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**MATRIC NO.:19/MHS01/309**

**COLLEGE: Medicine and Health Sciences**

**DEPARTMENT: Medicine and Surgery    LEVEL: 100**

**Assignment Title:** new assignment

**Course Title:** General Chemistry II

**Course Code:** CHM 102

**1. Alcohols are very important organic compounds. Discuss briefly their classification and give one example each**

Alcohol is among the class of organic compound composed of carbon hydrogen and oxygen CHO. It is hydroxyl derivative of hydrocarbon produced by replacing one or more hydrogen by one or more hydroxyl groups.

**Classification**

Number one classification is based on hydrogen atoms attached to the carbon atom C-H having the hydroxyl group. If the hydrogen atom which attaches to the carbon atom bearing the hydroxyle group are three or two, it is called primary alcoholic ( $1^0$ ). When it has one hydrogen it is secondary ( $2^0$ ) while no hydrogen is attached to the carbon atom bearing the hydroxyl group it is called tertiary alcohol ( $3^0$ ).

Example:  $\text{CH}_3\text{OH}$  – Methanol ( $1^0$ )

Another classification is based on the number of hydroxyl groups they possess.

- i. Monohydric alcohol: They have one hydroxyl group in their alcohol structure.
- ii. Dihydric alcohols also called Glycols have two hydroxyl groups in the alcohol structure.
- iii. Trihydric alcohols or triols have three hydroxyl groups in the alcohol structure.
- iv. Polyhydric alcohol (Polyols) have more than three hydroxyl groups.

e.g.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ - Propanal [monohydric alcohol]

## **2. Discuss the solubility of alcohols in water, organic solvents**

Solubility of alcohols in water, organic solvents.

Low alcohol which has up to three carbon atoms in their molecules are soluble in water. This happens because lower alcohol can form hydrogen bond with water.

Where there is increasing relative molecular mass, there is usually a decrease in water solubility monohydric alcohols are soluble in organic solvent. The ability to form hydrogen bonds with water molecules is as a result of solubility of simple and polyhydric alcohols.

## **3. Show the three steps in the industrial manufacture of ethanol. Equations of reaction are mandatory**

Answer:

Three steps in industrial manufacturing of ethanol

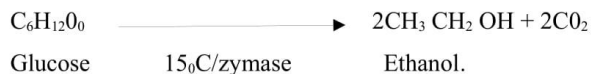
Carbohydrates (starch) when allowed to go through the biological process of fermentation will result to production of ethanol. Catalyst which is an enzyme in yeast breaks down carbohydrate molecules to form ethanol. Starch is derived from molasses, potatoes, cereals, rice. When they are warmed to 60°C for a period of time will be converted into maltose by enzyme diastase found in malt.



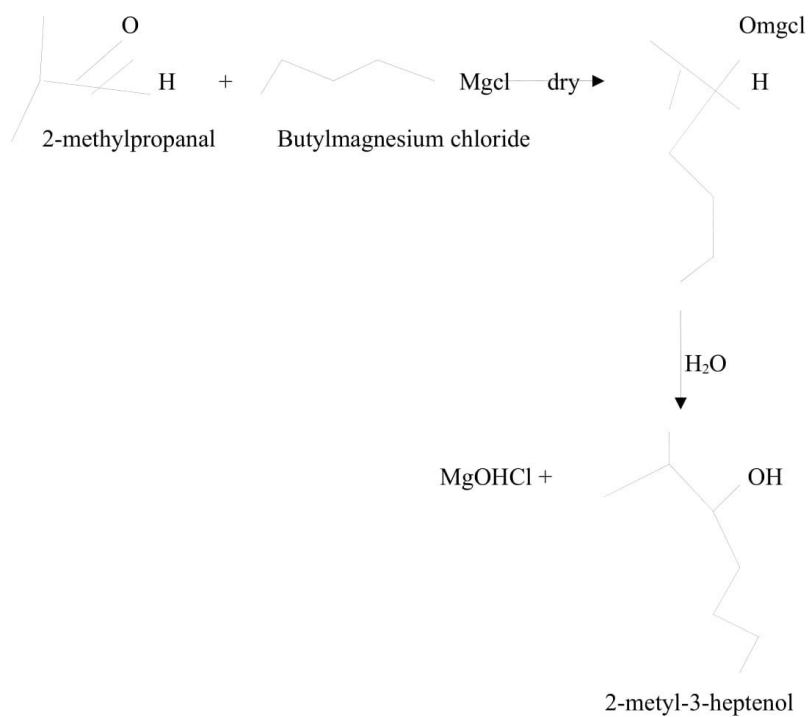
Then maltose is broken down into glucose when yeast is added that contain the enzyme maltase at 15°C temperature.



At constant temperature of 15°C glucose is converted into alcohol by enzyme zymase in yeast



## **4. Show the reaction between 2-methylpropanal and butylmagnesium chloride Hint: Grignard synthesis**



5. Show the reaction between 2-methyl propanone and butylmagnesiumchloride Hint: **Grignard synthesis. Note: show all structures**

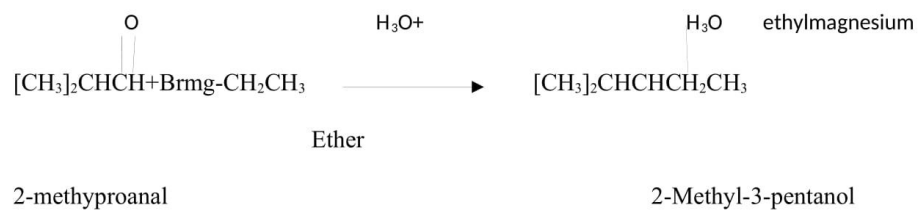
Answer: The reaction between 2-methyl propanone and butylmagnesium chloride is not possible

6. **Show the reduction reaction of 2-methylpropanone**

Answer: Reduction reaction of 2- methylpropanone is not possible

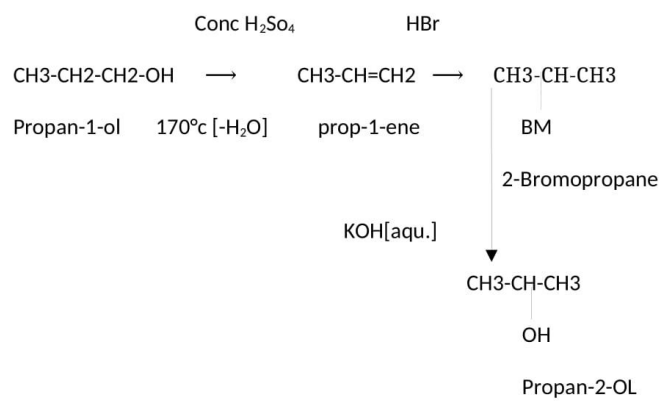
**7. Show the reduction reaction of 2-methylpropanal**

Answer.:



**8. Propose a scheme for the conversion of propan-1-ol to propan-2-ol.**

Answer:



Propan-1-ol to Propan-2-ol