

OGINMI OLUWASEYI M

19/ENG06/041

Mechanical Engineering

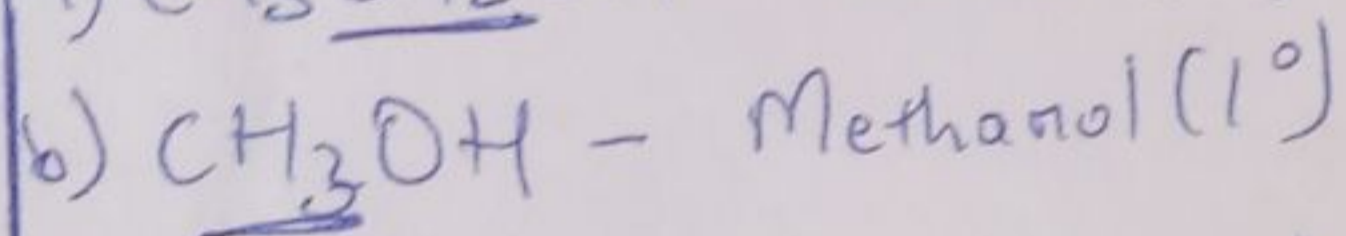
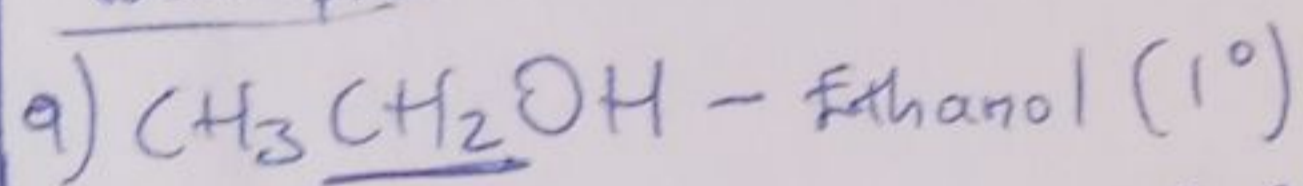
CHM 102

i) Classification based on the number of alkyl group

Note: Alcohol has general molecular formula of  $C_nH_{2n+1}OH$  or " $R-OH$ "

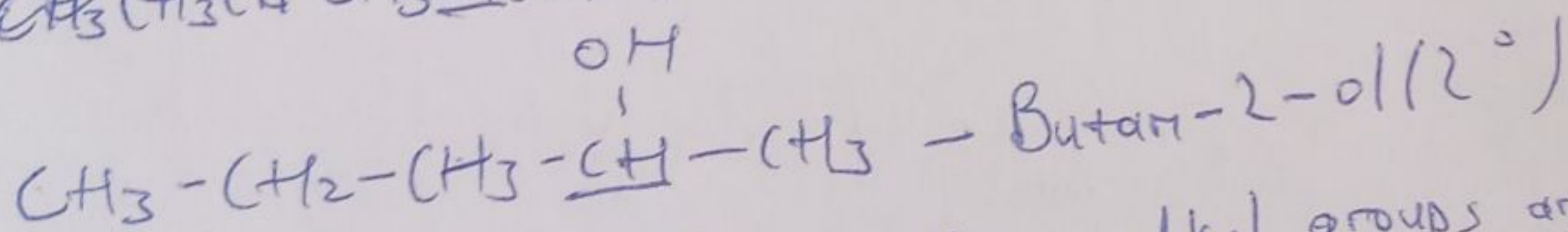
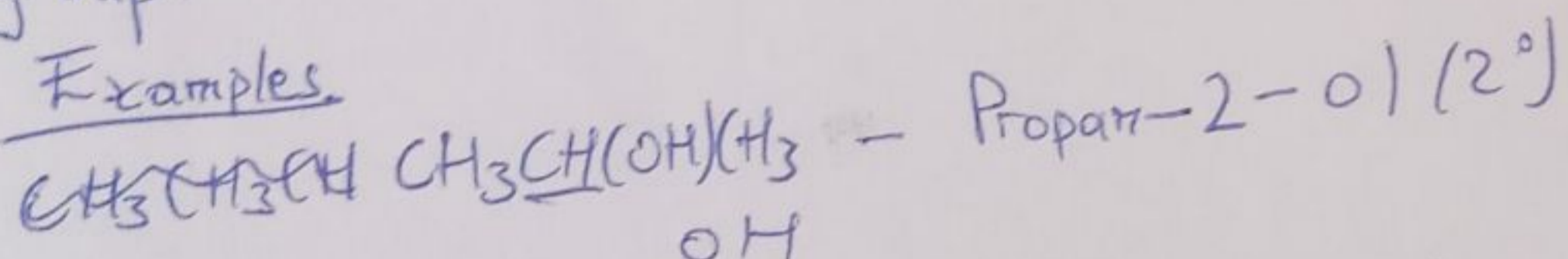
→ Firstly, Primary Alcohol → It has only one ~~alkyl~~ alkyl group or three or two hydrogen atoms attached to the carbon atom that carries the hydroxyl group.

Examples



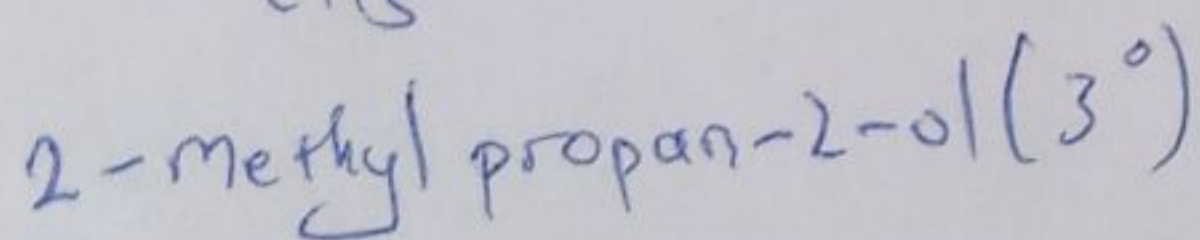
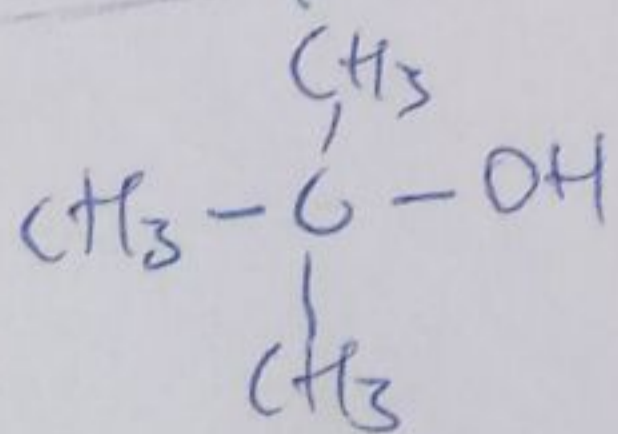
→ Secondly, Secondary Alcohol → It has two alkyl group or one hydrogen atom attached to the carbon atom that carries the hydroxyl group.

Examples



→ Tertiary Alcohol → It has three alkyl groups and no hydrogen atom attached to the carbon atom that carries the hydroxyl group.

Examples



(ii) Classification based on the number of hydroxyl groups they possess.

→ Monohydric alcohols: Monohydric alcohols have only one hydroxyl group (-OH) present in the alcohol structure

E.g.

a)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$  - Propanol (Monohydric alcohols)

→ Dihydric alcohols: Dihydric alcohols are also called GLYCOLS have two hydroxyl group present in the alcohol groups present in the alcohol structure.

E.g.

$\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$

Hexane-2,4-diol (Dihydric alcohols)

$\text{CH}_2\text{OH}$

$\text{CH}_2\text{OH}$ , Ethane-1,2-diol

→ Trihydric alcohols - Also called Triols have three hydroxyl groups (-OH) present in the alcohol groups present in the structure

E.g.

$\text{CH}_2\text{OH}$

$\text{CHOH}$

$\text{CH}_2\text{OH}$

Propane-1,2,3-triol (Trihydric alcohols)

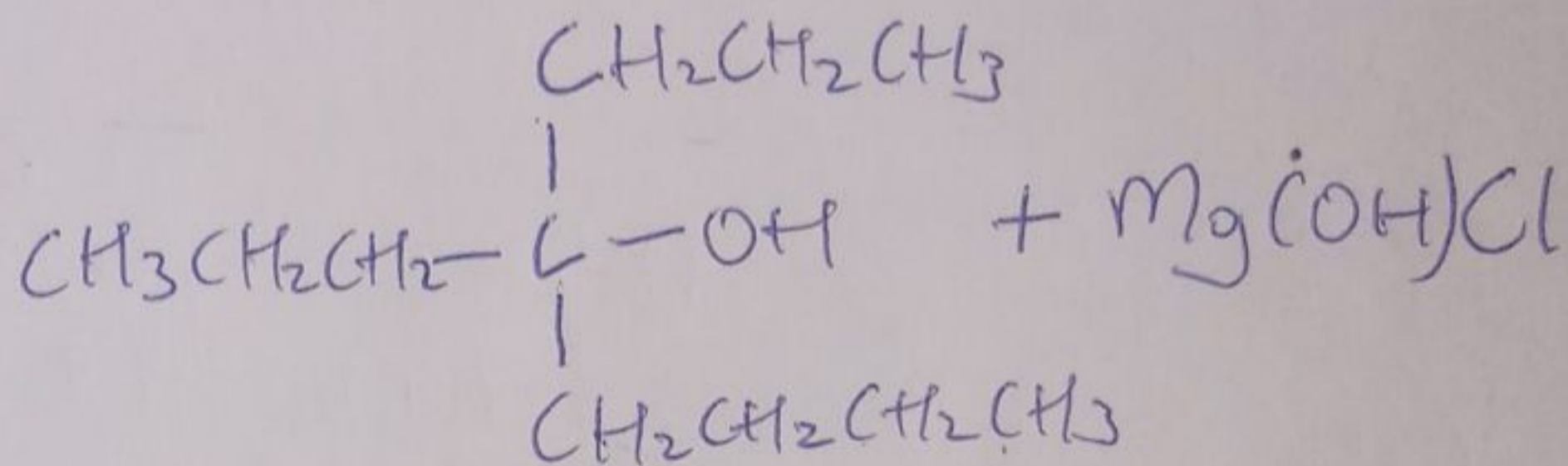
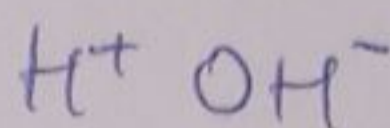
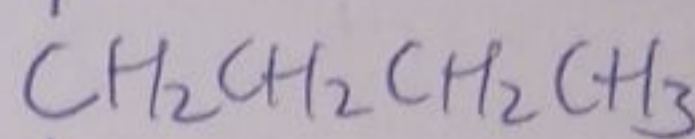
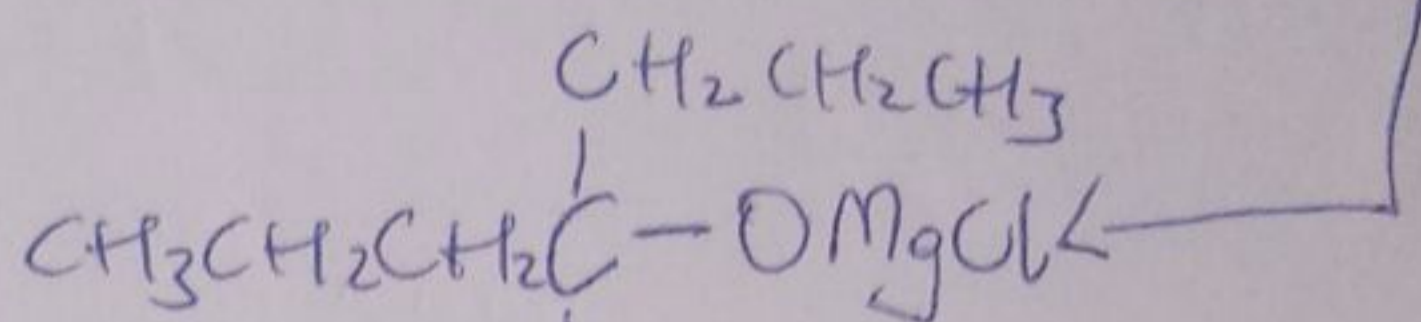
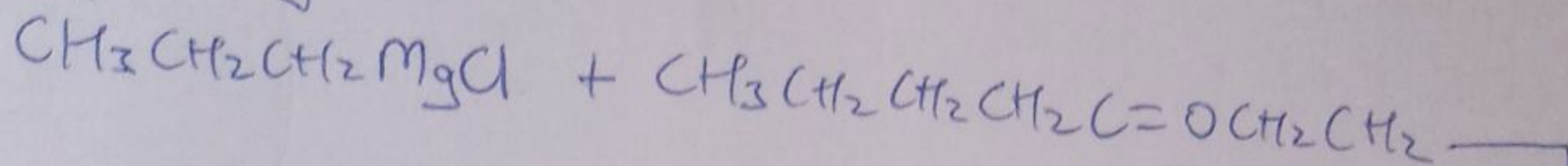
~~of  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$~~   
→ Polyhydric alcohols - Also called Polyols are those that have more than three hydroxyl groups (-OH) present in the alcohol groups present in the structure

E.g.

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

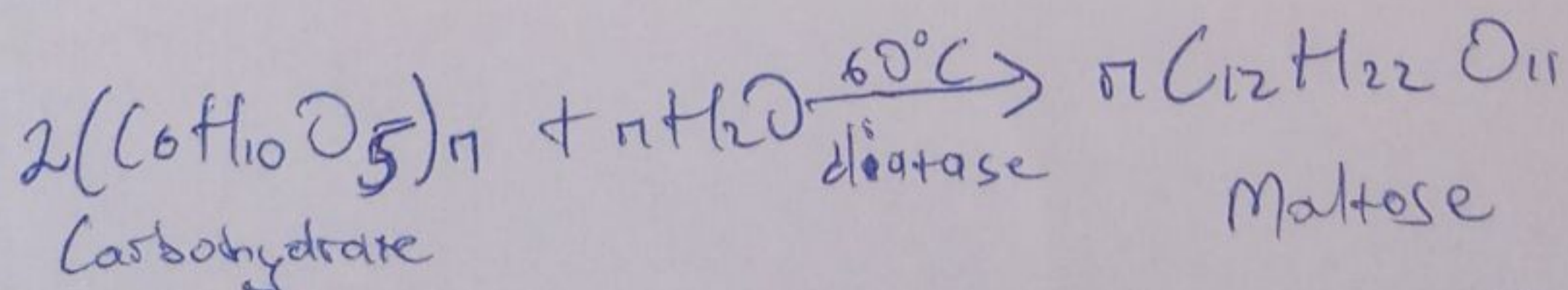
Heptane-2,3,4,5,6-pentanol

2) Grignard Synthesis

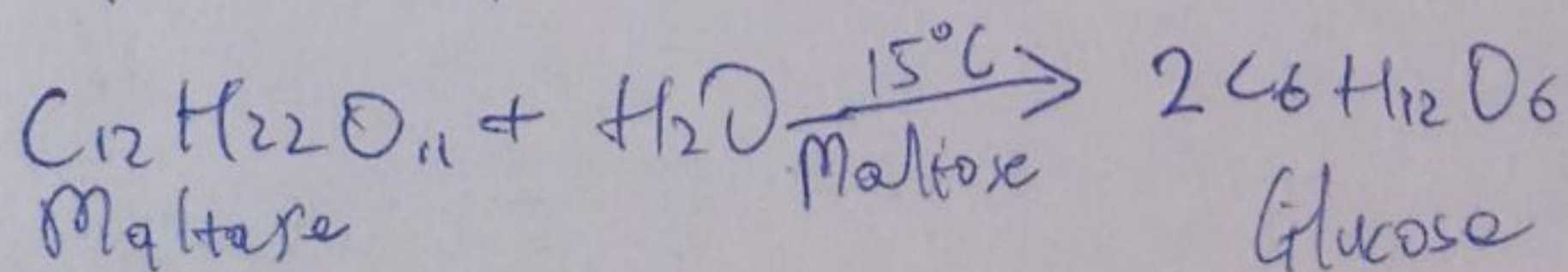


4-propyloctan-4-ol.

3) Carbohydrate 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 ~~are~~ enzymes found in yeast breakdown the carbohydrate molecule into ethanol to give a yield of 95%. The starch containing materials include molasses, potatoes, cereals, rice and on warming with malt to 60°C for a specific period of time are converted to maltose by the enzyme diastase contained in malt.

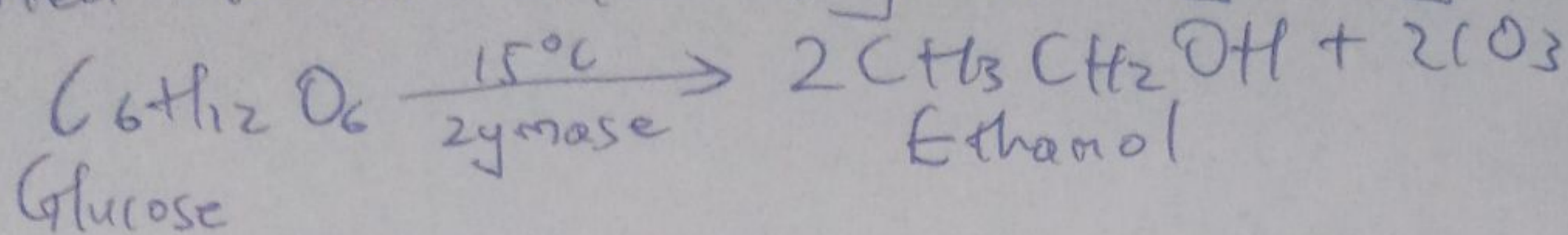


→ The Maltose is broken down into glucose on addition of maltose <sup>(enzyme)</sup> and at a temperature of 15°C



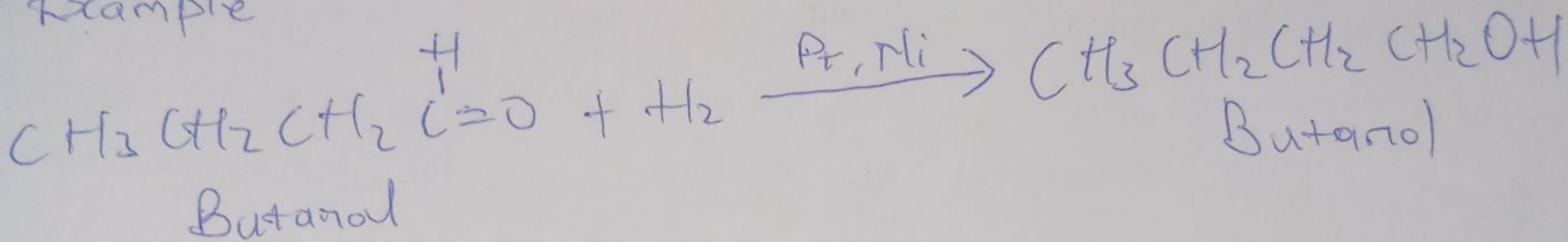
$\text{C}_2\text{H}_5\text{C}_2\text{H}_5$

The glucose at constant temperature of  $15^\circ\text{C}$  ~~is then~~ is then converted into ethanol (alcohol) by the enzyme (zymase)

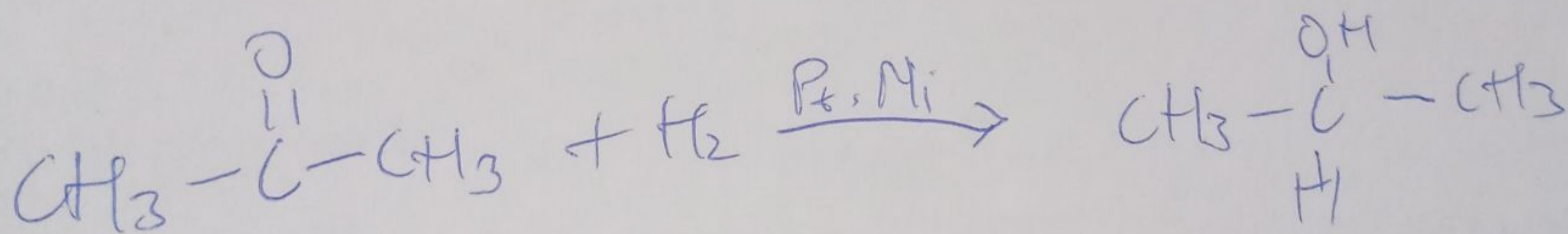


Alkanals and alkanones are reduced to primary and secondary alkanol by hydrogenation of carbon-oxygen double bond ( $\text{C}=\text{O}$ ) in the presence of catalyst such as Platinum, <sup>(Pt)</sup>Nickel <sup>(Ni)</sup> or with Sodium Tetrahydride  $\text{NaBH}_4$

Example



Reduction of an alkanone yields a secondary alkanol



2-propanone

2-propanol