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MATRIC NO : 19/MHS02/070

COURSE CODE : CHM 102

ASSIGNMENT

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

The classifications are;

- CLASSIFICATION BASED ON THE NUMBER OF HYDROGEN ATOMS: This is based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. This is made up of the primary alkanol, secondary alkanol and tertiary alkanol. The primary alkanol which is made up of two or three carbon atoms attached to the hydrogen atom. The secondary alkanol which is made up of one carbon atom attached to the hydrogen atom. The tertiary alkanol which is made up of no carbon atom attached to the hydrogen atom.

Examples;

CH3OH [Methanol]

- CLASSIFICATION BASED ON THE NUMBER OF HYDROXYL GROUP THEY POSSES : This is made up of monohydric alcohol that is made up of one hydroxyl group present in the alcoholic structure , the dihydric alcohol [Glycols] that is made up of two hydroxyl groups in their alcoholic structures. The trihydric alcohol [Triols] that is made up of three hydroxyl groups present in their alcoholic structures.

Examples;

CH3CH2CH2OH – Propanol [Monohydric alcohol]

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

Alcohols are soluble in water. This is due to the hydroxyl group in the alcohol which is able to form hydrogen bons with water molecules. Alcohols with a smaller hydrocarbon chain are very soluble. As the length of the hydrocarbon chain increases, the solubility in water decreases.

3.Show the three steps in the industrial manufacture of ethanol

The biological catalysts [Enzymes] found in yeast break down the carbohydrate molecules in ethanol.

The industrial manufacture shows the following processes;

The starch containing the materials is warmed with malt to 60°C for a specific period of time and is converted into maltose by diastase [an enzyme] in the malt.

$2[C_6H_{10}O_6]_n + nH_2O \rightarrow nC_{12}H_{22}O_{11}$

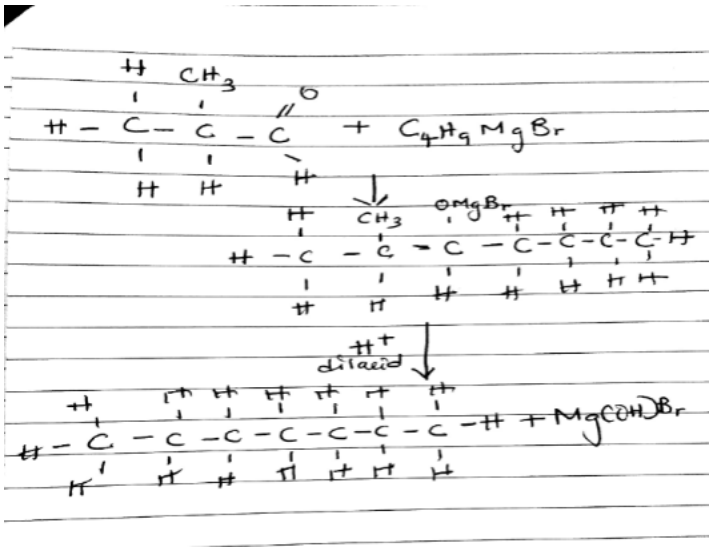
The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 15°C

$C_{12}H_{22}O_{11} + H_2O \rightarrow 2[C_6H_{12}O_6]$

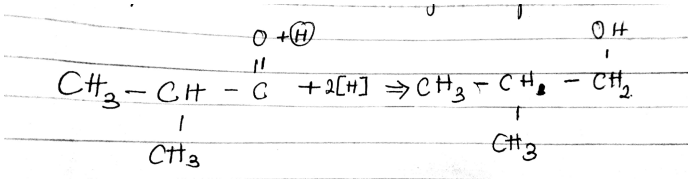
Glucose at a constant temp of 15°C is then converted into alcohol by the enzyme zymase also contained in the yeast

$C_6H_{12}O_6 \rightarrow 2CH_3CH_2OH + 2CO_2$

4. Show the reaction between 2- methylpropanol and butylmagnesiumchloride. Hint: Gringnard synthesis.



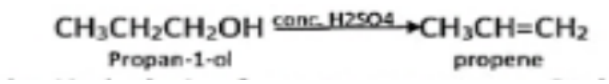
7. Show the reduction reaction of 2- methyl propanal



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

When propan-2-ol is treated with concentrated sulfuric acid (H_2SO_4) the phenomenon called dehydration occurs due to which a water molecule from propan-1-ol gets eliminated.

Due to this propan-1-ol gets converted into propene



- Hydrolysis of propene to propan-2-ol

Propene can be hydrolysed to propan-2-ol in accordance with mechanism called Markownikoff's reaction which states that when an asymmetrical reagent which is used in H20 which is composed of H+ and OH- part. Due to hydrolysis of water, the negative part attaches itself to the propene and converts and converts it to propan-2-ol