

NAME: Owolabi Oluwanifemi Mopelola

DEPT: MBBS

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COURSE: CHEM 102

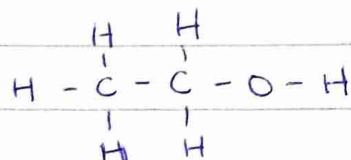
1 Discuss the major classification of Alkanols with two examples each

A Based on the number of hydrogen atoms attached to the carbon carrying the hydroxyl group

~~of the / kind / etc~~

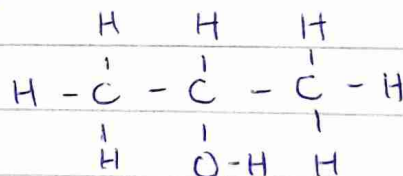
- Primary - The carbon carrying the hydroxyl group has two or three hydrogen atoms attached.

Eg Ethanol:



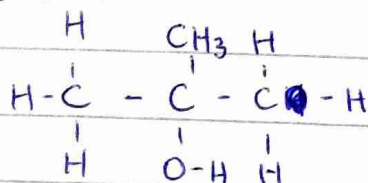
- Secondary alkanols: The carbon carrying the hydroxyl group has only one hydrogen atom attached.

Eg Propan-2-ol:



- Tertiary alkanols: The carbon carrying the hydroxyl group has no hydrogen atom attached to it.

Eg 2-methylpropan-2-ol

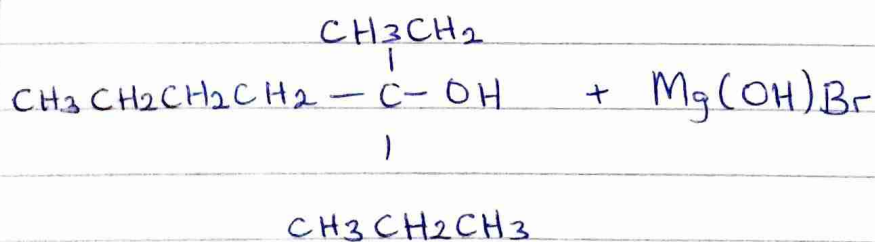
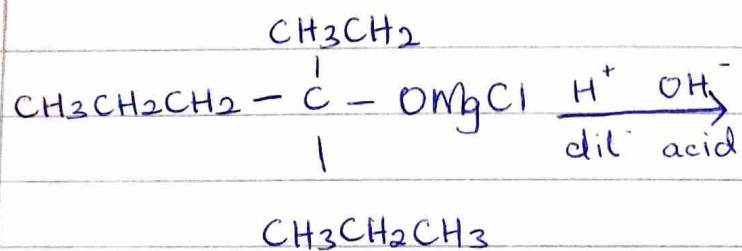
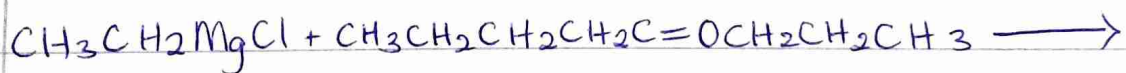


8 Classification based on the number of hydroxyl groups they possess

- Monohydric alkanols: have only one hydroxyl group attached per alkanol structure. Eg propanol, ethanol.
- Dihydric alkanols: have two hydroxyl groups per alkanol structure. Eg Hexan-2,4-diol  $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$
- Trihydric alkanols: have three hydroxyl groups per alkanol structure. Eg 1,2,3-Propanetriol.
- Polyhydric alkanols: have more than three hydroxyl groups per alkanol structure.

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.

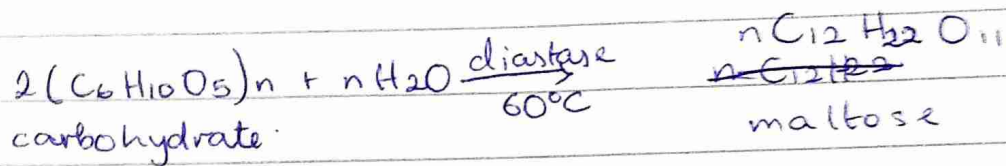
Grignard reagent:  $\text{CH}_3\text{CH}_2\text{MgCl}$  (ethyl magnesium chloride).



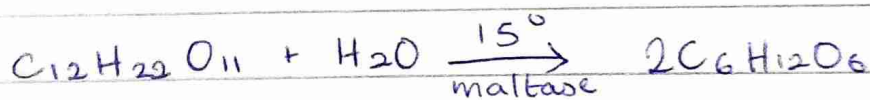
3 Discuss the industrial manufacture of ethanol showing all reaction equations, enzymes and temperature of reaction.

- Carbohydrates can be made to yield ethanol by the biological process of fermentation.

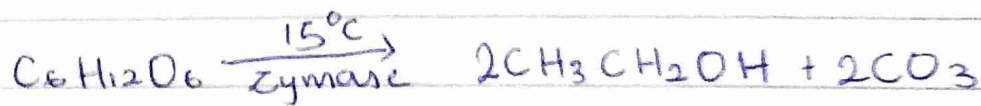
Step 1: The starch containing substance is warmed with malt to  $60^{\circ}\text{C}$  for a specific period of time to convert it to maltose by the enzyme diastase contained in the malt.



Step 2: The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at the temperature of  $15^{\circ}\text{C}$



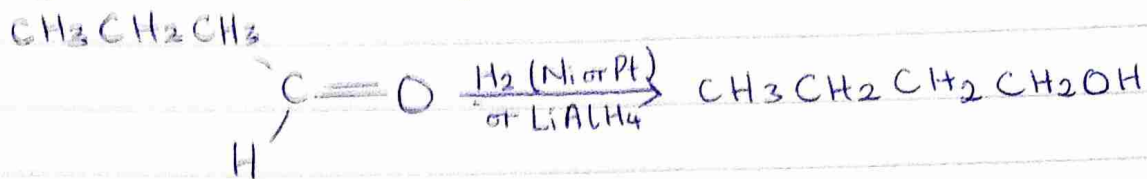
Step 3: The glucose at  $15^{\circ}\text{C}$  is then converted to alcohol by the enzyme zymase contained in yeast.



- 11 Determine the product obtained in the reduction of alkanone and alkanal. Use a specific example for each and show the equation of reaction.

## Alkanals

Using Meerwein-Ponndorf Reaction

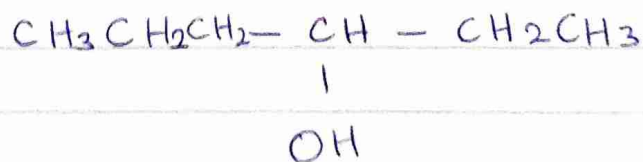
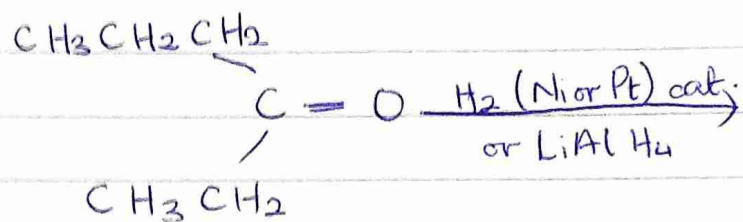


Butanal

The reaction shows the reduction of an alkanal to alkanol.

## Alkanone

Using Meerwein-Ponndorf Reaction



The reaction shows the reduction of an alkanone to an alkanol.