

KPOLOGRI PRECIOUS SJOMAFUNWS

19/MHS01/231

MBS5/MHS

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

Answer.

a. Monohydric Alkanols :- These are alkanols with only one hydroxyl group (-OH) in their molecule. The first three members of the family are:

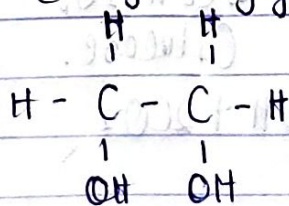
- Methanol :  $\text{CH}_3\text{OH}$  (Commonly known as wood spirit)
- Ethanol :  $\text{CH}_3\text{CH}_2\text{OH}$  or  $\text{C}_2\text{H}_5\text{OH}$
- Propanol :  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$  or  $\text{C}_3\text{H}_7\text{OH}$

b Polyhydric Alkanols :- This class of alkanols contains more than one hydroxyl groups per molecule. It occurs in the sub-class namely:

- The dihydric alkanol
- The trihydric alkanol.

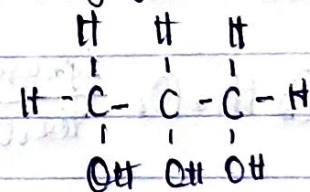
Examples are :- Dihydric alkanol

Ethane-1,2-diol  
(Ethylene glycol)



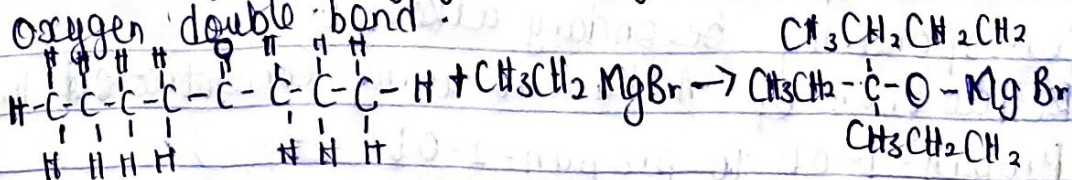
Trihydric alkanol

Propan-1,2,3 triol  
(Glycerol)

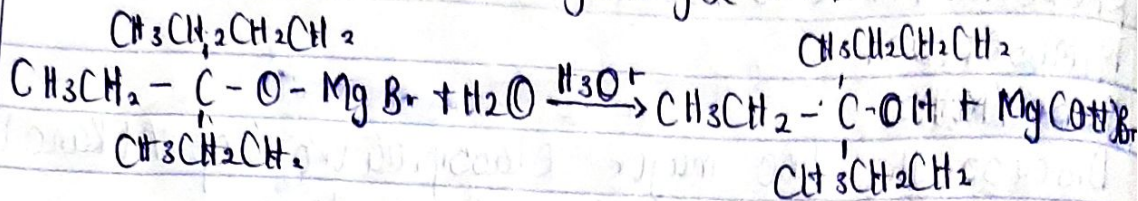


2 In the Grignard Synthesis of Alkanols, react a named Grignard reagent with  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{C}=\text{OCH}_2\text{CH}_2\text{CH}_3$   
Show the reaction steps  
Solution.

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



Dilute acid is added to hydrolyse it:



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

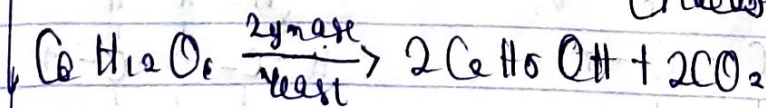
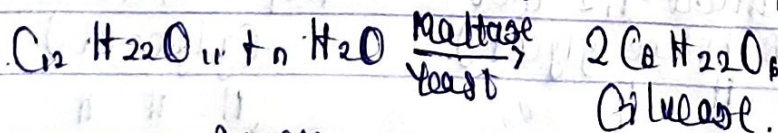
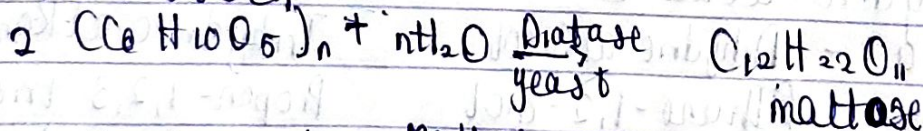
Answers:

Fermentation is the chemical process that involves the breaking down of molecules 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 of  $25 - 35^\circ\text{C}$ .

From Starch  $\rightarrow$

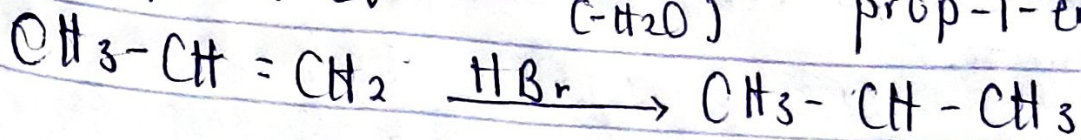
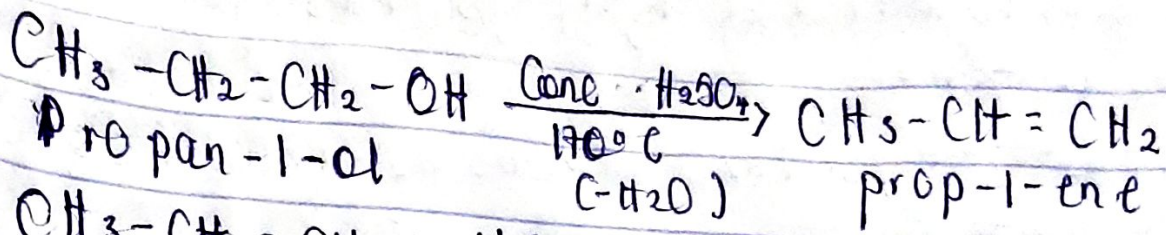


4 Determine the product obtained in the reduction of Alkanone and Alkanal. Use a specific example for each and show the equation of reaction.

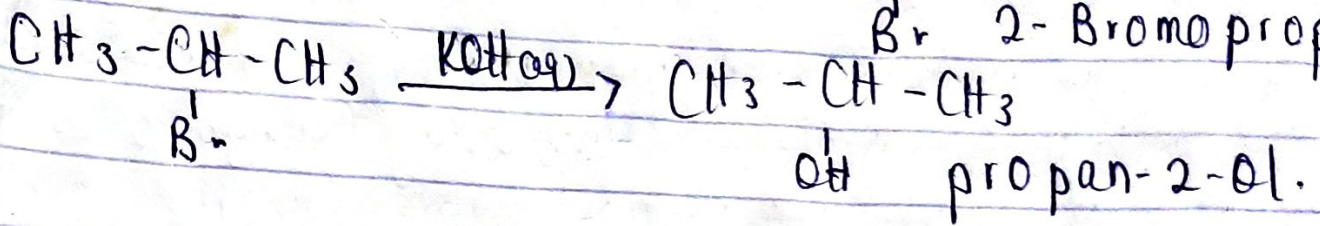
Answers:

Reduction of Alkanone: Alkanone is reduced to the corresponding secondary alcohol.

Reduction of Alkanone using concentrated  $\text{H}_2\text{SO}_4$   
Propan-1-ol to propan-2-ol



2-Bromopropane.



Reduction of Alkanal -> Alkanals are reduced to the corresponding primary alcohol by reducing agents such as lithium tetrahydridoaluminate (LiAlH<sub>4</sub>).

e.g. Ethanal is reduced to ethanol

