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DEPARTMENT: PETROLEUM ENGINEERING

MATRIC NO: 19/ENG07/012

1. Discuss the two major classification of Alkanols. Give two examples each for each class

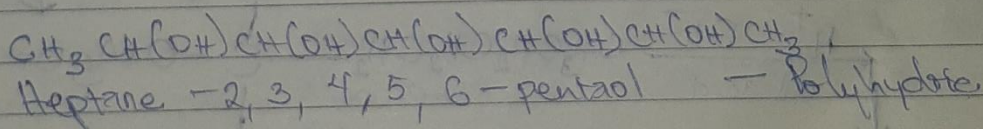
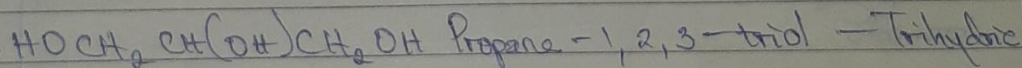
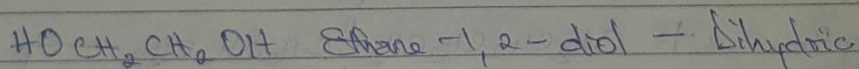
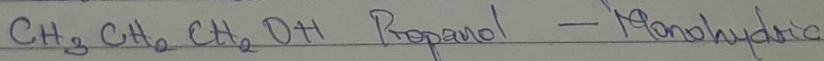
Solution

- i.) Classification based on number of hydroxyl groups present.

This can further be broken into four groups. They are:

Monohydric, Dihydric, Trihydric and Polyhydric.

Monohydric alkanols have only one hydroxyl group present in their structure. Dihydric alkanols have only two hydroxyl groups present in their structure. Trihydric alkanols have only three hydroxyl groups in their structure. Polyhydric alkanols have more than three hydroxyl groups present in their structure. Examples include:



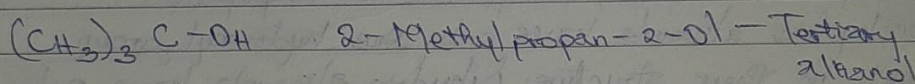
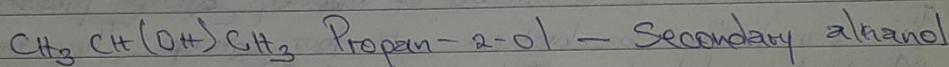
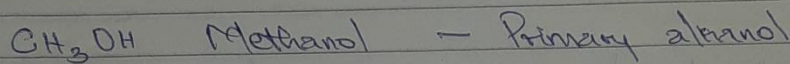
- ii.) Classification based on number of hydrogen atoms attached to carbon atom carrying the hydroxyl group.

This can further be divided into three groups. They include: primary alkanols, secondary alkanols and tertiary alkanols.

Primary alkanols have two or three hydrogen atoms attached

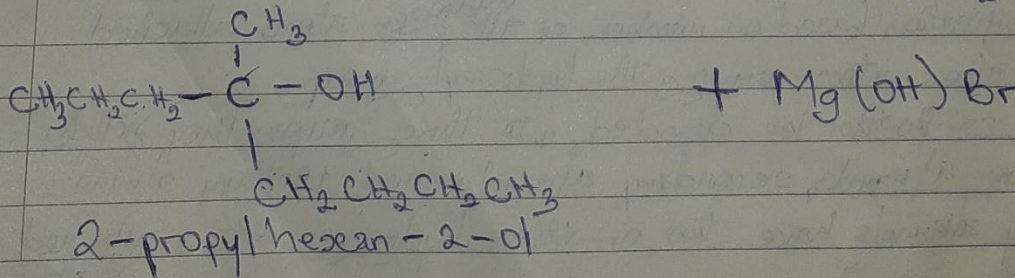
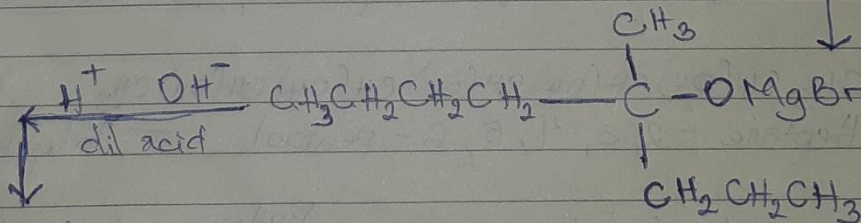
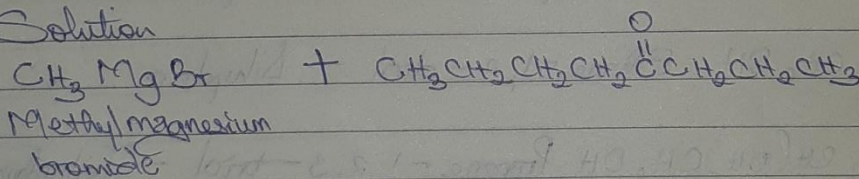
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to the carbon atom carrying the hydroxyl group. Secondary alcohols have only one hydrogen atom attached to the carbon atom carrying the hydroxyl group. Tertiary alcohols have no hydrogen atom attached to the carbon atom carrying the hydroxyl group. Examples are:



2. In the Grignard synthesis of Alcohols, react a named Grignard reagent with $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{C}(=\text{O})\text{CH}_2\text{CH}_2\text{CH}_3$. Show the reaction steps.

Solution

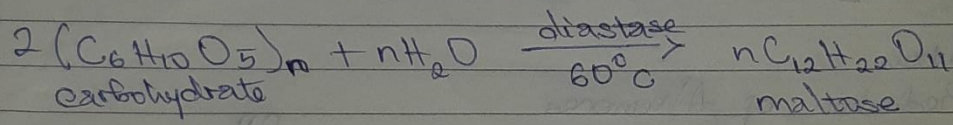


3 Discuss the industrial manufacture of ethanol showing all reactions equations and necessary enzymes and temperature of reaction.

Solution

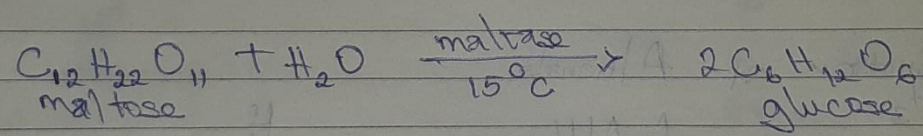
STEP I

Carbohydrates are warmed with malt to 60°C for a specific period of time. The carbohydrate is then converted into maltose by enzyme diastase found in the malt.



STEP II

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



STEP III

The glucose is then converted into ethanol by the enzyme zymase also found in yeast at a constant temperature of 15°C.

