

OLIH, ANITA IMABONG 19/mhs 01/335
CHEM 102

1 Discuss the two major classification of Alkanols and give two examples each for each class.

→ Monohydric Alkanols: - These are alkanols with only hydroxyl group (OH) in their molecule. The first three members of the family are: - Methanol: CH_3OH (commonly known as wood spirit).

- Ethanol: $\text{CH}_3\text{CH}_2\text{OH}$ or $\text{C}_2\text{H}_5\text{OH}$

- Propanol: $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ or $\text{C}_3\text{H}_7\text{OH}$

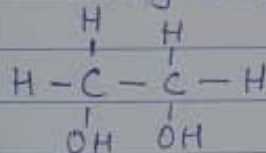
→ Polyhydric Alkanols: - This class of alkanols contains more than one hydroxyl groups per molecule. It occurs in the two sub class namely the dihydric alkanol and trihydric alkanol. Examples: -

~~list~~

Dihydric alkanol

Ethane-1,2-diol

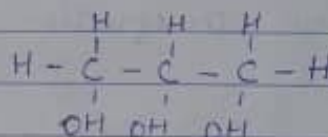
(ethylene glycol)



Trihydric alkanol

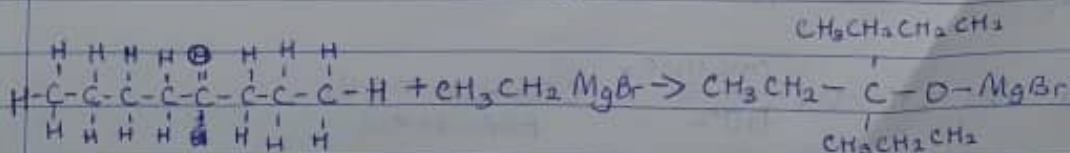
Propan-1,2,3-triol

(glycerol)

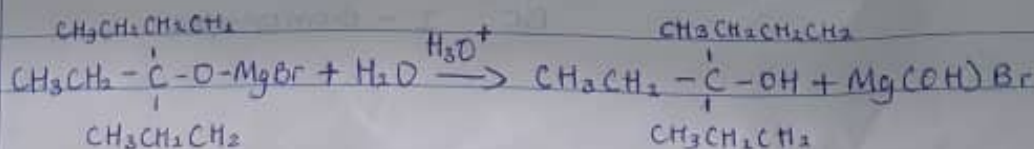


2 In the Grignard synthesis of Alkanols, react a named Grignard reagent with $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{C}=\text{OCH}_2\text{CH}_2\text{CH}_3$. Show the reaction steps.

First stage: The Grignard adds across the carbon-oxygen double bond.



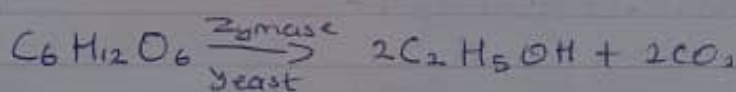
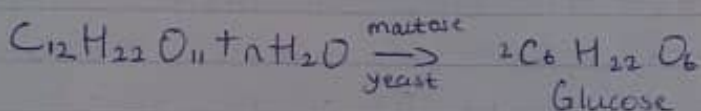
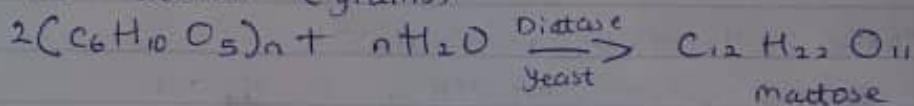
Dilute acid is then added to hydrolyse it:



3) Discuss the industrial manufacture of ethanol showing all reaction equations and necessary enzymes and temperature of reaction. Fermentation is the chemical process that involves the breaking down of molecule such as glucose anaerobically with the release of carbon dioxide gas and alcohol.

The production of ethanol by fermentation occurs in three basic steps:- The temperature of the reactions occur at a minimum temperature of $(25-35)^{\circ}\text{C}$

From starch (grains)

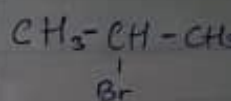
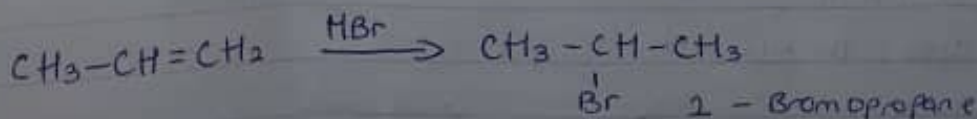
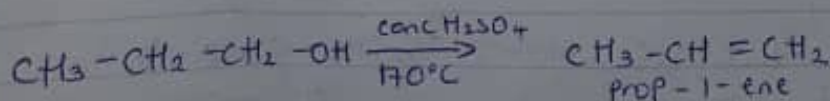


4) Determine the product obtained in the reduction of Alkanone and Alkanol. Use a specific example for each and show the equation of reaction.

Answer.

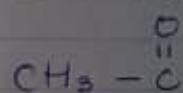
Reduction of Alkanone :- Alkanone are reduced to the corresponding secondary alkanol

Reduction of Alkanone using conc. H_2SO_4
Propan-1-ol to propan-2-ol



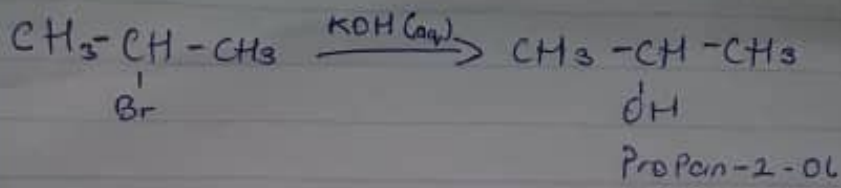
Reduction of
ding primer
tetrahydride
(LiAlH₄)

e.g Ethano



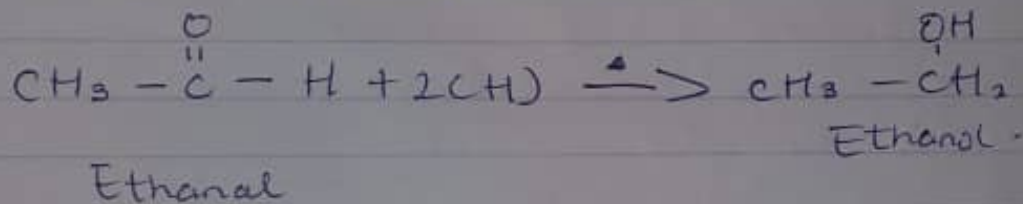
Ethano

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Reduction of Alkanol :- Alkanols are reduced to the corresponding primary alkanol by reducing agents such as Lithium tetrahydridoaluminate (III) (LiAlH₄)

e.g Ethanal is reduced to ethanol



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