

ANUGWU FRANKLIN CHEMELLE

19/11/2019

CHEM 102

MBBS

Question

- 1] Discuss the two major classification of Alkanols. Give two examples for each class
- 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.
- 3] Discuss the industrial manufacture of ethanol showing all reaction equations and necessary enzymes and temperature of reaction.
- 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

1] Classification of Alcohols

i] a] Based on the number of hydrogen attached to the carbon atom containing the hydroxyl group.

- Primary alcohol: The number of hydrogen atoms attached to the carbon bearing the hydroxyl group are three or less. (1°)
- Secondary alcohol: One hydrogen atom attached to the carbon bearing the hydroxyl group. (2°)
- Tertiary alcohol: No hydrogen atom attached to the carbon bearing the hydroxyl group. (3°)

b] Based on the number of hydroxyl groups they possess

- Monohydric alcohols: have one hydroxyl group present in the alcohol structure.
- Dihydric alcohols: have two hydroxyl groups present in the alcohol structure and are also called glycols or diols
- Trihydric alcohols: or triols have three hydroxyl groups present in the alcohol structure
- Polyhydric alcohols: or polyols have more than three hydroxyl groups.

ii] Two examples for each class

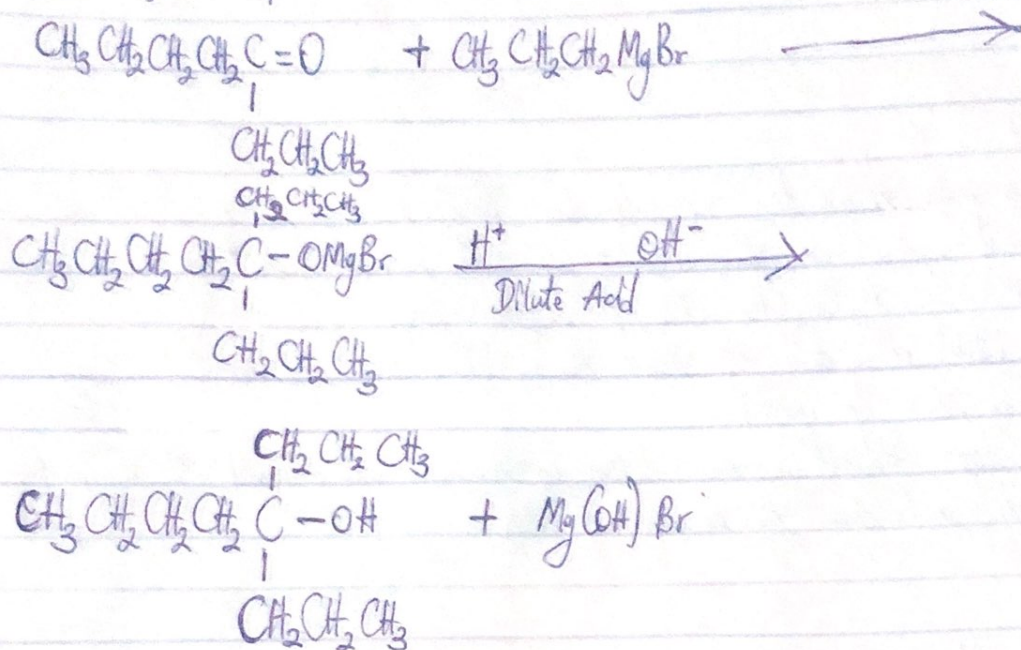
- Based on number of hydrogen attached to the carbon

- CH_3OH (1°)
- $(\text{CH}_3)_2\text{C}-\text{OH}$ (3°)

- Based on the number of hydroxyl group

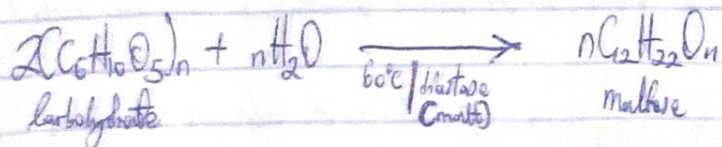
- $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ (Monohydric)
- $\text{HOCH}_2\text{CH}_2\text{OH}$ (Dihydric)

2] Grignard synthesis of Alcohols

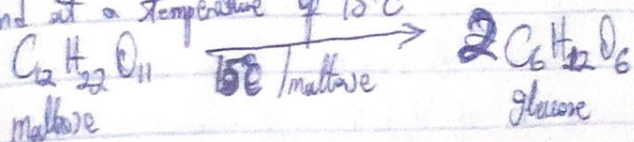


NOTE: $\text{CH}_3\text{CH}_2\text{CH}_2\text{MgBr}$ is grignard reagent named "

3] Industrial Production of Ethanol Many all reaction equations and necessary enzymes and temperature of carbohydrates can be made to yield ethanol by fermentation. The biological catalysts, enzymes found in yeast break down the carbohydrate molecules into ethanol to give a yield of 95%. The starch containing materials include molasses, potatoes, cereals, rice and on warming with malt to 60°C for a specific period of time are converted into maltose by the enzyme diastase contained in malt.



The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 15°C



The glucose is enzyme

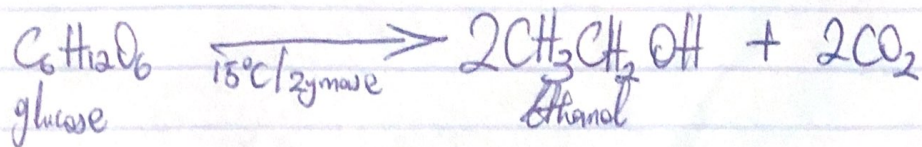
$\text{C}_6\text{H}_{12}\text{O}_6$
glucose

AJ When primary

CH_3CH_2

CH_3CH_2

The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme zymase also extracted in yeast



4] When Alkanones and Alkanols are reduced, it gives products of secondary and primary alcohols respectively.

