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(13)

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

Ans

1. Classification based on the number of hydrogen attached to the carbon atom containing hydroxyl group:

If the number of hydrogen attached to the carbon atom bearing the hydroxyl group are three or two, it is called a Primary Alcohol (1°) eg CH_3OH - Methanol, $\text{CH}_3\text{CH}_2\text{OH}$ - Ethanol.

If it is one hydrogen atom that is attached to the carbon bearing the hydroxyl group it is called Secondary Alcohol (2°)

eg $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$ - Propan-2-ol, $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$ - Penta-3-ol

If no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a Tertiary Alcohol (3°)

eg, $\text{CH}_3\text{CH}_2\text{CH}_2\text{C}(\text{OH})(\text{CH}_3)_2$ - 2 Methyl Penta-2-ol.

$\text{CH}_3\text{C}(\text{OH})(\text{CH}_3)_2$ - 2 Methyl Propan-2-ol.

ii CLASSIFICATION based on the number of hydroxyl groups they possess.

a. MONOHYDRIC ALCOHOLS - They have one hydroxyl group present in the ~~alcohol~~ ALCOHOL structure. e.g.
 $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ - Propanol.
 $\text{CH}_3\text{CH}_2\text{OH}$ - Ethanol.

b. DIHYDRIC ALCOHOLS - they are also called DIYOLS, they have two hydroxyl groups present in the alcohol structure. e.g. $\text{HOCH}_2\text{CH}_2\text{OH}$ - Ethane 1,2 diol.
 $\text{HOCH}_2\text{CH}_2\text{CH}_2\text{OH}$ - Propane 1,3 diol.

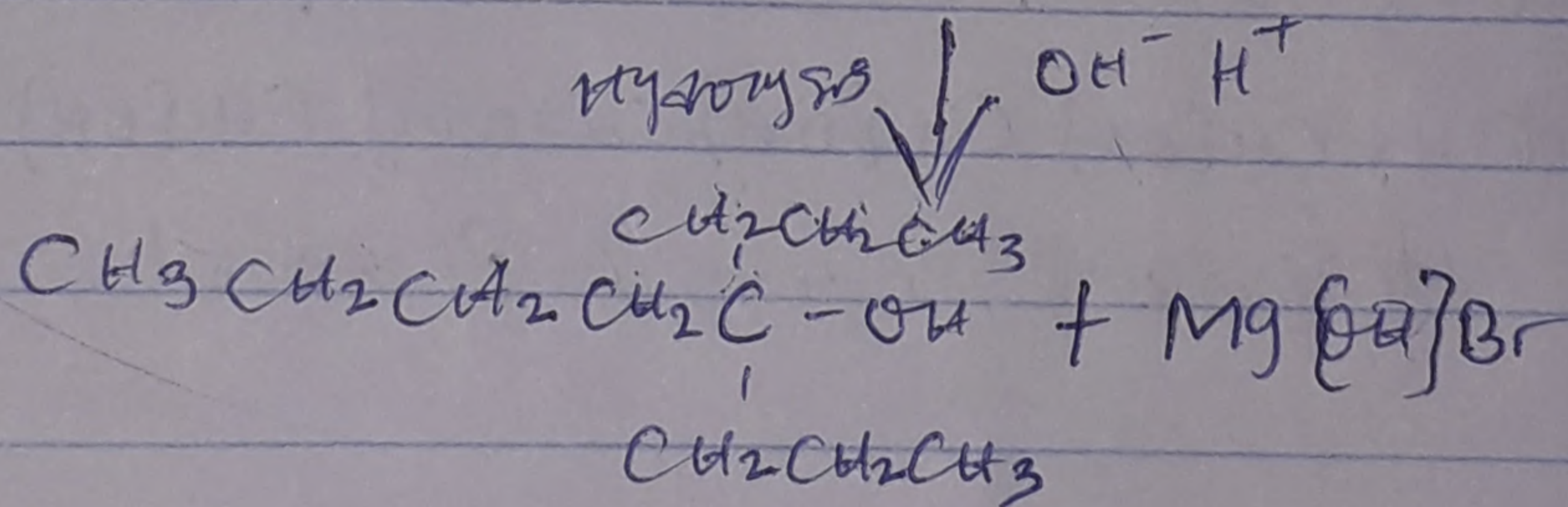
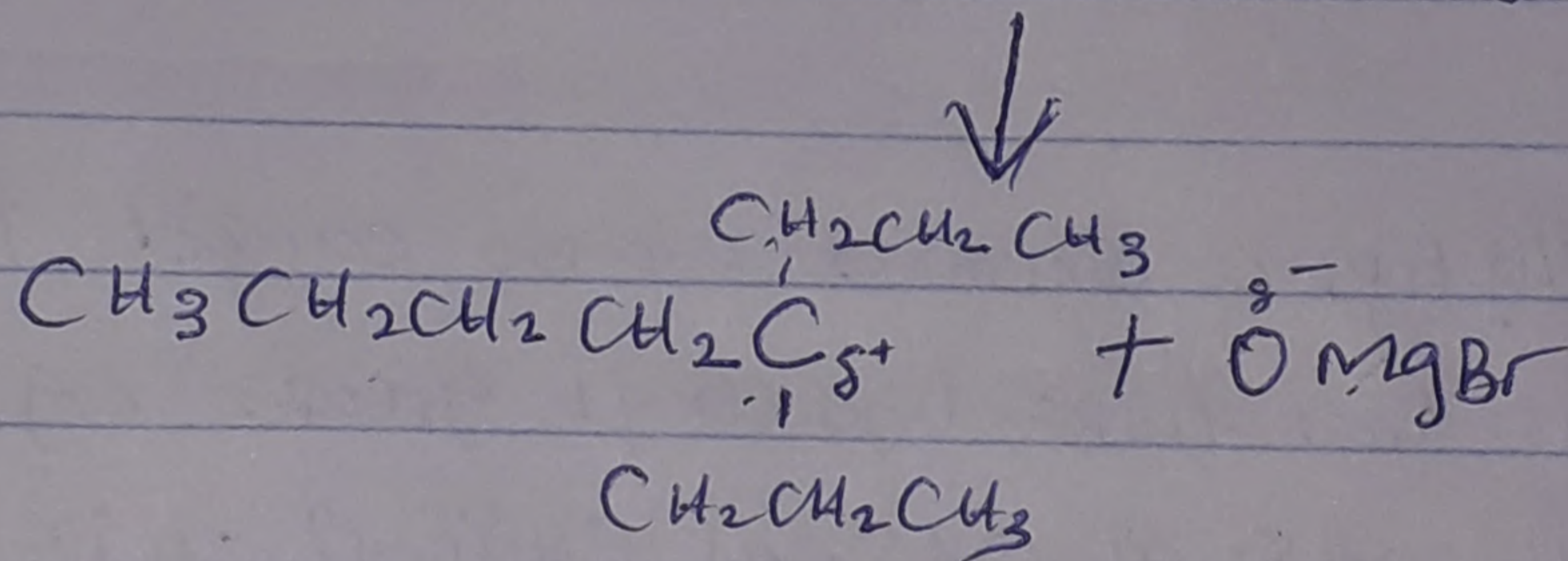
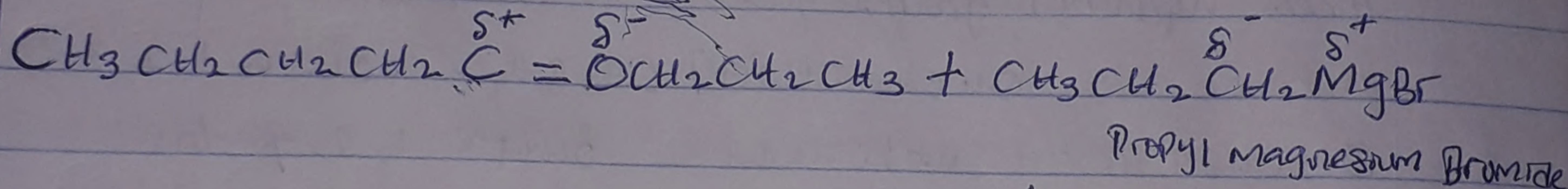
c. TRIHYDRIC ALCOHOLS - Also called TRIOLS, they have three hydroxyl groups present in the structure of the alcohol. e.g. $\text{OHCH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$ - Propane-1,2,3 triol.
 $\text{OHCH}_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$ - Butane 1,2,4 triol.

c. POLYHYDRIC ALCOHOLS - also called POLYOLS, they have more than three hydroxyl groups e.g.

$\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3$ - Hexane, 2,3,4 - 5 Butanol

$\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3$

Heptane 2,3,4,5,6 Pentanol.

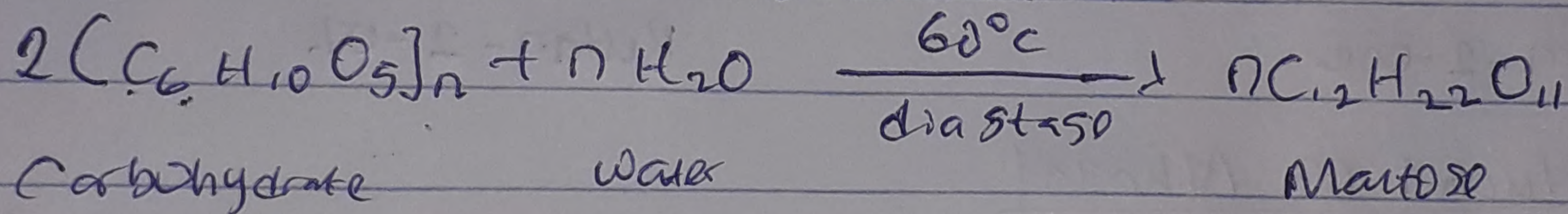


H Propyl Octan-4-ol

3 Carbohydrates such as starch are major group of natural compounds that can be made to yield ethanol by the biological process of fermentation. The biological catalysts, enzymes are found in yeast break down ~~the~~ ^{of} carbohydrate molecules into ethanol to give a yield of 95%. The starch containing materials includes mashes, potatoes, cereals, rice.

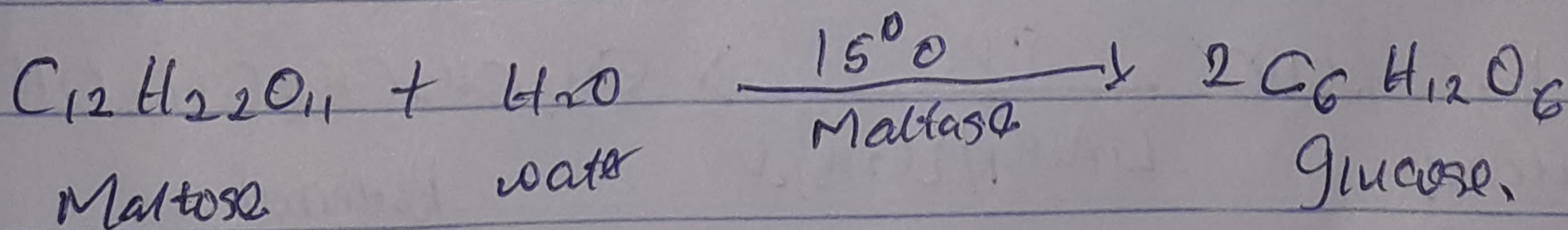
Step 1

On warming with ~~starch~~ Malt to 60°C for a specific period of time are converted into Maltose by the enzyme diastase contained in the malt.



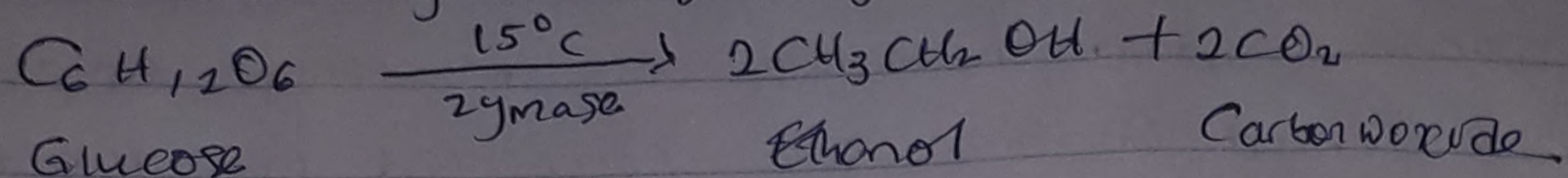
Step 2

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



Step 3.

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

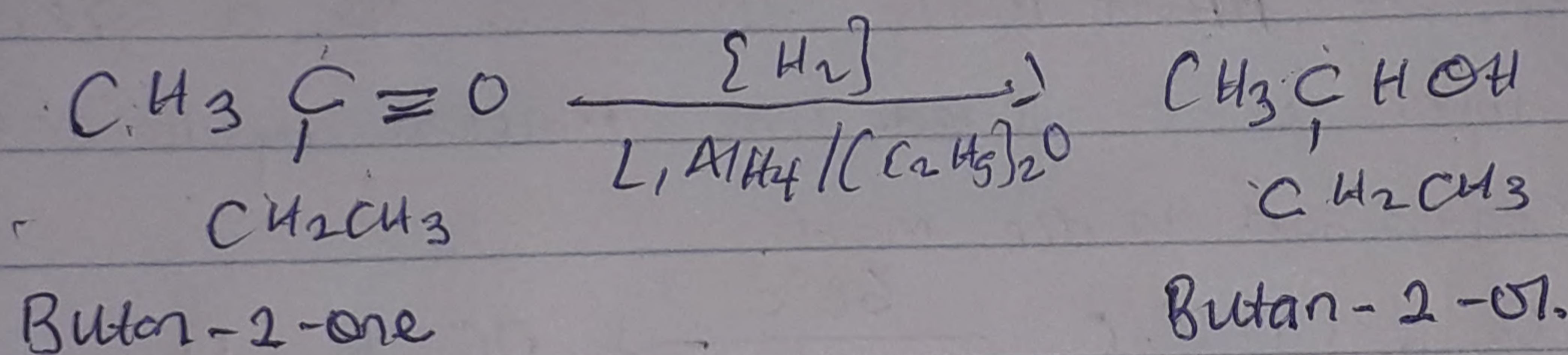
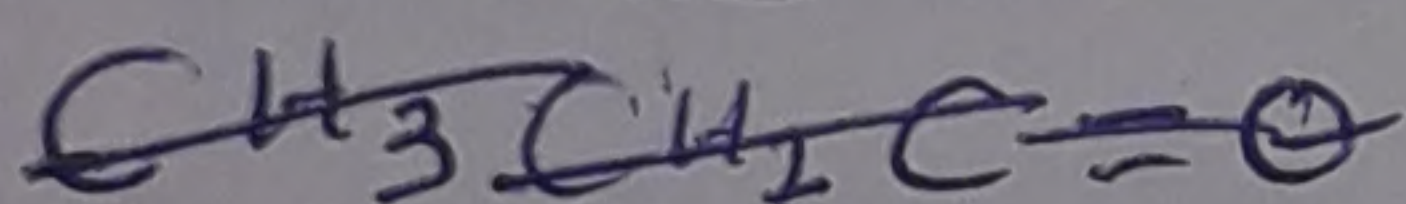
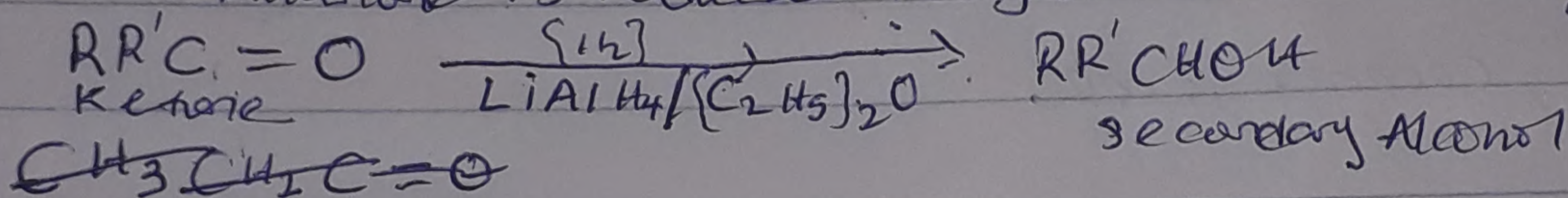


H. Determine the product obtained in the reduction of Alkanone & Alkanal. Use a specific reagent for each & show the equation of reaction.

Ans

Reduction of Alkanone

When Alkanone is reduced it gives a secondary Alcohol



Reduction of Alkanal

When Alkanal (Aldehyde) is reduced it gives a Primary

Alcohol

