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MATRIC NUMBER: 19/MH5011/029

Department: MBBS Course: CHM102

Assignment title: New Assignment

Date: 15-05-2020.

Q₁ Alcohols are very important organic compounds. Discuss briefly their classification and give one example each.

(i) Based on the number of hydrogen atom(s) attached to the carbon atom containing the hydroxyl group. If the number of hydrogen atoms attached 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 $-OH$ group, it is called a tertiary alcohol (3°).

Example: $CH_3OH \rightarrow$ Methanol (1°)

(ii) Based on the number of $-OH$ groups they possess. Monohydric alcohols have one hydroxyl ($-OH$) group present in their structure. Dihydric (glycols), trihydric (trials) and polyhydric (polyols) alcohols have two, three and more than three hydroxyl groups present in their structures respectively.

Example: $CH_3CH(OH)CH_2CH(OH)CH_2CH_3$ - Hexane-2,4-diol (Dihydric)

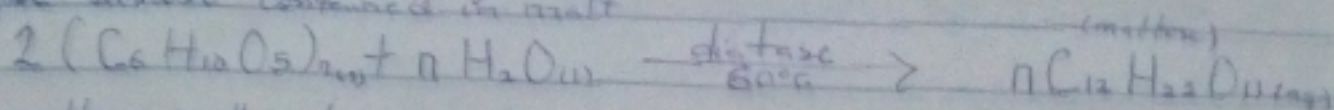
Q₂ Discuss the solubility of alcohols in water, organic solvents

(i) Lower alcohols with up to three carbon atoms in their molecules are soluble in water because of their ability to form hydrogen bond with water molecules. The water solubility of alcohols decreases with increasing relative molecular mass.

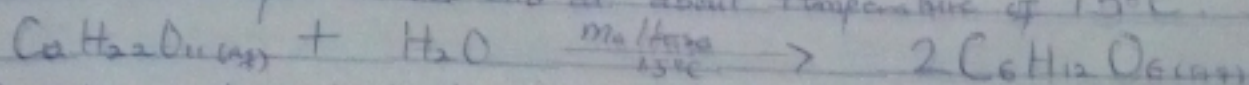
(ii) All monohydric alcohols are soluble in organic solvents.

Q3 Show the three steps in the industrial manufacture of ethanol. Equations of reactions are mandatory.

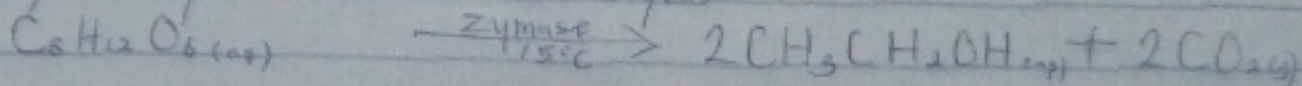
(a) Carbohydrates such as rice, maize etc. are major raw material used in the industrial manufacture of ethanol. The starch granules are mixed with malt to 60°C for a specific period of time. They are then converted into maltose by enzyme diastase contained in malt.



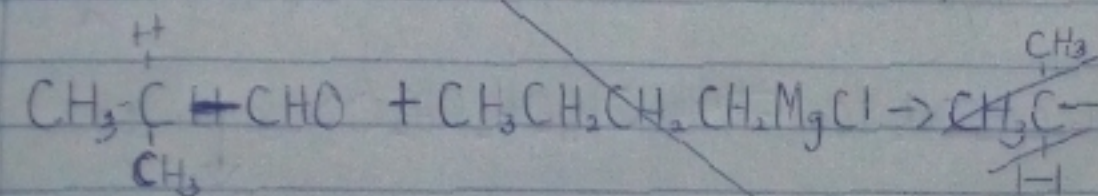
(b) The maltose is then broken down into glucose on addition of yeast which contains the enzyme maltase and at about temperature of 15°C .



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



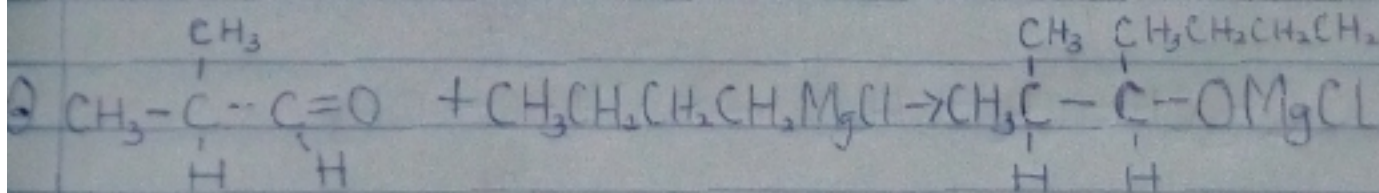
Q4 Show the reaction between 2-methylpropanal and butylmagnesium chloride.



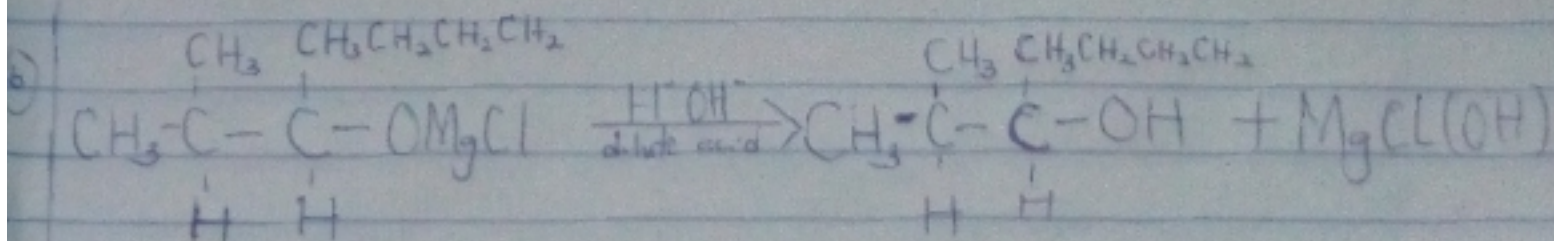
2-Methylpropanal Butylmagnesium chloride

Q5 Show the reaction between 2-methylpropanal and butylmagnesium chloride.

Solution

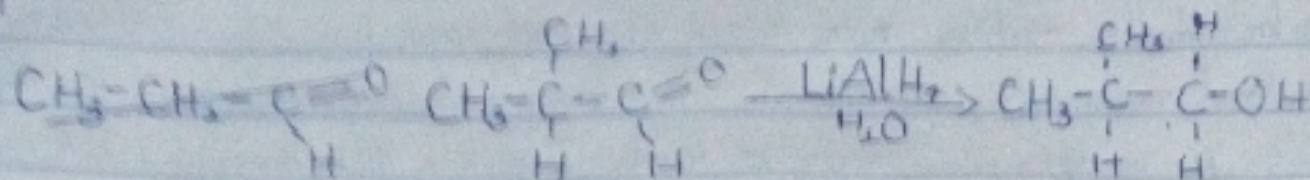


2-Methylpropanal Butylmagnesium chloride



Q7 Show the reduction reaction of 2-methylpropanal

Solution

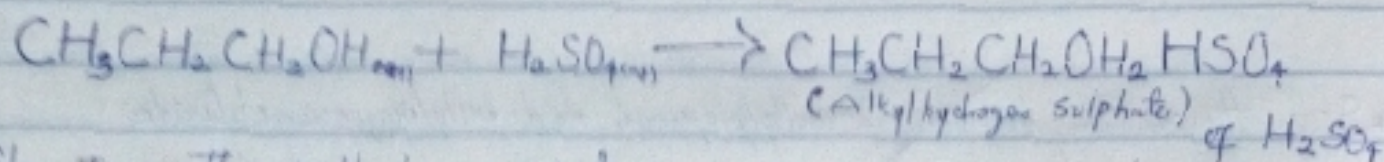


The reduction of 2-methylpropanal using LiAlH_4 will give 2-methylpropanol.

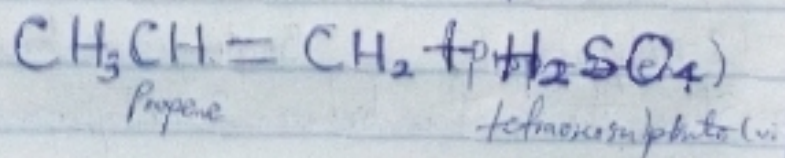
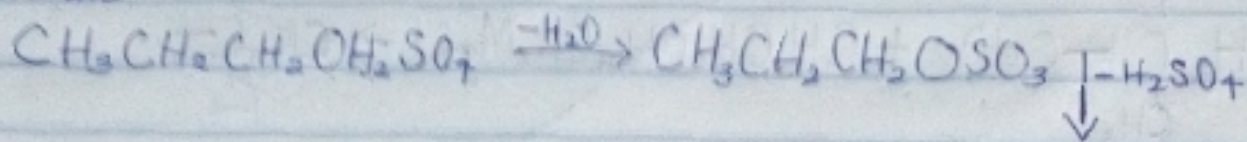
Q8 Propose a scheme for the conversion of propan-1-ol to propan-2-ol.

Solution

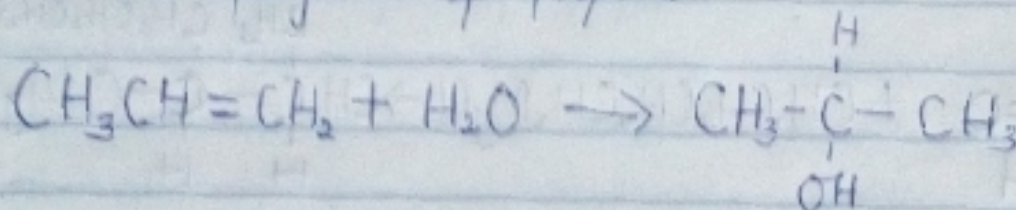
Step One: Dehydration of propan-1-ol using tetraoxosulphate(vi) acid as a dehydrating agent



Step Two: The alkylhydrogensulphate formed then undergoes further elimination to give an alkene



Step Three: the hydrogenation of propene



Propan-2-ol