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Course: Chem 102

Nursing

19 (MHS021072)

① Classification of Alcohols

There are two major ways of classifying alcohols
⇒ This type of classification is based on the carbon atom containing the hydroxyl group. This classification divides alcohols into three:

(i) Primary alcohols: Alcohols in which there are two or three hydrogen atoms attached to carbon carrying the hydroxyl group e.g. $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$

(ii) Secondary alcohols: Alcohols in which there is only one hydrogen atom attached to the carbon carrying the hydroxyl group. e.g. $\text{CH}_3\text{C}(\text{OH})_2\text{CH}_3$

(iii) Tertiary alcohol: Alcohols in which there are no hydrogen atoms attached to the carbon bearing the hydroxyl group e.g. $(\text{CH}_3)_3\text{C}-\text{OH}$

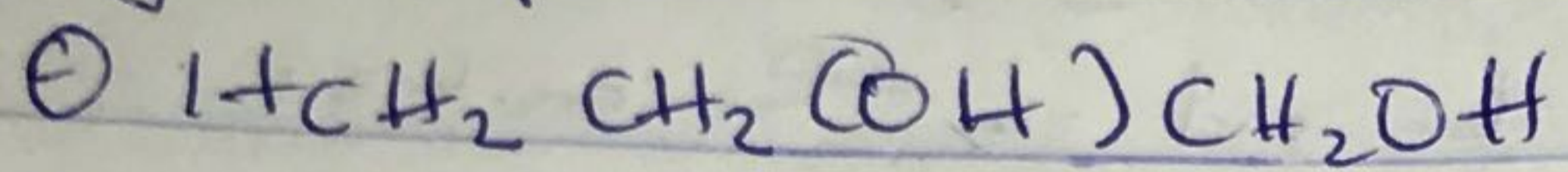
⇒ The second type of classification is based on the hydroxyl groups present in the alcohol possesses.

This classification divides alcohol into four:

Monohydric alcohol which has one hydroxyl group present in their alcohol structure e.g. $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$

Dihydric alcohol: Alcohol which has two hydroxyl groups present in their alcohol structure e.g. $\text{HOCH}_2\text{CH}_2\text{CH}_2\text{OH}$

Trihydric alcohol: Alcohols which have three hydroxyl groups present in their alcohol structure e.g.



- Polyhydric alcohols: Alcohols which have more than three hydroxyl groups in their alcohol structure. They are also referred to as polyols e.g. $\text{CH}_2\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_2$

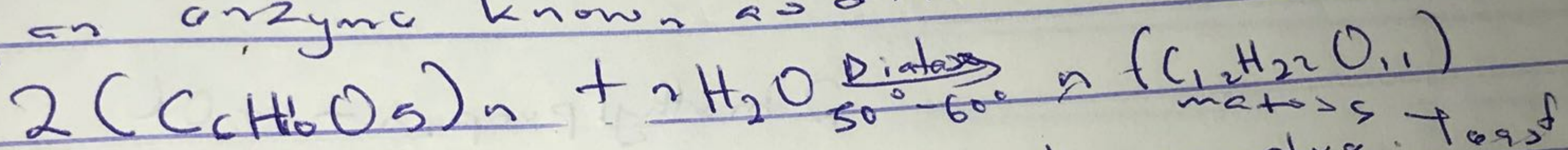
Solubility of Alcohols

Lower alcohols with up to three carbon atoms in their molecule are soluble in water because these lower alcohols can form hydrogen bonds with water molecules. The water solubility decreases with increasing relative molecular mass. All monohydric alcohols are soluble in organic solvent. The solubility of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules.

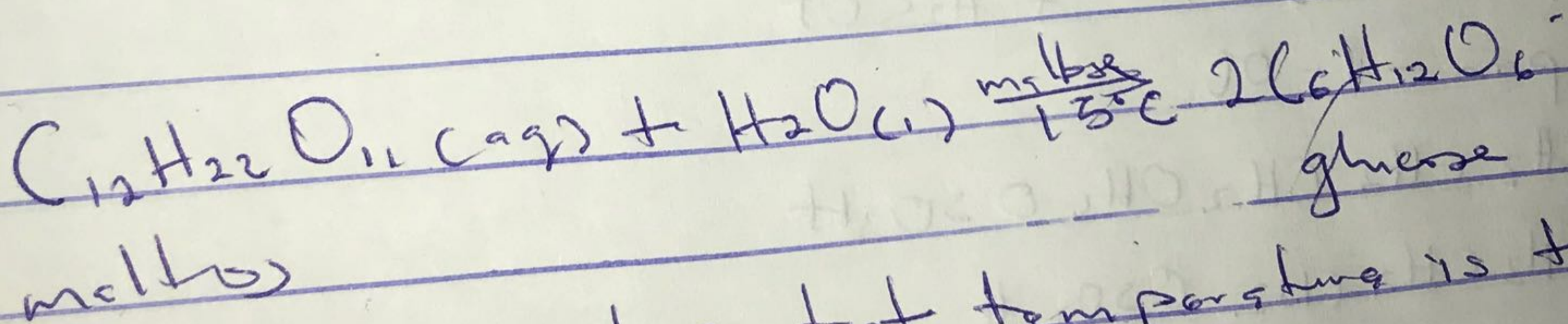
Industrial manufacture of ethanol

Generally, starchy foods such as rice, maize or barley are used ~~as~~ ^{the} source of starch. The potato is crushed and then steamed at 1400°C to 1500°C under pressure to prepare a starch solution known as mash.

(B) hydrolysis of starch: Starch is hydrolysed to maltose by an enzyme known as diastase

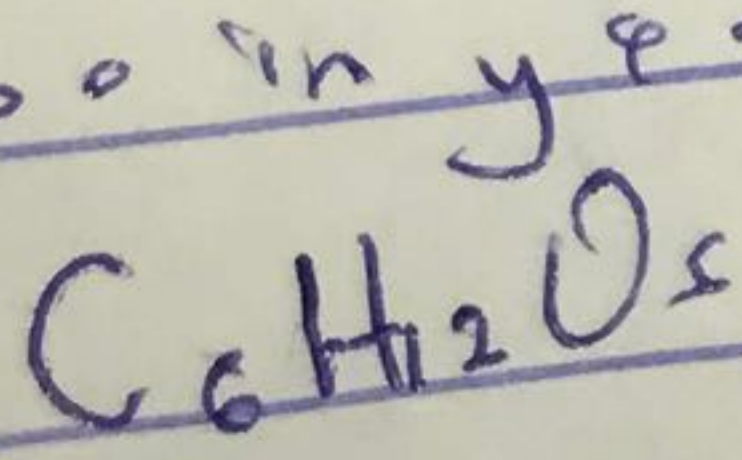


(C) Yeast is then added at room temperature. Yeast contains 2 enzymes which convert maltose to glucose

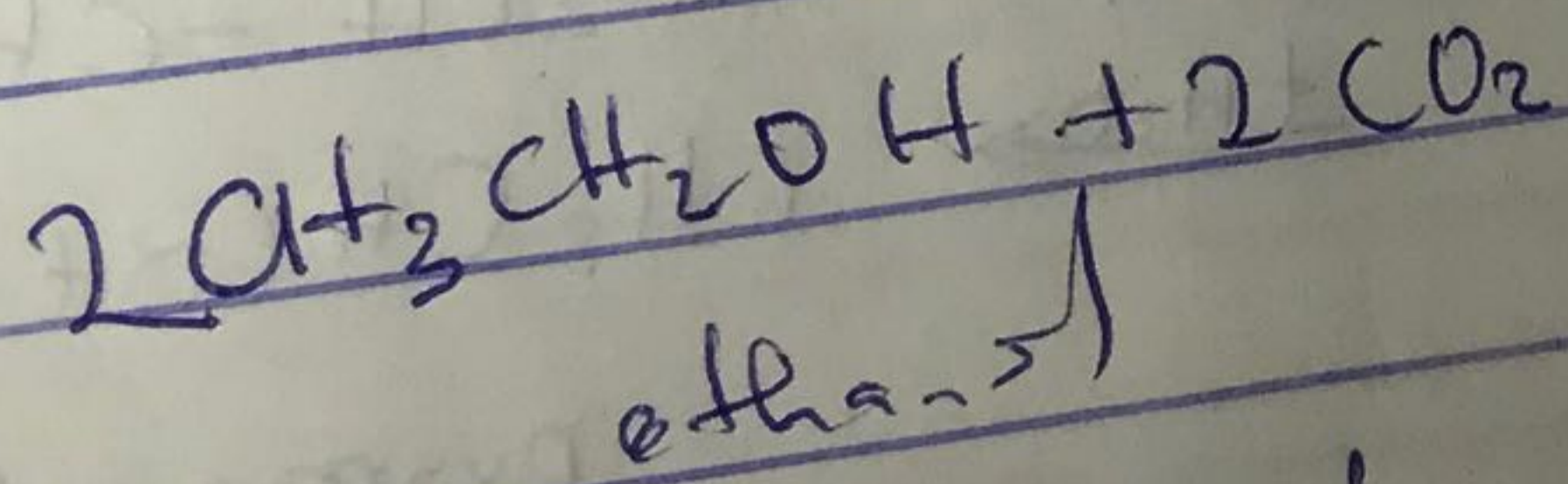
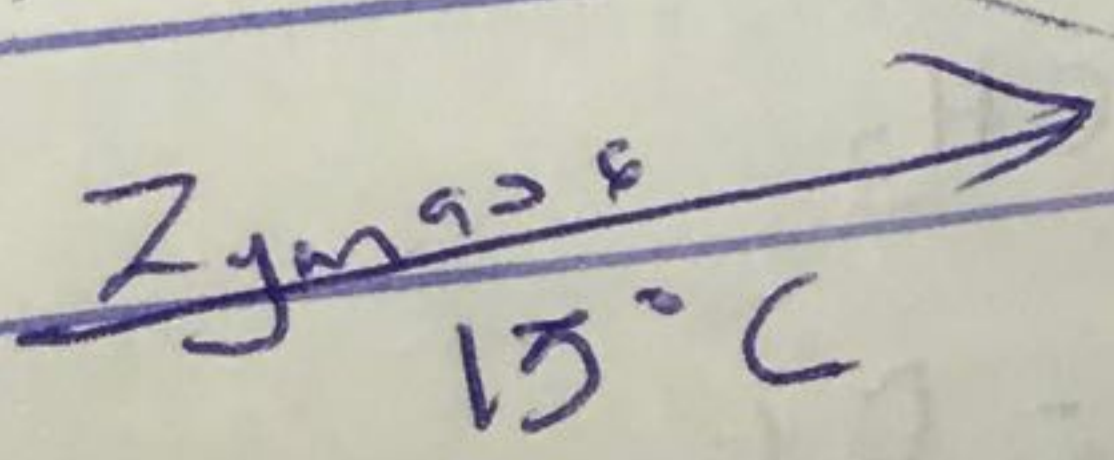


The glucose at constant temperature is then converted into alcohol by the enzyme zymase contained

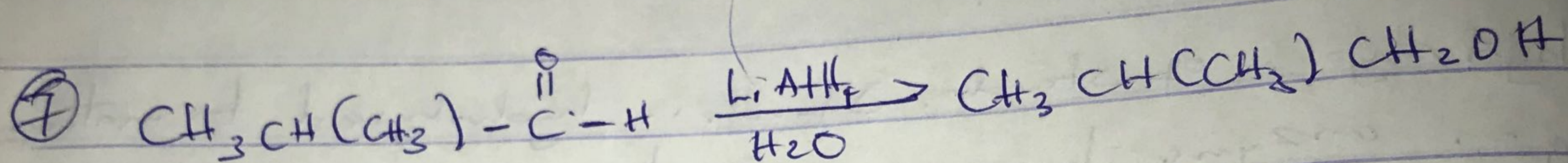
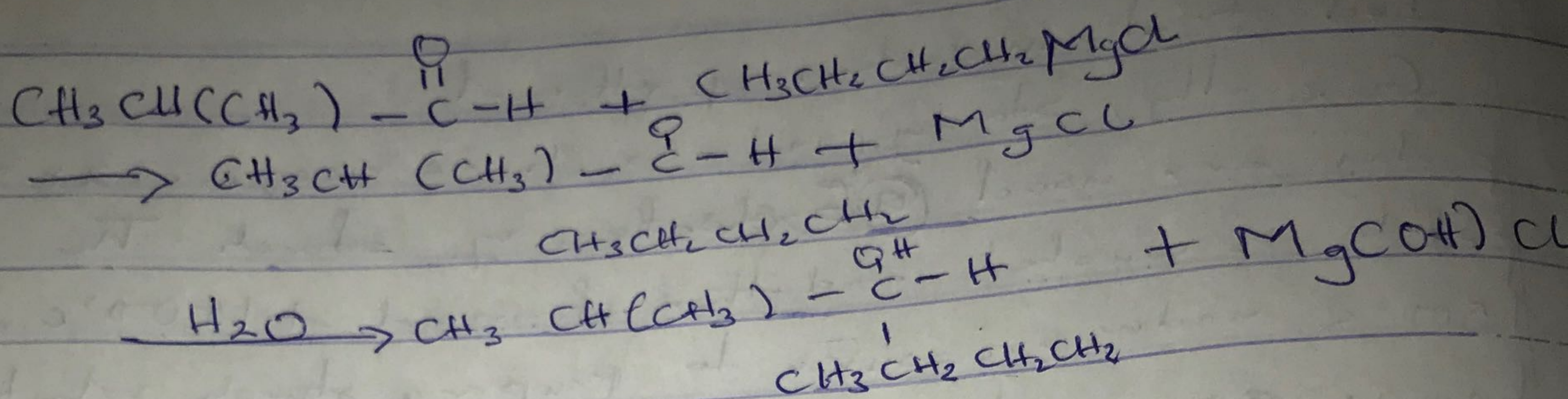
also in yeast



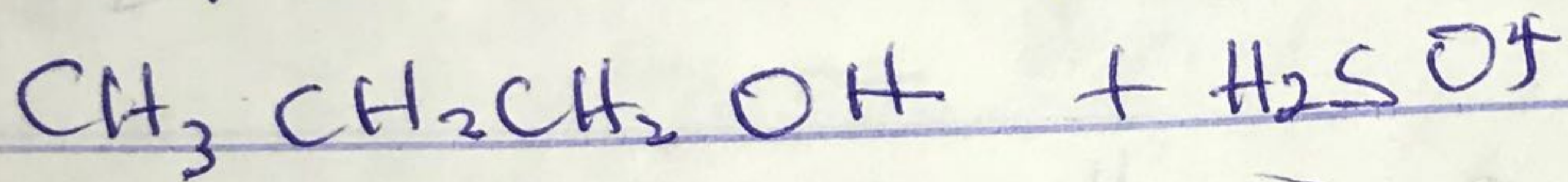
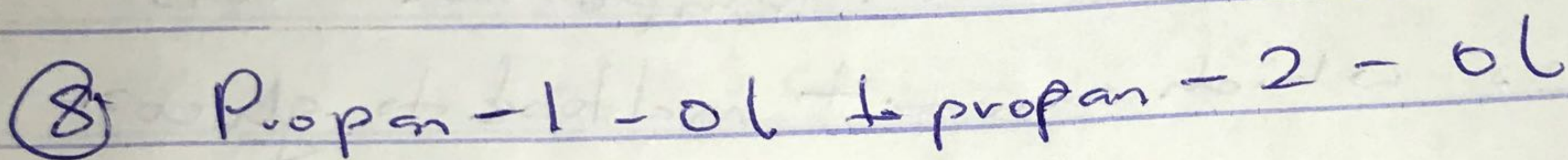
glucose



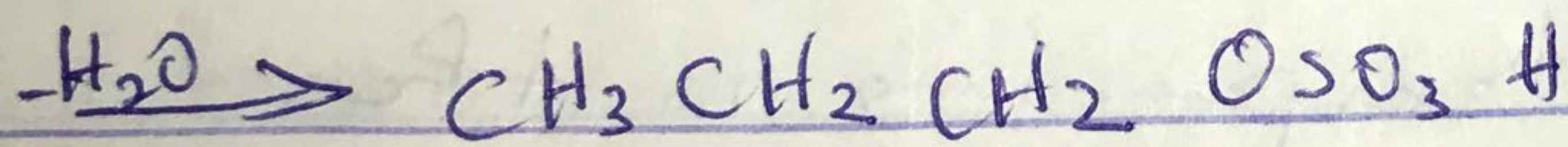
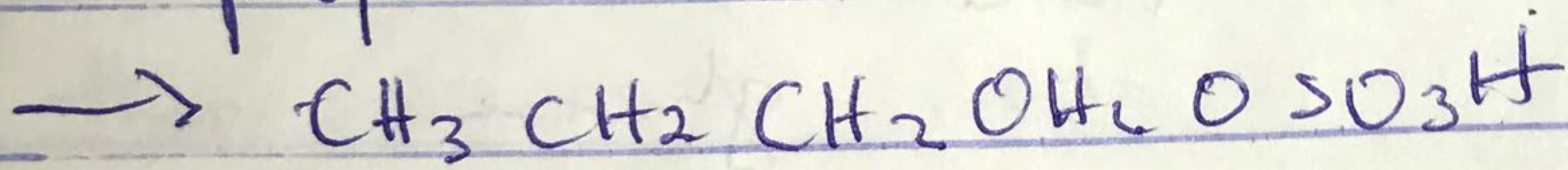
(A) Reaction between 2-methyl propanol and butyl magnesium chloride



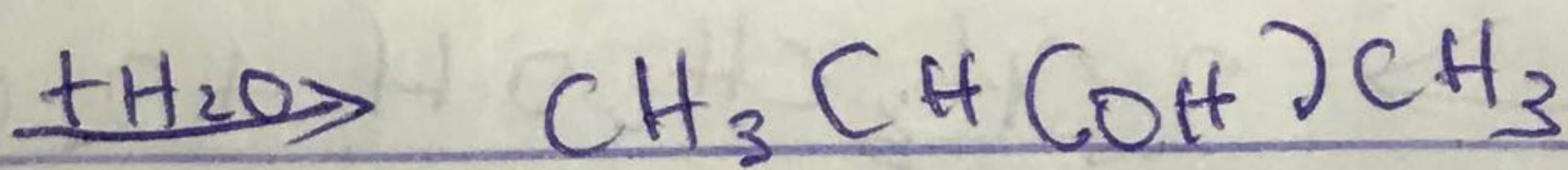
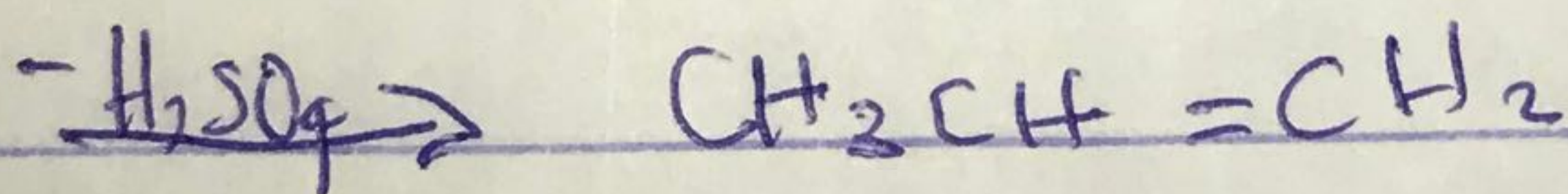
2-methylpropan-1-ol



propan-1-ol



propyl hydrogensulphate



propan-2-ol