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Metric No: 19/ENG02/057

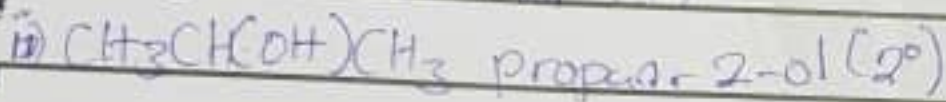
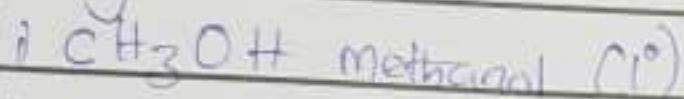
Department: Computer Engineering

Course: CEM 102

### 1) Major classification of Alkanols

a) Alkanols are classified based on the number of hydrogen atom attached to the carbon atom containing the hydroxyl group. If the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are two or three, it is called a primary alcohol ( $1^\circ$ ). If it is one hydrogen atom, it is called a secondary alcohol ( $2^\circ$ ) and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol ( $3^\circ$ ).

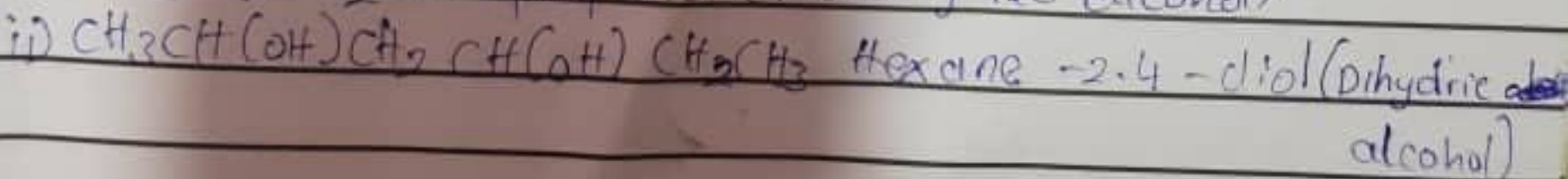
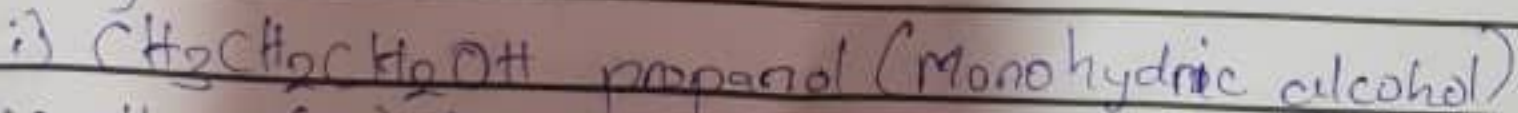
E.g



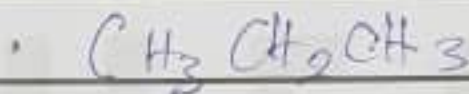
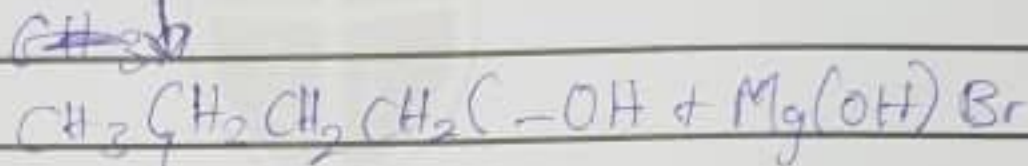
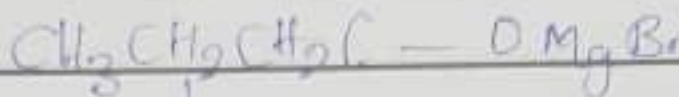
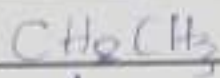
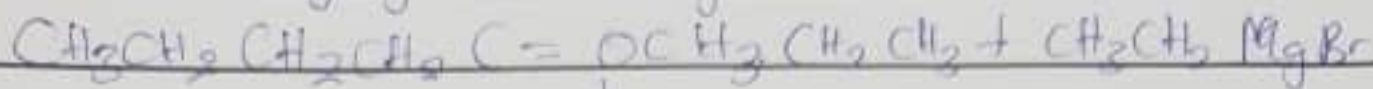
b) They are also classified based on the number of hydroxyl groups they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structures. Dihydric alcohols are also called Glycols, have two hydroxyl groups present in the alcohol structure while the trihydric alcohols ~~are~~ <sup>or</sup> triols have three hydroxyl group present in the structure of the alcohol.

Polyhydric alcohols are ~~polyols~~ <sup>polyols</sup> have more than three hydroxyl groups.

E.g



2) Grignard Synthesis of an Alcohol using  $\text{CH}_3\text{CH}_2\text{MgBr}$  as a ~~Grignard~~ Grignard Reagent



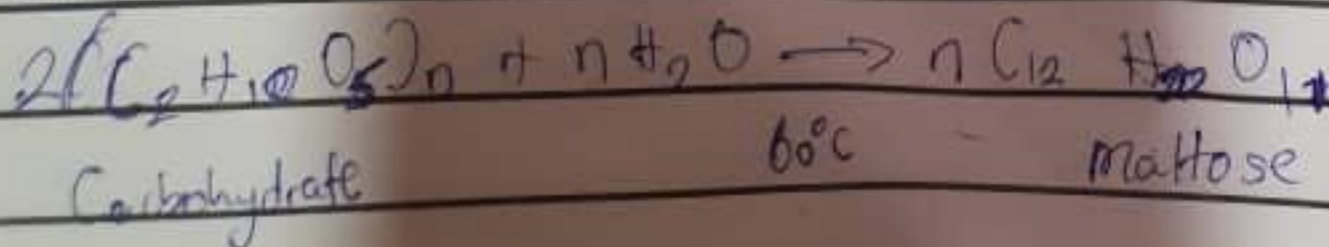
3-Butylethanol-3-ol

3) Industrial Preparation 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

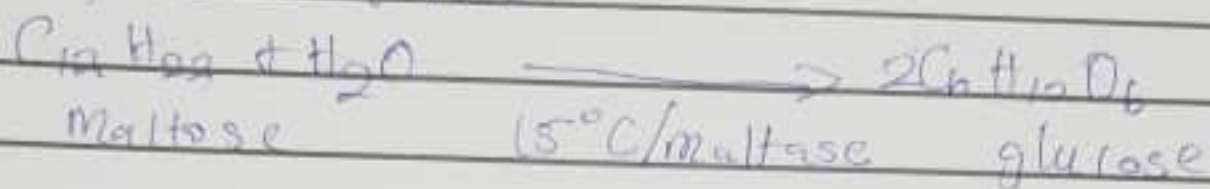
STEP I

The starch containing materials include potatoes, cereals, rice and on warming with malt to  $60^\circ\text{C}$  for a specific period of time are converted into ~~maltose~~ maltose by the enzyme diastase contained in the malt.



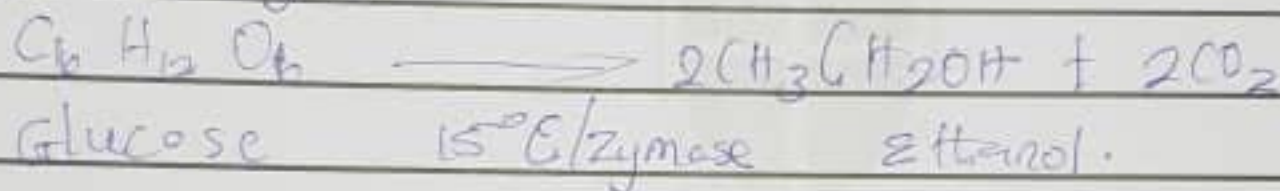
STEP II

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



STEP III

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

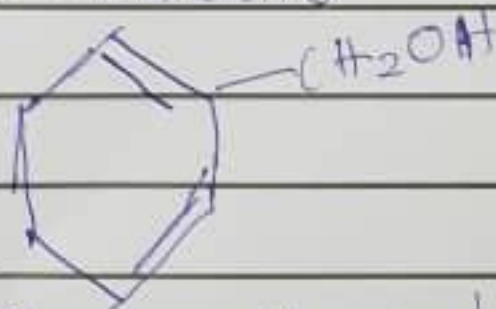


4) Product obtained in the reduction of Alkanal and Alkanone.

Aldehyde and ketones are reduced to primary and secondary alcohols respectively by reacting with hydrogen in the presence of a platinum or nickel catalyst or with aluminium isopropoxide or with complex metal hydride, such as lithium tetrahydridoaluminate(III) or sodium tetrahydridoborate(III)



Aldehyde



Primary Alcohol



ketone



Secondary Alcohol