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MECHATRONICS ENGINEERING

CHM 102

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

Ans! ① Primary Alkanol! This is an alcohol which has the hydroxyl group connected to a primary carbon atom. It can also be defined as a molecule containing a " $-CH_2OH$ " group. In contrast a secondary alcohol has a formula " $-CHROH$ " and a tertiary alcohol has a formula " CR_2OH ", where R is a carbon containing group.

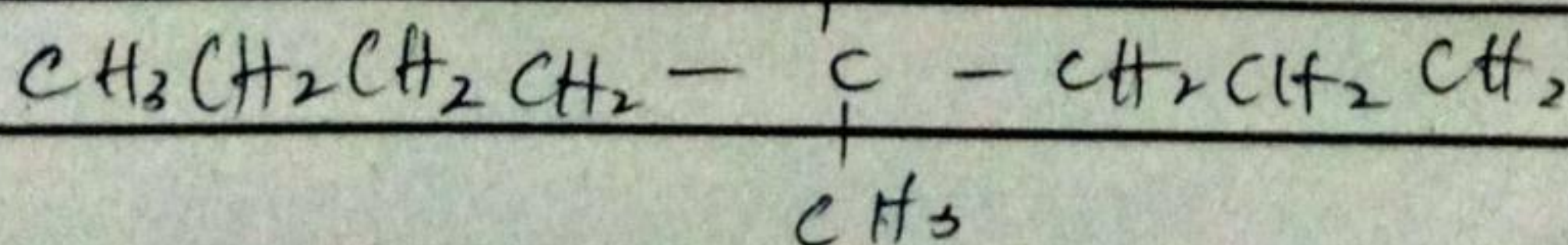
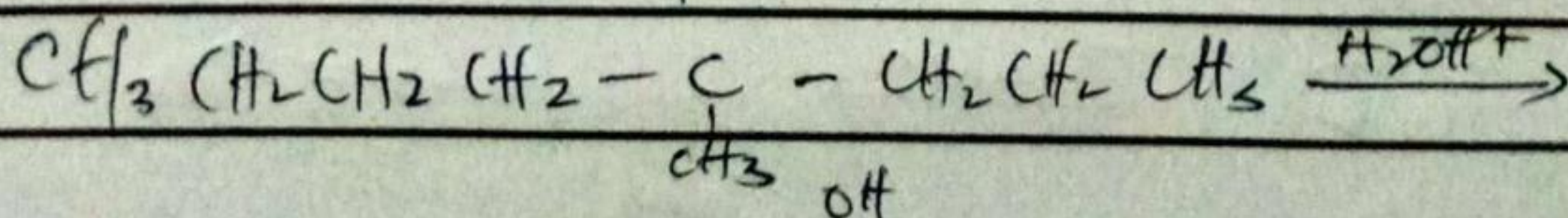
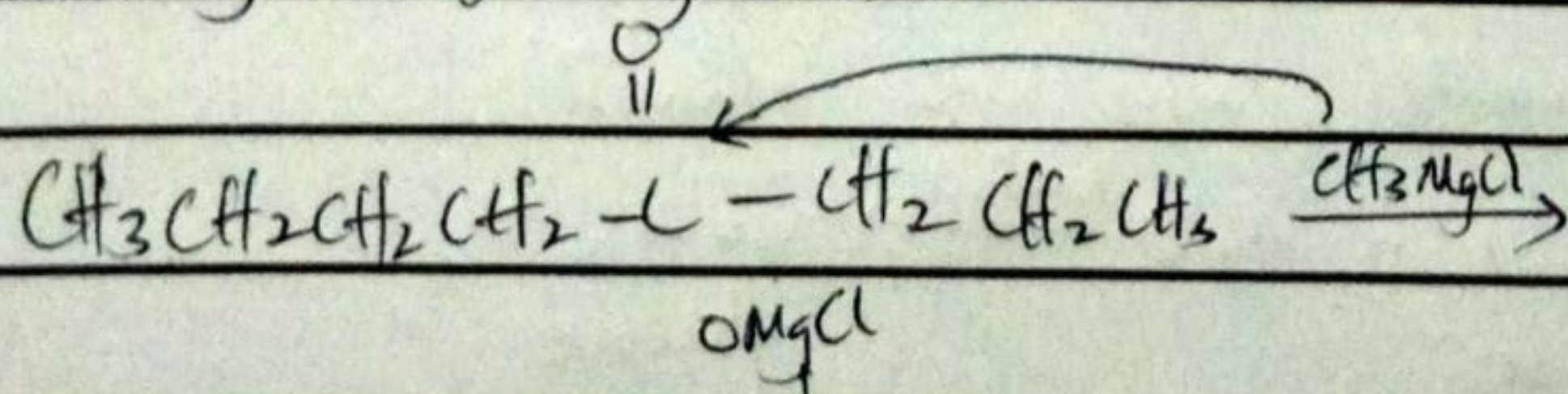
② Examples! butan-1-ol, propan-1-ol

② Secondary Alkanol! This is a compound in which a hydroxyl group " $-OH$ ", is attached to a saturated carbon atom which has two other carbon atoms attached to it.

Examples: Butan-2-ol, pentan-3-ol

② In Grignard synthesis of Alkanols, react a named Grignard reagent with $CH_3CH_2CH_2CH_2C(=O)CH_2CH_2CH_3$. Show the reaction steps

Ans! using Methylmagnesium chloride (CH_3MgCl)



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

Ans: FERMENTATION OF STARCH

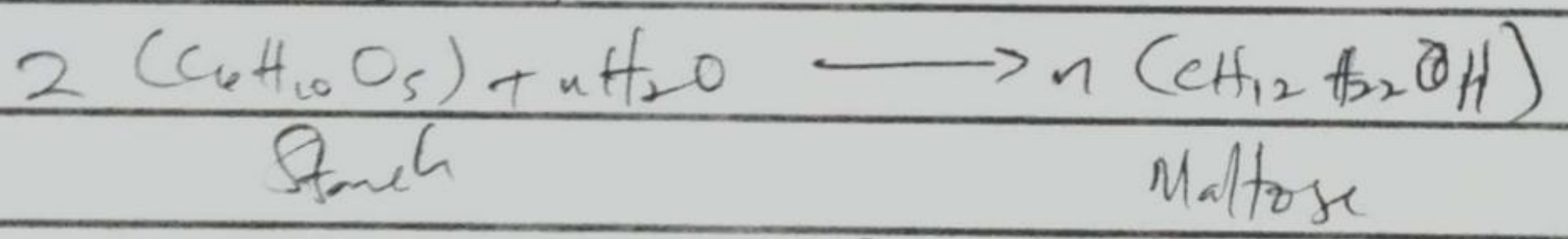
Starch is carbohydrate and is an important source of ethanol. Generally potato, rice, maize or barley are used as such source of starch. Use of potato starch is very common

~~STARCH~~ STEPS

1) Extraction of starch: The crushed potato is steamed at 1400C to 1500C under pressure to prepare starch solution known as mash.

Germination: Before hydrolysis, starch is first undergo germination at 100°C to 130°C for few days. The germinated starch is called malt.

2) Hydrolysis of starch: Starch is hydrolysed to maltose by an enzyme known as diastase.

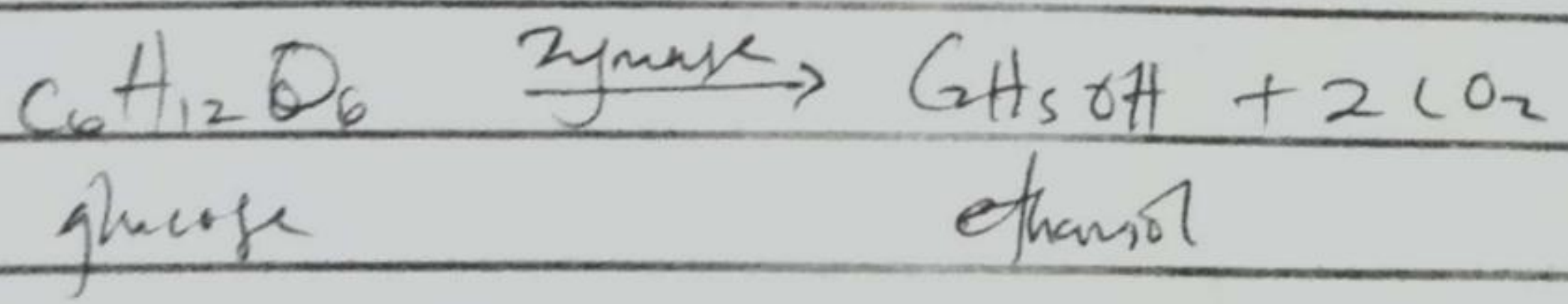
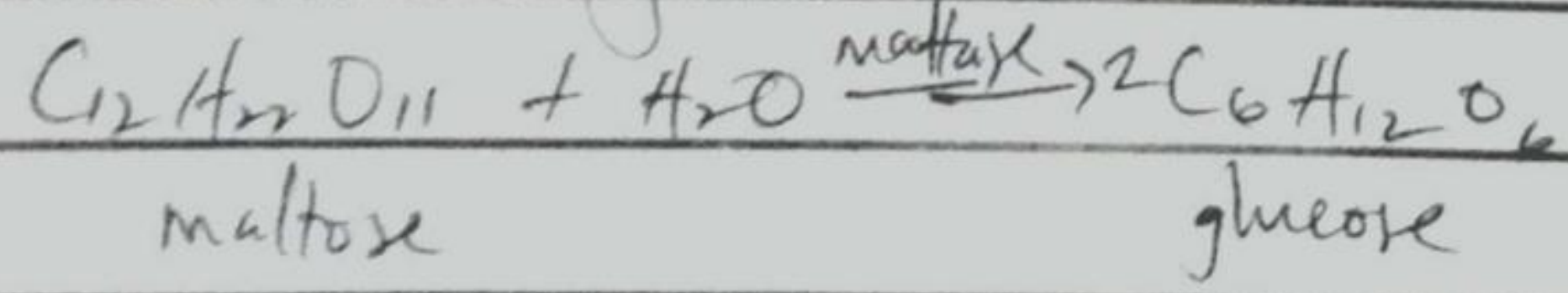


3) Fermentation: Finally yeast is added to maltose.

Yeast secretes two enzymes:

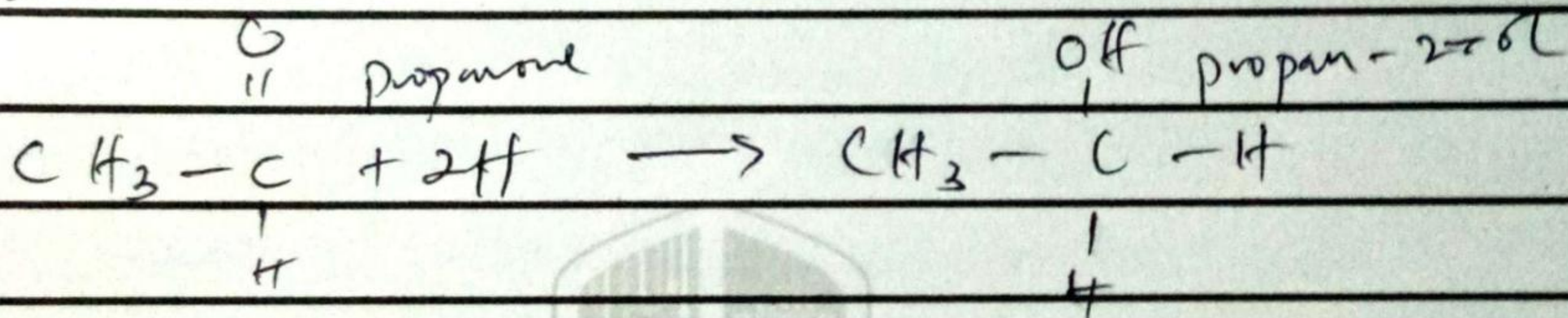
1) Maltase: converts maltose into glucose

2) Zymase: converts glucose into ethanol



④ Determine the product obtained in the reduction of Alkane and Alkanol. use a specific example for each and show the equation of reaction

Ans: Reduction of Alkane leads to a secondary alcohol and the reduction of Alkanol leads to a primary alcohol. Hence the specific example; ① The reduction of propanone leads to propan-2-ol



② The reduction of ethanal leads to ethanol

