it feeds on the sugar in the absence of oxygen to form a

Solution of ethanol and Carbon dioxide

The equation for the reaction is

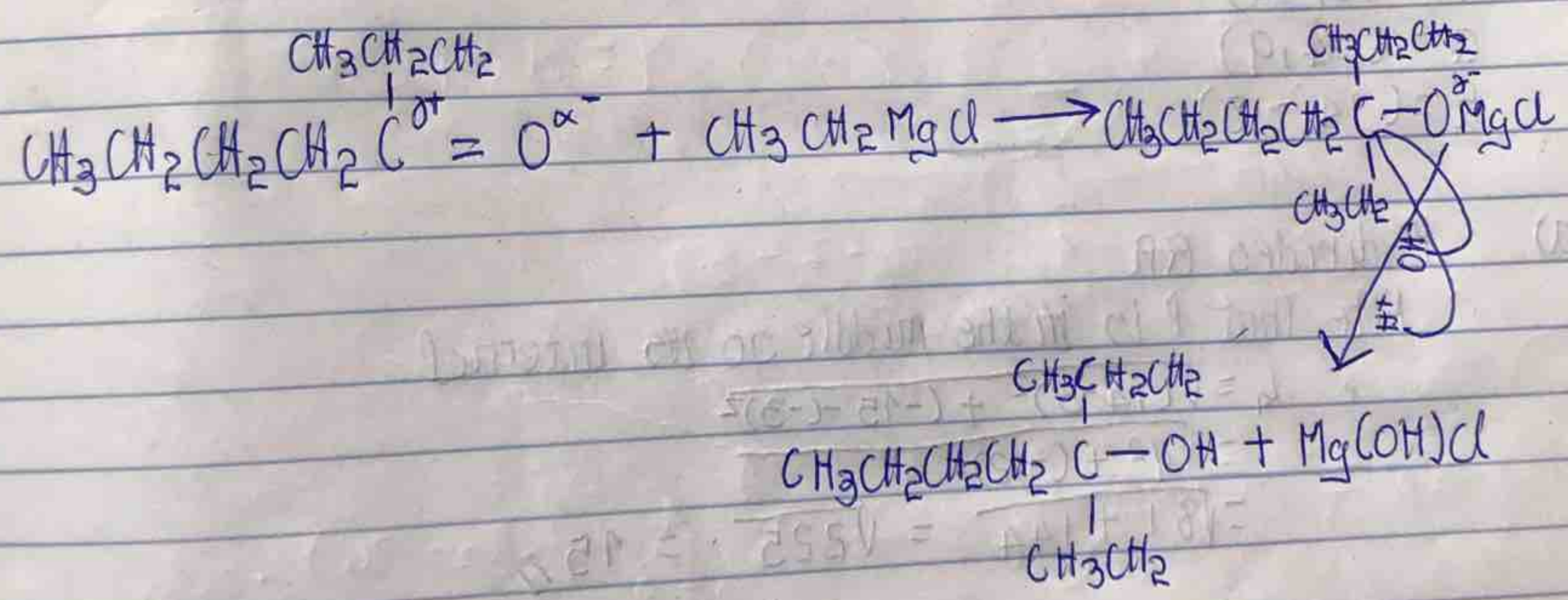
glucose $\xrightarrow{\text{yeast}}$ ethanol + Carbon dioxide

Or

$C_6H_{12}O_{6(aq)} \xrightarrow{\text{yeast}} 2\,C_2H_5OH_{(aq)} + 2CO_{2(aq)}$

The temperature must be between the range of 25°C and 50°C. enzymes are affected by temperature. If the temperature is too cold the enzymes move around slowly to meet the substrate and for a reaction to occur. And as temperature increase, so does the rate of the reaction.

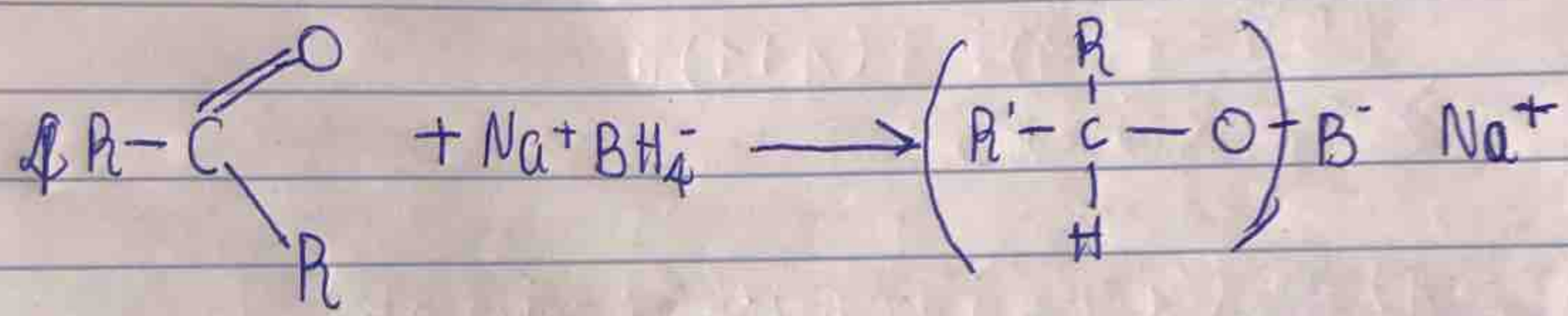
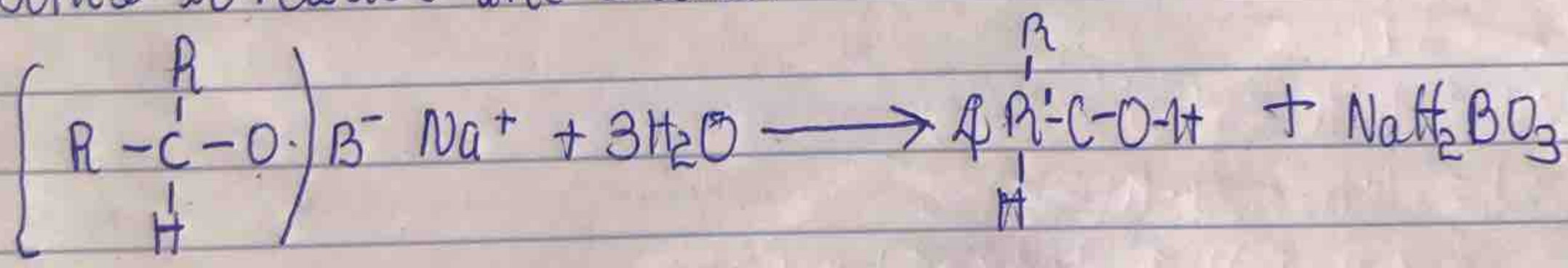
2)



4 - Ethyl Octan-4 Ol

4) Determine the Product obtained in the reduction of alkanone and alkanal. Use a specific example for each and show the equation of reaction.

Sodium tetrahydridoborate ($NaBH_4$) is added to a solution of the aldehyde or ketone in an alcohol e.g methanol. It is then treated under reflux or left for some time under room temperature. At the end of all this, a complex similar to the previous one is formed.



At the second stage water is added and the mixture is boiled to release the alcohol from the complex