

Jatto Shakeerah CHM102 Assignment

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COURSE: CHM 102

ASSIGNMENT

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

Answer

a. Based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group

- If the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group are three or two, it is called a "primary alcohol (1°)" e.g. Methanol.

- If it is one hydrogen atom attached to the carbon atom containing the hydroxyl group, it is called a "secondary alcohol (2°)" e.g. Propan-2-ol.

- If no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a "tertiary alcohol (3°)".

e.g. 2-methylpropan-2-ol.

b. Based on the number of hydroxyl groups they possess

- When there is one hydroxyl group present it is called a monohydric alcohol e.g. Propanol.

- When there are two hydroxyl groups present, it is called a dihydric alcohol or glycol e.g. 1,2-ethandiol.

- When three hydroxyl groups are present it is called trihydric alcohol or triols e.g. Propane-1,2,3-triol.

2) Discuss the solubility of alcohols in water, organic solvents

Answer

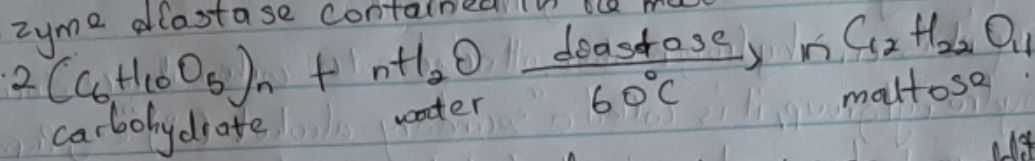
Alcohols with lower number of carbon atoms are soluble in water because they form hydrogen bonds. Increase in the number of carbon atoms leads to a decrease in solubility.

All monohydric alcohols will dissolve in organic solutions.

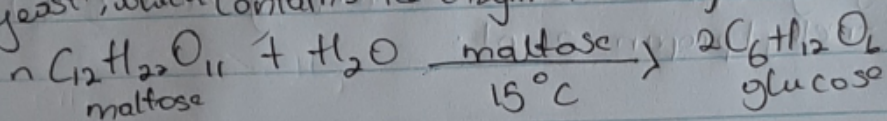
3. Show the 3 steps in the industrial manufacture of ethanol.

Answer

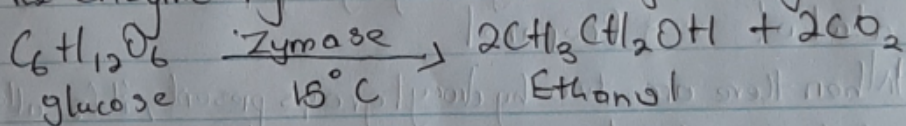
i. Ethanol can be manufactured by the biological process of fermentation of carbohydrates. Enzymes, which are biological catalysts of yeast, breakdown carbohydrate molecules to yield 95% of ethanol. Starch containing material e.g. potatoes, rice, molasses, etc., on warming with malt to 60°C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.



ii. The maltose is then broken down into glucose on addition of yeast, which contains the enzyme maltase, at a temperature of 5°C.

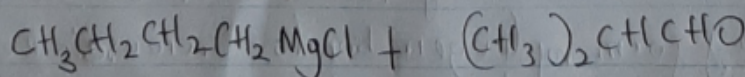
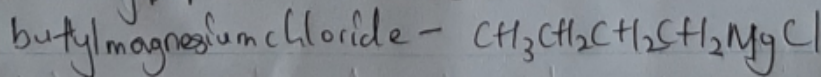
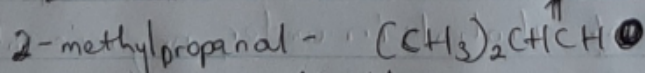


iii. At a constant temperature of 15°C it is then converted into alcohol by the enzyme zymase which is also found in yeast.

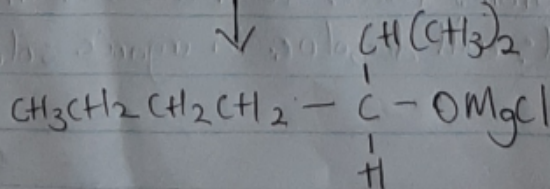


4. Show the reaction between 2-methylpropanal and butylmagnesium chloride.

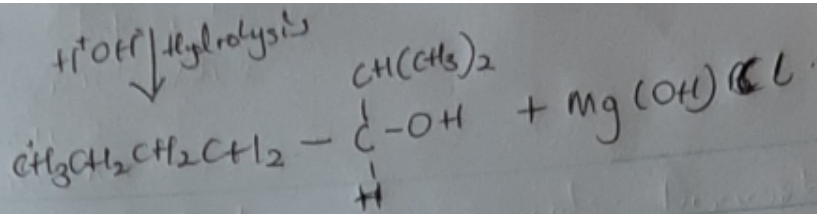
Answer



↓



↓ Hydrolysis

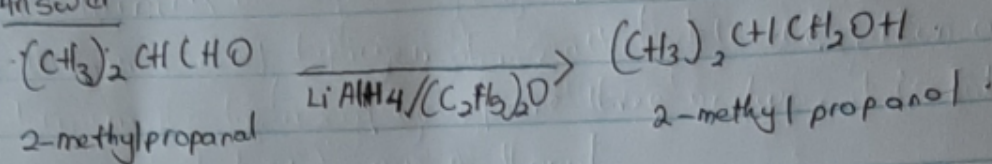


5.

5.

Show the reduction reaction of 2-methyl propanal.

Answer

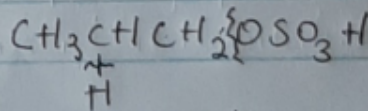
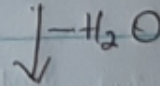
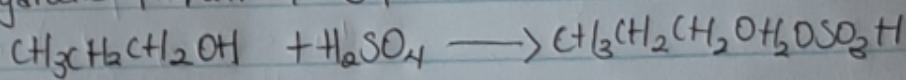


6. Propose a scheme for the conversion of propan-1-ol to propan-2-ol

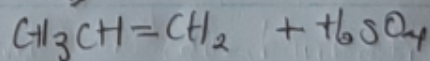
i.

Dehydrate Answer

Dehydrate propan-1-ol



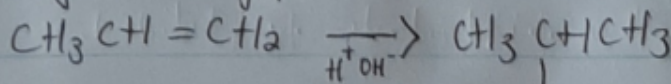
propyl hydrogen sulphate



Propene

ii.

Hydration of propene



Propan-2-ol

