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DEPARTMENT: M.B.B.S

MATRIC NO: 19/MHSDI/277

COURSE: CHEM 102

ASSIGNMENT

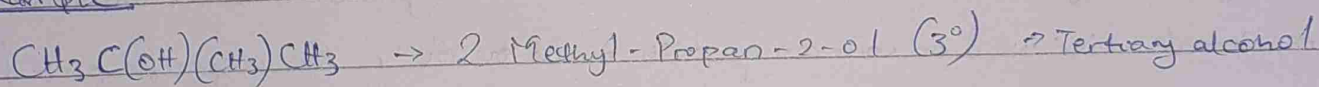
1. → Alcohols are very important organic compounds. Discuss briefly their classification and give one example each.

Answer

(i) CLASSIFICATION BASED ON THE NUMBER OF HYDROGEN ATOMS

This is based on the number of hydrogen atoms attached to the carbon containing the 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 a 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°).

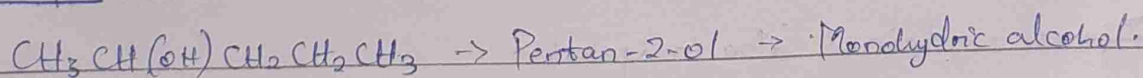
Example



(ii) CLASSIFICATION BASED ON THE NUMBER OF HYDROXYL GROUPS

This is based on the number of hydroxyl groups they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols, also called Glycols have two hydroxyl groups present in the alcohol structure while Trihydric alcohols also called triols have three hydroxyl groups present in the structure of the alcohol. Polyhydric alcohols or Polyols have more than three hydroxyl groups.

Example:



Q1) Discuss the solubility of alcohols in water, organic solvents.

Answer

Lower alcohols with up to three carbon atoms in their molecules are soluble in water because these lower alcohols can form hydrogen bond with water molecules.

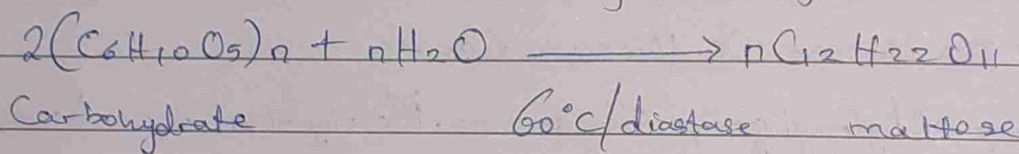
The water solubility of alcohols decreases with increasing relative molecular mass.

All Monohydric alcohols are soluble in organic solvents. The solubility of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules.

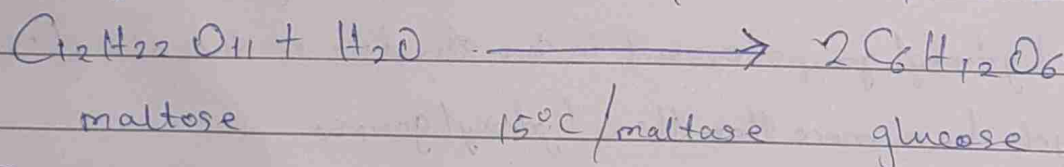
Q2) Show the three steps in the industrial manufacture of Ethanol. Equations of reaction are mandatory.

Answer

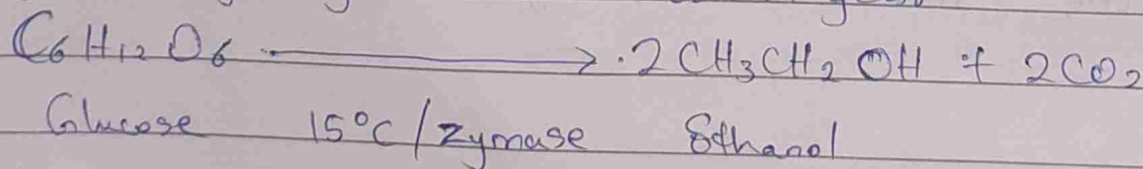
Carbohydrates such as starch are major groups of natural compounds that can be made to yield ethanol by the biological process of fermentation. The biological catalysts, enzymes found in yeast break down the carbohydrate molecules into ethanol to give a yield of 95%. The starch containing materials include molasses, potatoes, cereals, rice and on warming with malt to 60°C for a specific period of time are converted to 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



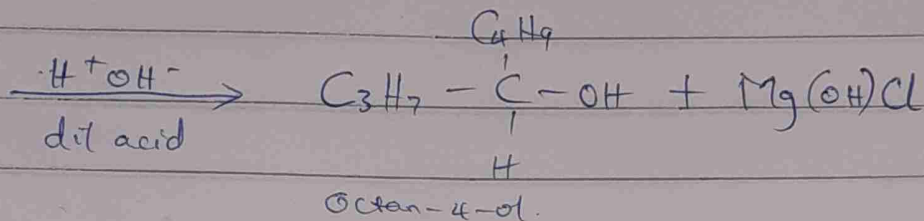
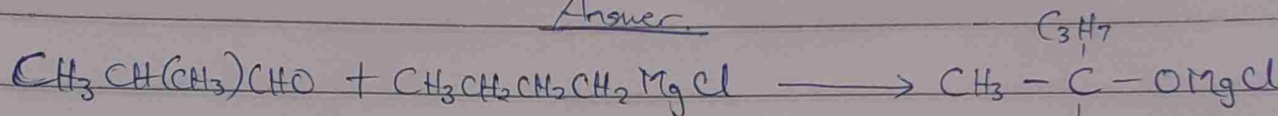
The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme Zymase contained also in yeast.



④ Show the reaction between 2-methylpropanal and butylmagnesium chloride.

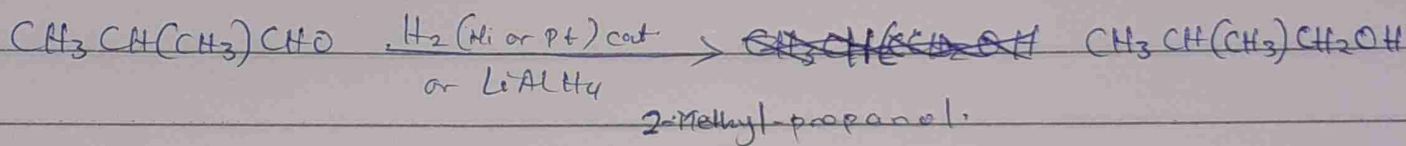
Hint: Grignard synthesis.

Answer



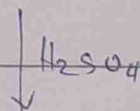
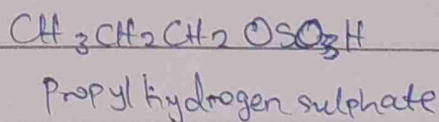
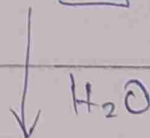
⑤ Show the reduction reaction of 2-methylpropanal

Answer



⑥ Propose a scheme for the conversion of propan-1-ol to propan-2-ol.

Answer



Propan-2-ol