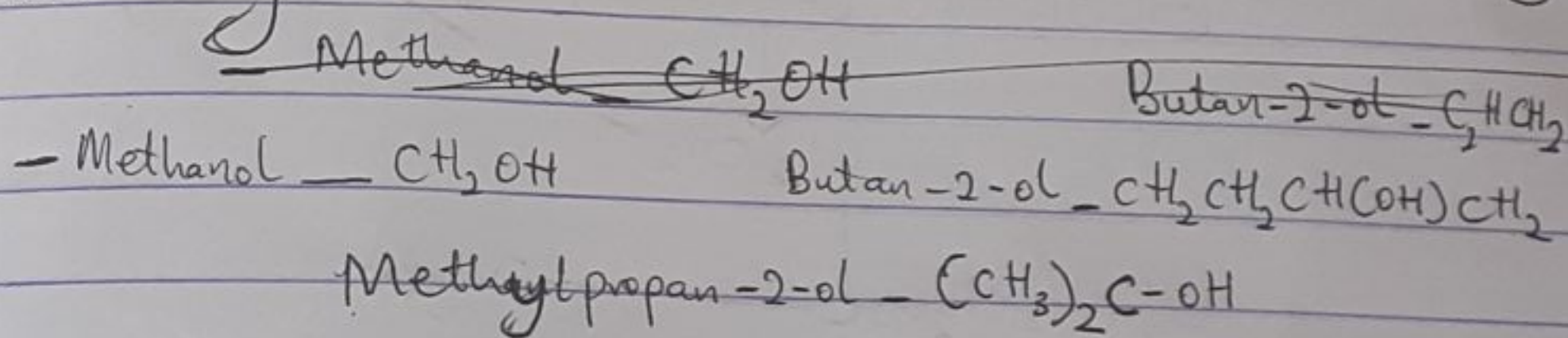


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### CHEM 102 Assignment

#### 1) Major classifications of Alkanols

a) Alkanols are classified based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. If the hydroxyl group are two or three, it is called a primary alcohol. If it is one hydrogen atom, it is called a secondary alcohol and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol. E.g



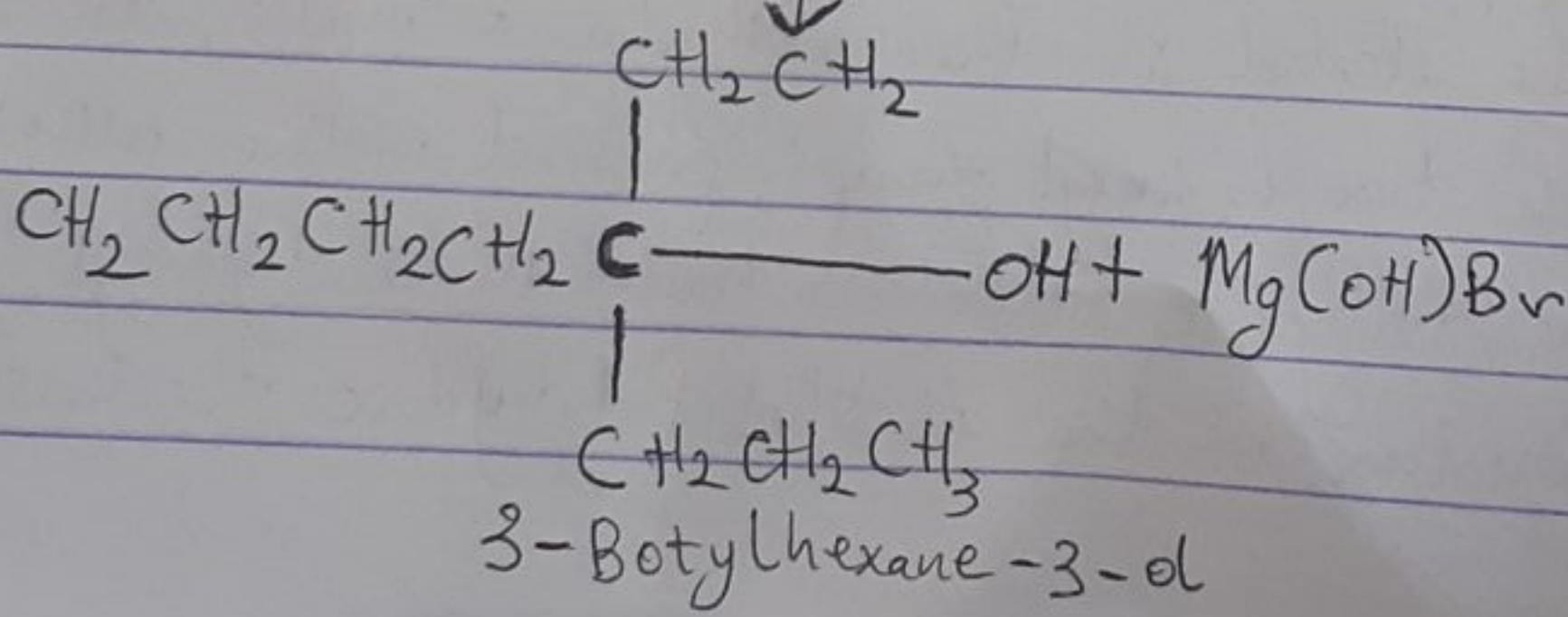
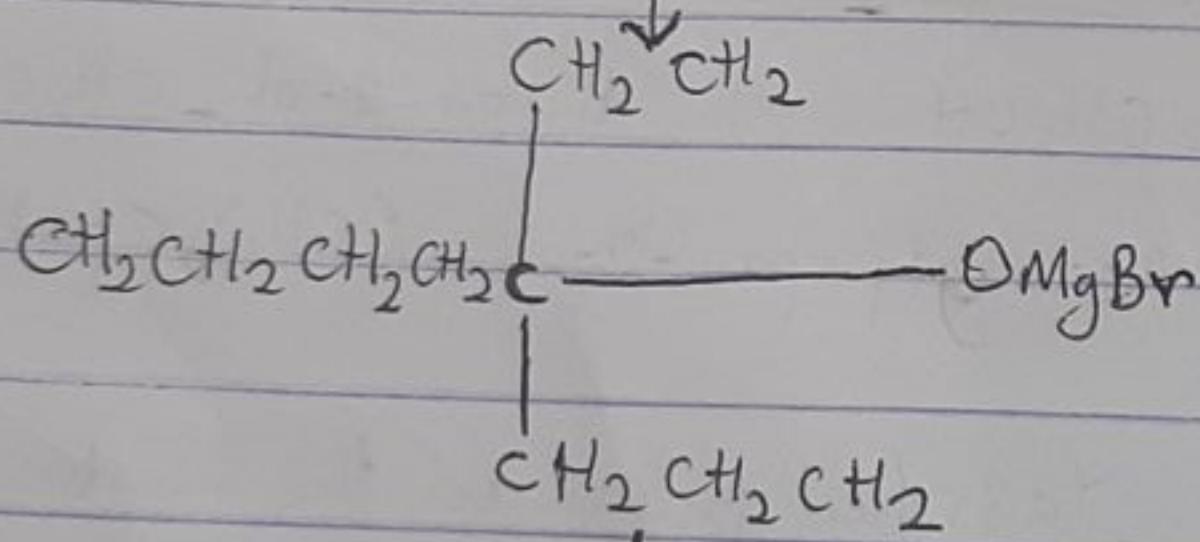
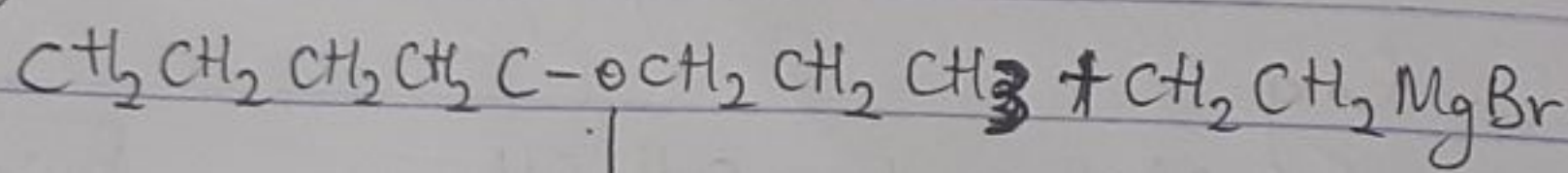
b) They are also classified based on the number of hydroxyl groups they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structures. Dihydric alcohols, also called glycols have two hydroxyl groups present in the alcohol structure while the trihydric alcohols have three hydroxyl groups present in the structure of the alcohol. Polyhydric alcohols or polyols

have more than three hydroxyl groups.

E.g

- Propanol (Monohydric alcohol) -  $\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$
- Ethane-1,2-diol (Dihydric alcohol) -  $\text{HOCH}_2\text{CH}_2\text{OH}$
- Propane 1,2,3-triol (Trihydric alcohol) -  $\text{OHCH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$
- Heptane 2,3,4,5,6-Pentaol (Polyhydric acid) -  $\text{CH}_2\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$

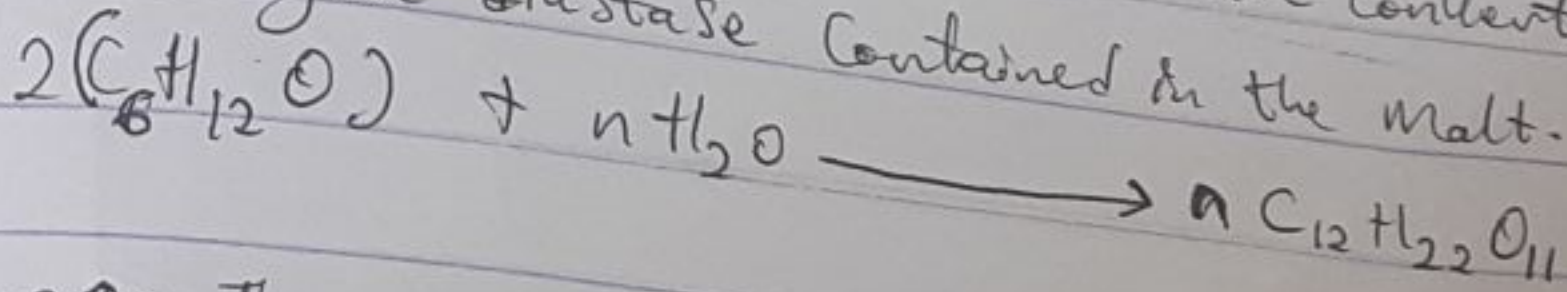
2) GRIGNARD synthesis of an alcohol using  $\text{CH}_3\text{CH}_2\text{MgBr}$  as a GRIGNARD reagent.



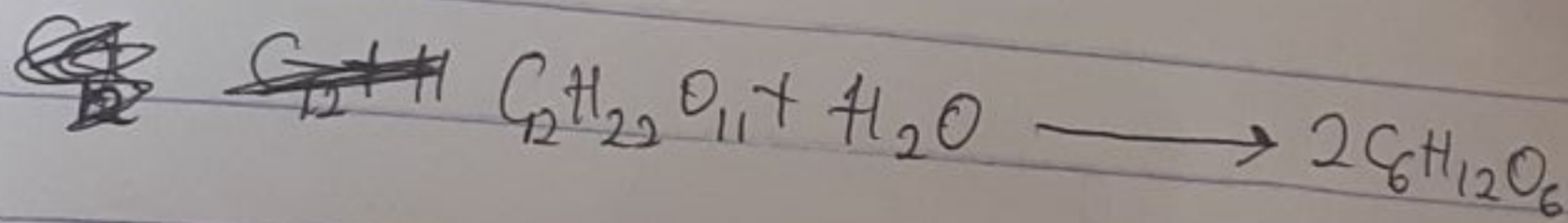
### 3) Industrial Preparation of Ethanol

Carbohydrates such as starch are major groups of natural compounds that can be made to yield ethanol by the biological process of fermentation.

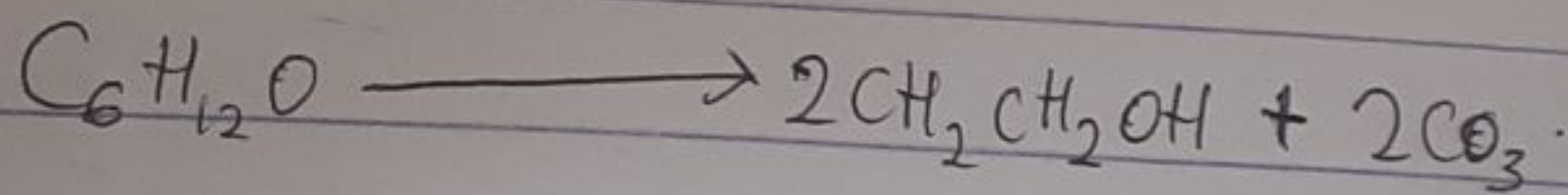
- Step 1: The starch containing materials include molasses, potatoes, cereals, rice and on warming with malt to  $60^{\circ}\text{C}$  for a specific period of time are converted into Maltose by the enzyme diastase contained in the malt.



- Step 2: The Maltose is broken down into glucose on addition to yeast which contains the enzyme maltase and at a temp. of  $15^{\circ}\text{C}$ .



- Step 3: The glucose at constant temperature of  $15^{\circ}\text{C}$  is then converted into alcohol by the enzyme zymase contained also in yeast



4) Product obtained in the reduction of alkanal & Alkanone  
Aldehydes 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).

