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PHARMACOLOGY

MEDICINE & HEALTH SCIENCES

CHM 102 (ASSIGNMENT)

19/MHS01/002

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

a Based on the number of hydrogen atoms to the carbon atom containing hydroxyl group.

b Based on the number of hydroxyl group they possess.

a Based on the number of hydrogen atoms to the carbon atom containing hydroxyl group: - If the numbers of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three or two, it is called a primary alcohol (1°). If it is one hydrogen atom, it is called secondary alcohol (2°) and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol (3°).

Example; - ① $\overset{\text{O}}{\text{C}}\text{H}_3\text{OH}$ (Methanol (1°))

② $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$ (Propan-2-ol (2°))

③ $(\text{CH}_3)_3\text{C}-\text{OH}$ (2-Methylpropan-2-ol (3°))

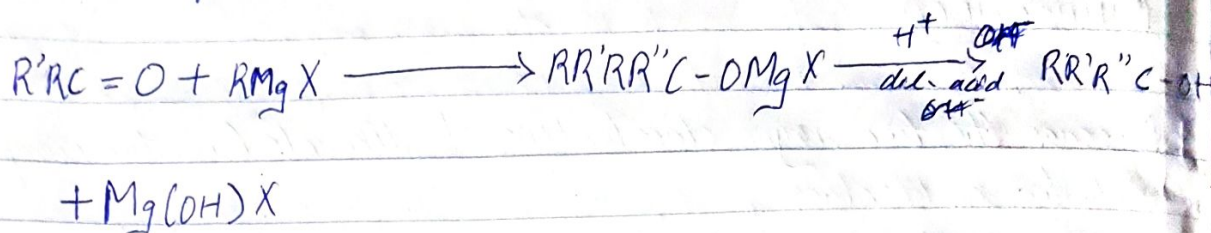
b Based on the number of hydroxyl group they possess: - Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols also known as glycols have two hydroxyl groups present in the alcohol structure while trihydric alcohols or triols have three hydroxyl groups present in the alcohol structure. Polyhydric alcohols or polyols have more than three hydroxyl alcohols.

Example; - ① $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ (Propanol \rightarrow Monohydric alcohol)

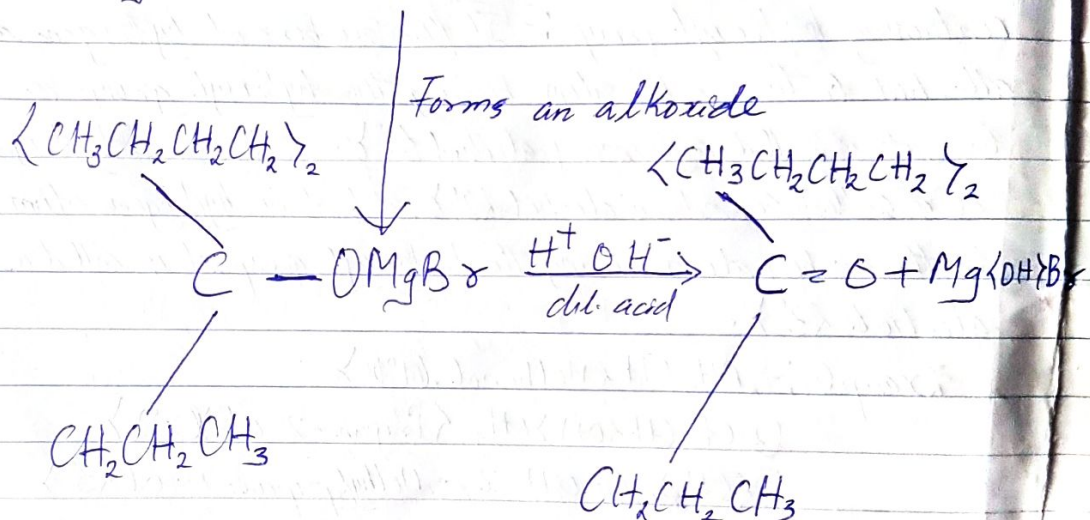
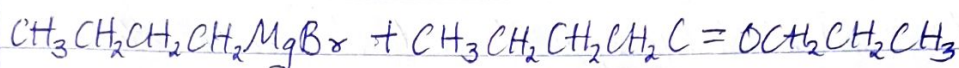
② $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_2\text{OH}$ (Hexane-2,4-diol \rightarrow Dihydric alcohol)

③ $\text{OHCH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$ (Propane-1,2,3-triol \rightarrow Trihydric alcohol)

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.



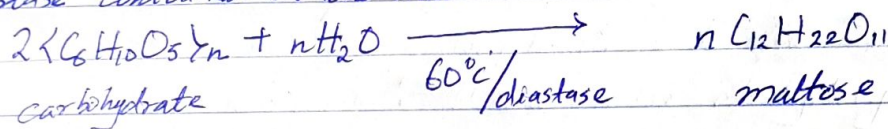
Note! R.MgX is the Grignard reagent used.



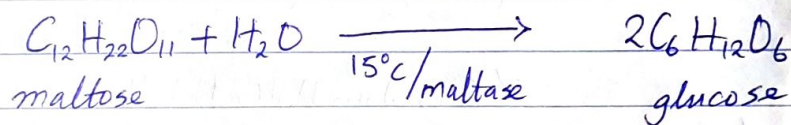
3 Discuss the industrial manufacture of ethanol showing all reaction equations and necessary enzymes and temperature of reaction.

Production of Ethanol:-

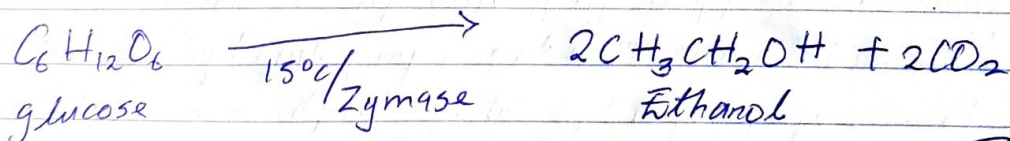
Carbohydrates such as starch are major group of natural compounds that can be made to yield ethanol by the biological process of fermentation. The biological catalysts, enzymes found in yeast break down the carbohydrate molecules into ethanol to give a yield of 95%. The starch containing materials include 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 the malt.



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



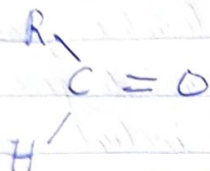
The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme Zymase contained also in yeast.



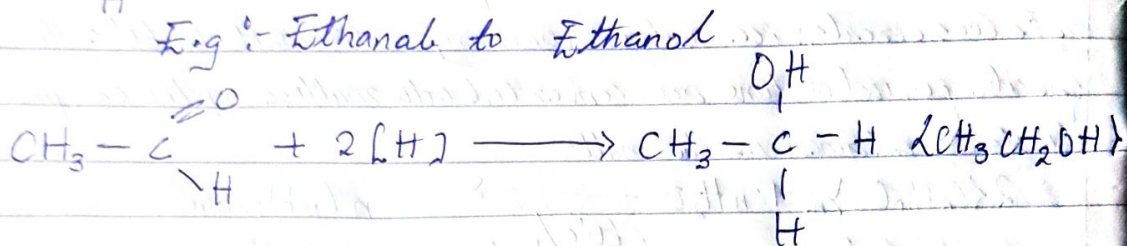
~~Filho Akten~~

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

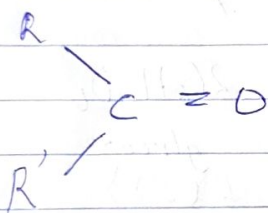
* Reduction of an aldehyde



E.g.: Ethanal to Ethanol



* Reduction of a ketone



E.g.: Propanone to propan-2-ol

