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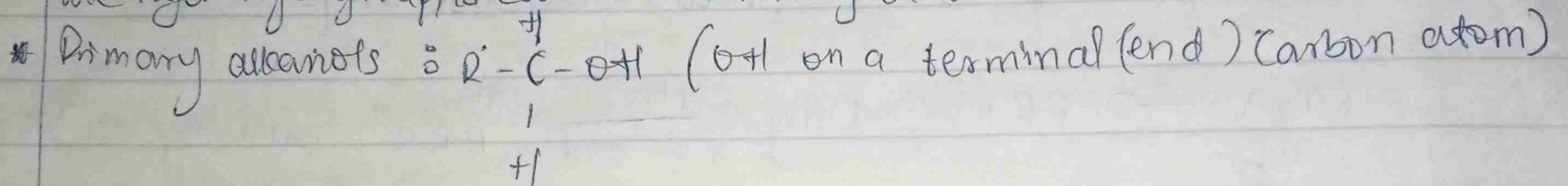
M.No 19/MHSD1/437

Course CHM 102

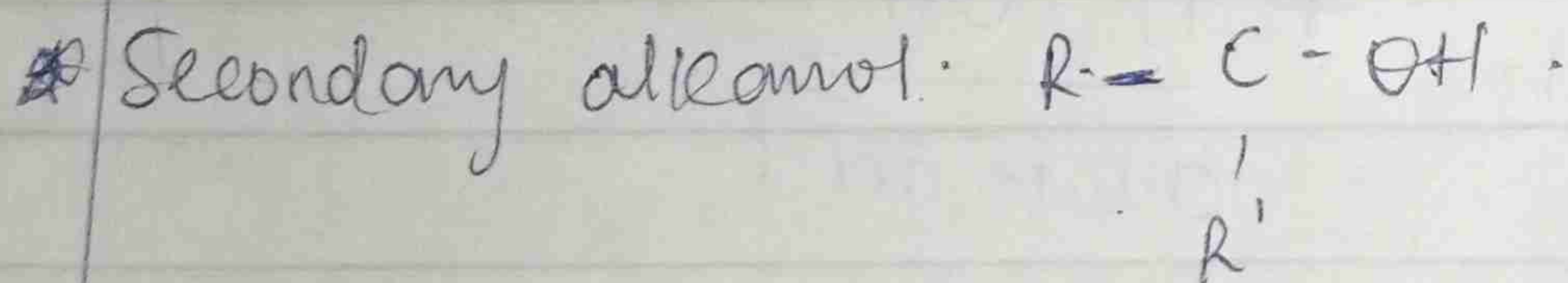
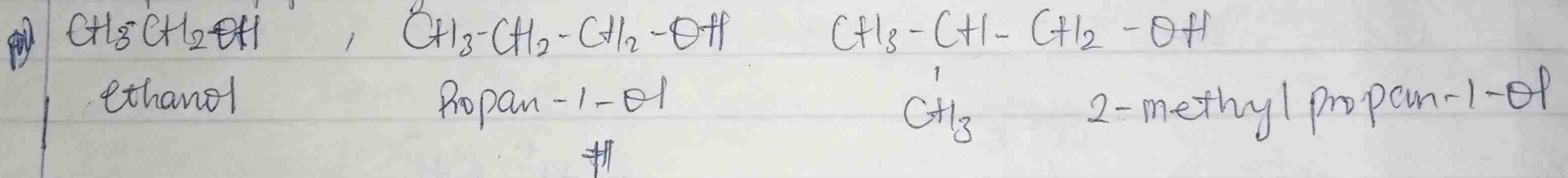
1) Discuss the two major classification of alkanols. Give two examples each for each class.

answer

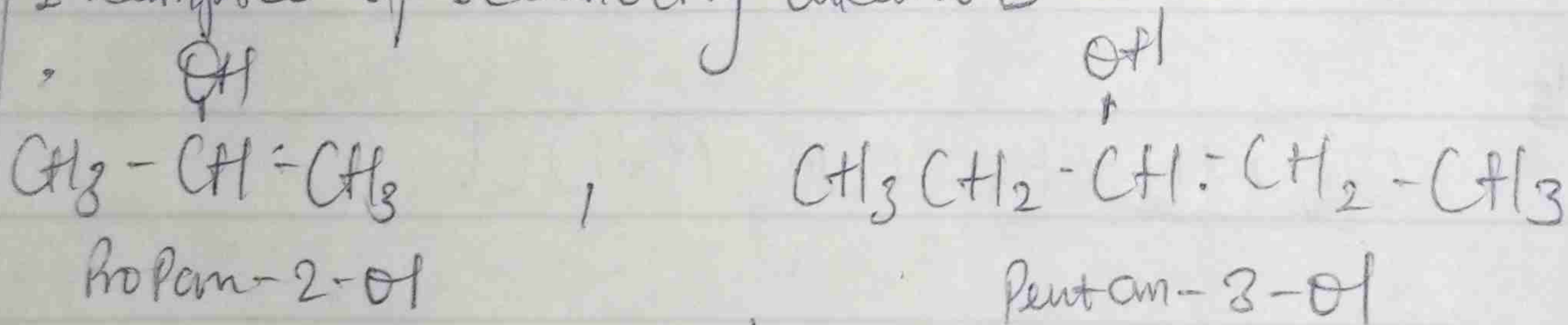
1) This is based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. If the numbers of hydrogen atoms attached to the carbon bearing the hydroxyl group are three or two, it is called a primary alcohol (1°). If it is one hydrogen atom, it is called a secondary alcohol (2°) and if no hydrogen atom is attached, the carbon atom bearing the hydroxyl group, is called a tertiary alcohol.



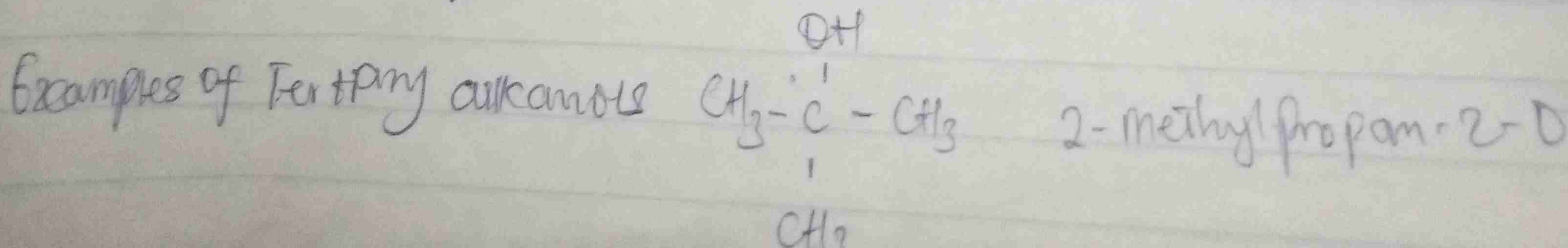
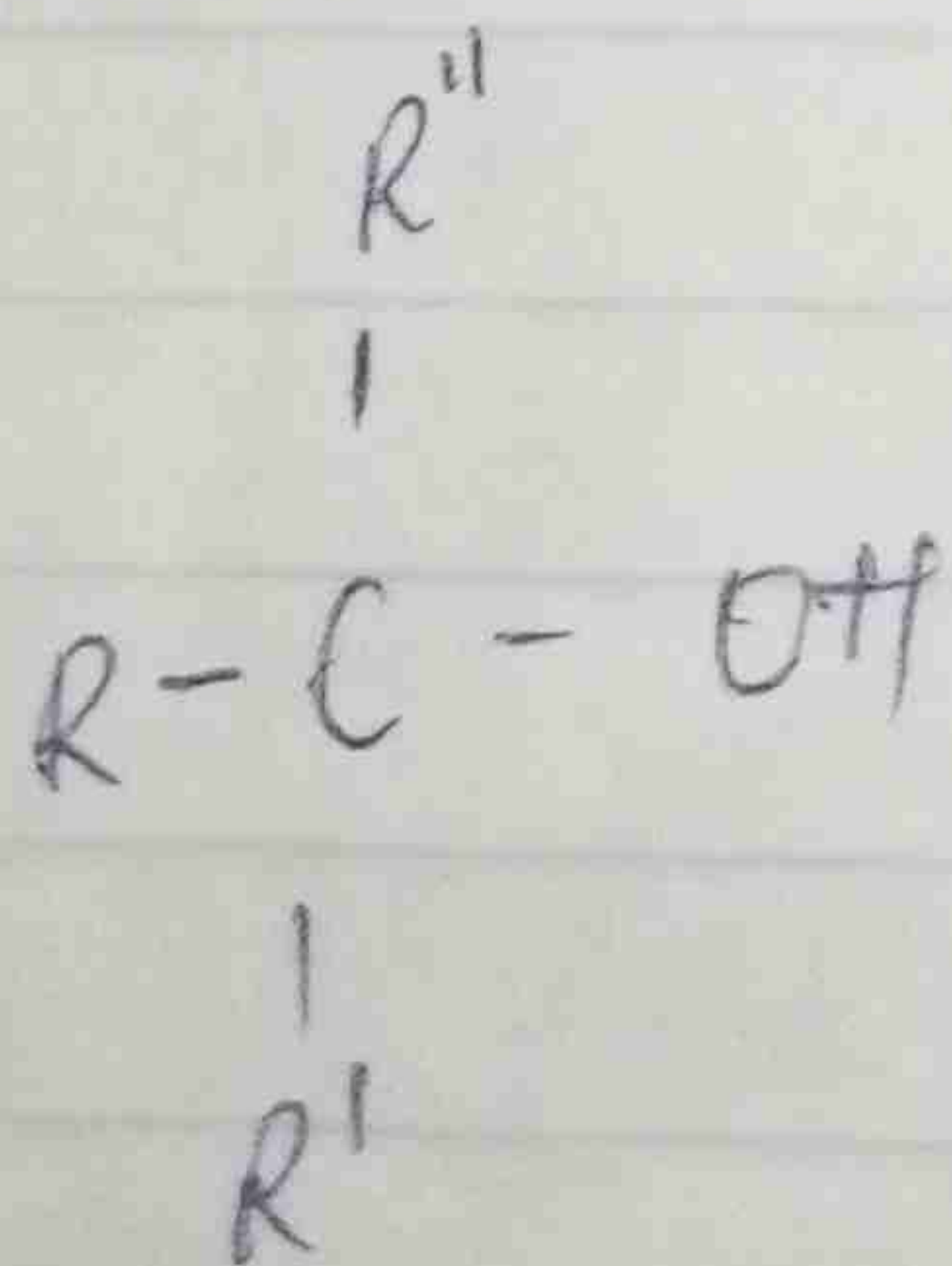
Examples of primary alkanols



Examples of secondary alkanols



* Tertiary alkanols



b) This is based on the number of hydroxyl groups they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols are also called GLYCOLS have two hydroxyl groups present in the alcohol structure while trihydric alcohols or triols have three hydroxyl groups present in the structure of the alcohol. Polyhydric alcohols or polyols have more than three hydroxyl groups.

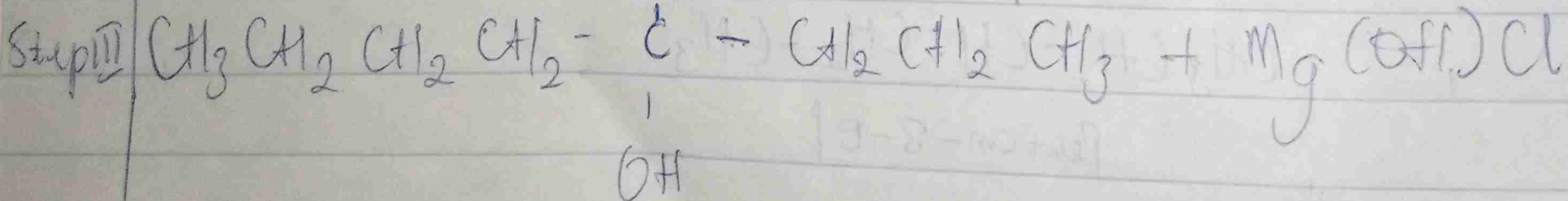
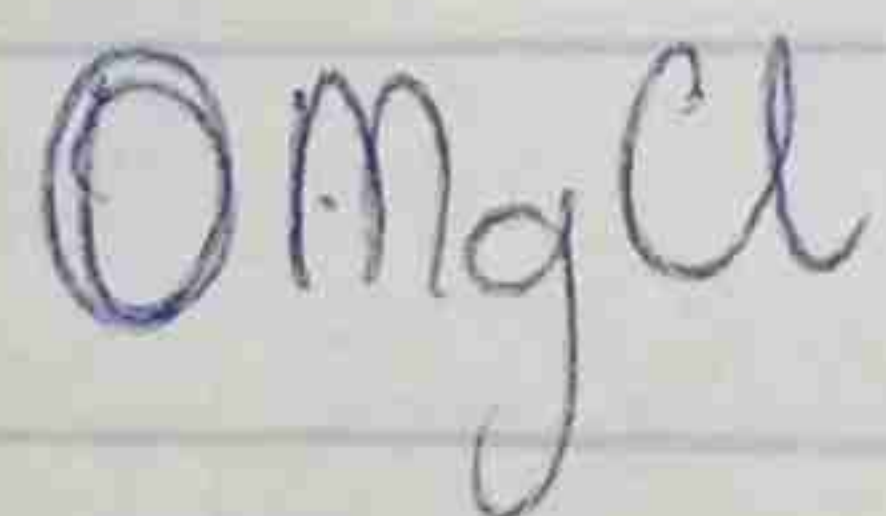
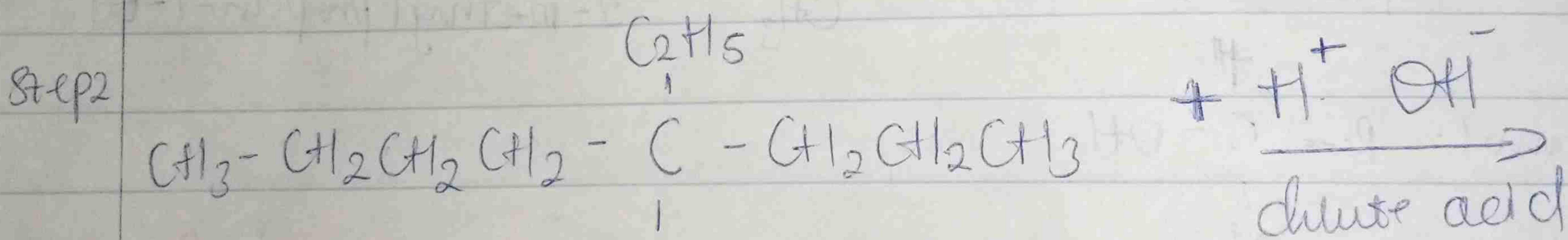
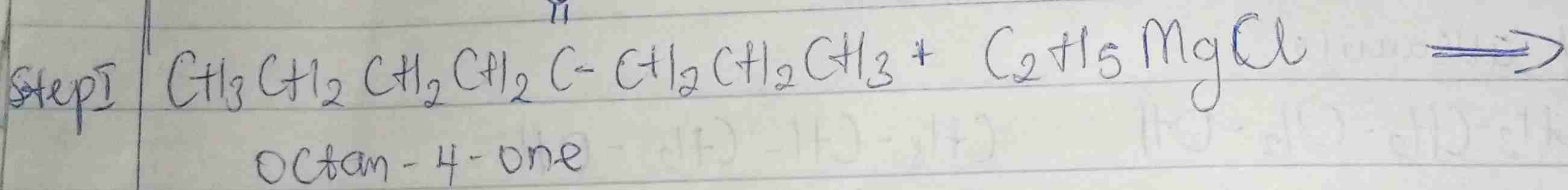
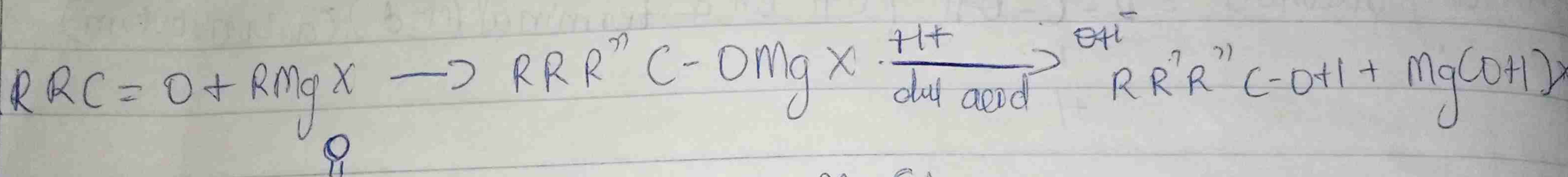
Examples of Monohydric: $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_{16}\text{H}_{33}\text{OH}$.

Examples of Dihydric: $\text{HOCH}_2\text{CH}_2\text{OH}$.

Examples of Trihydric: $\text{HOCH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$.

Examples of Polyhydric: $\text{C}_7\text{H}_{15}(\text{OH})_3$, $\text{C}_6\text{H}_8(\text{OH})_6$, $\text{C}_5\text{H}_7(\text{OH})_5$.

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

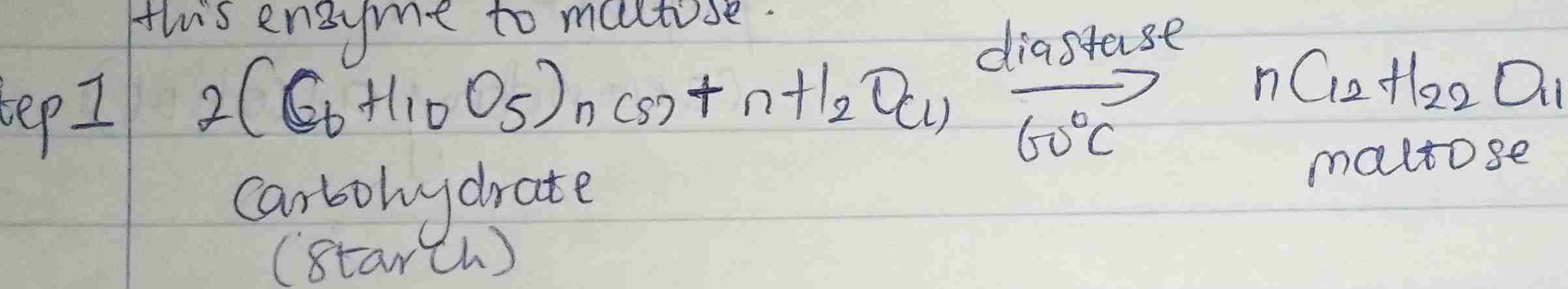


4 ethyl Octan-4-ol

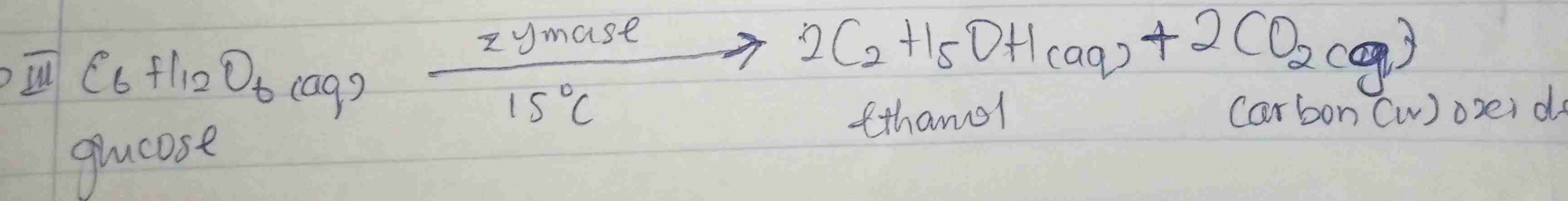
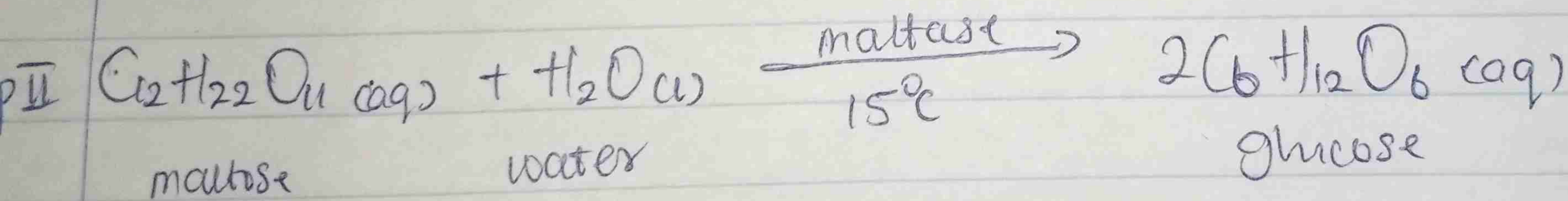
3) Discuss the industrial manufacture of ethanol showing all reaction equations and necessary enzymes and temperature of reaction.

* By Fermentation

Carbohydrates such as starch are major group of natural compounds that can be made to yield ethanol by the biological process of fermentation. The starch granules are extracted by crushing and pressure cooking the material. They are then treated with malt at 50°C to 60°C for an hour. Malt is partially germinated barley, which contains the enzyme diastase. The starch is converted by this enzyme to maltose.



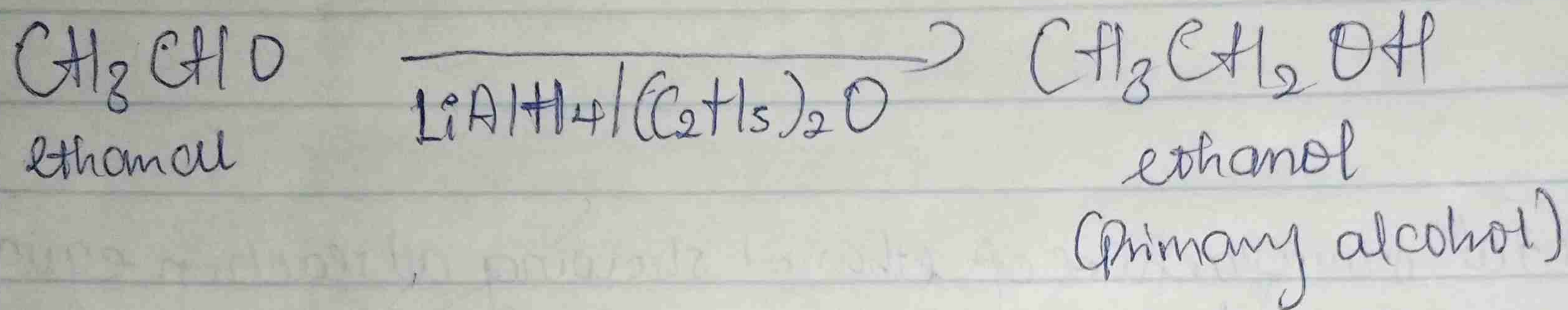
Yeast is then added at room temperature. Yeast contains two enzymes, namely maltase which converts maltose to glucose, and zymase which then decomposes the glucose into ethanol and carbon dioxide.



4) Determine the product obtained in the reduction of Alkanone and Alkanal. Use a specific example for each and show the equation reaction.

Solution

Alkanal (Aldehyde)



Alkanone (Ketone)

