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Matric no: 19/MHSD1/159

Course code: CHM 102 (General chemistry II)

Assignment on Alcohol 2.

100 Level.

1. Classification of alcohols;

i) Alcohols, are classified according to the number of hydrogen atom attached to ^{the carbon atom which carries} the -OH functional group. i.e if three or two hydrogen atoms is attached to an hydroxyl functional group, it is a primary alcohol (1°), if only one hydrogen atom is attached to an hydroxyl group, it is a secondary alcohol (2°) and also, if no hydrogen atom is attached to an hydroxyl group, it is a tertiary alcohol (3°).

Example:

$\text{CH}_3\text{CH}_2\text{OH}$ (1°) Primary alcohol.

Ethanol

ii) Another classification, is based on the number of -OH functional group present in a structure. When there is one hydroxyl group present, it is called a Monohydric alcohol, When there are two or three hydroxyl groups present, it is known as a dihydric alcohol or glycol. When three hydroxyl groups are present, it is known as a triol.

continuation of no. 1.

trihydric alcohol. Also, when more than three hydroxyl groups are present, it is known as a polyol or polyhydric alcohols.

Examples

$\text{OHCH}_2\text{CH}_2\text{CH}_2\text{OH}$ (dihydric alcohol).

Propane-1,3-diol.

② Solubility of alcohols in water: lower alcohols with up to three carbon atoms in their molecules are soluble in water because these lower alcohols molecules can form hydrogen bonds with water molecules. The water solubility of alcohols decreases with increasing relative molecular mass.

* Solubility of alcohols in organic solvents: All monohydric alcohols are soluble in organic solvents. The solubility of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules.

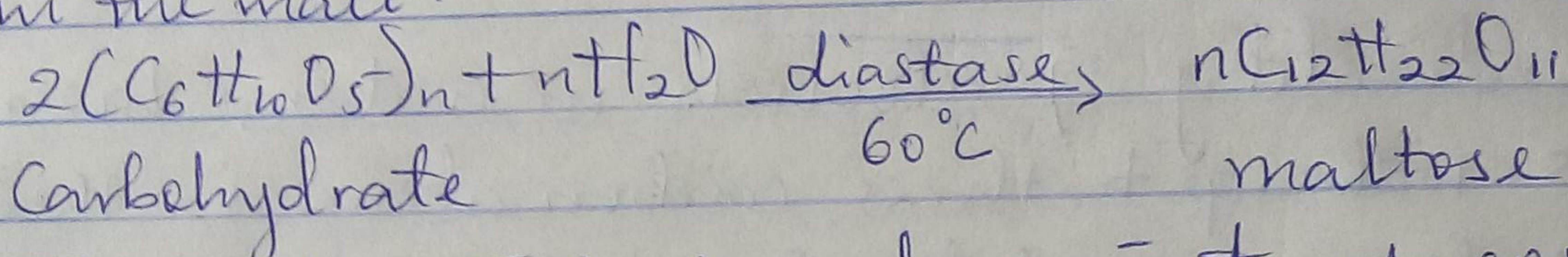
③ Production of Ethanol.

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

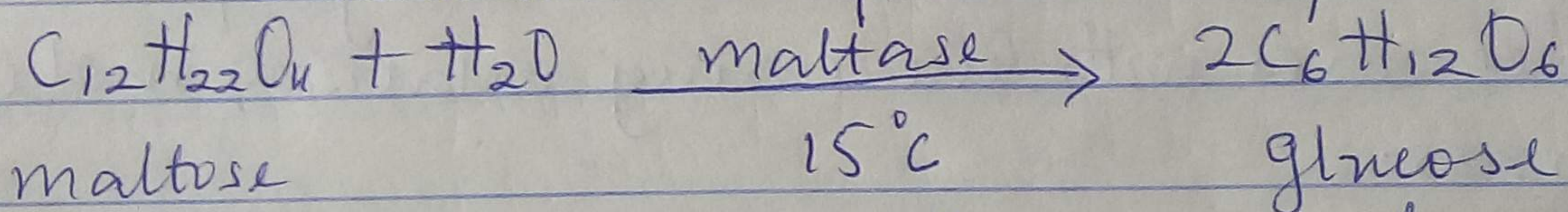
3.8
u.g

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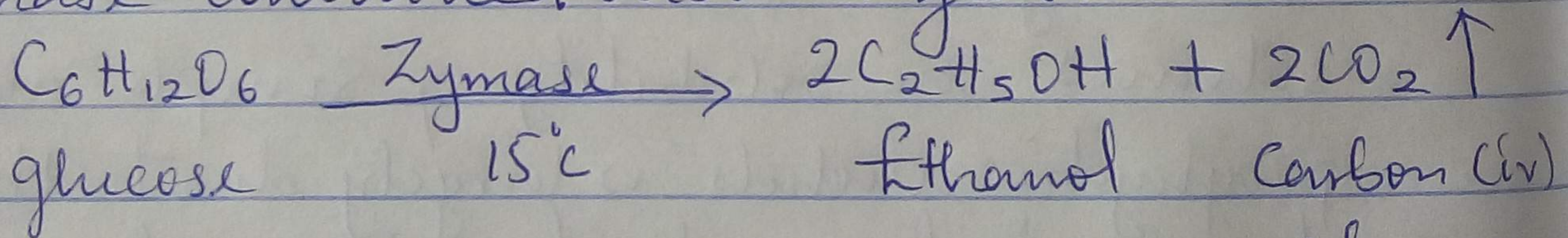
found in yeast break down the carbohydrate molecules into ethanol to give a yield of 95%. The starch containing materials (beetle molasses, potatoes, cereal, rice and on warming with malt to 60°C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.



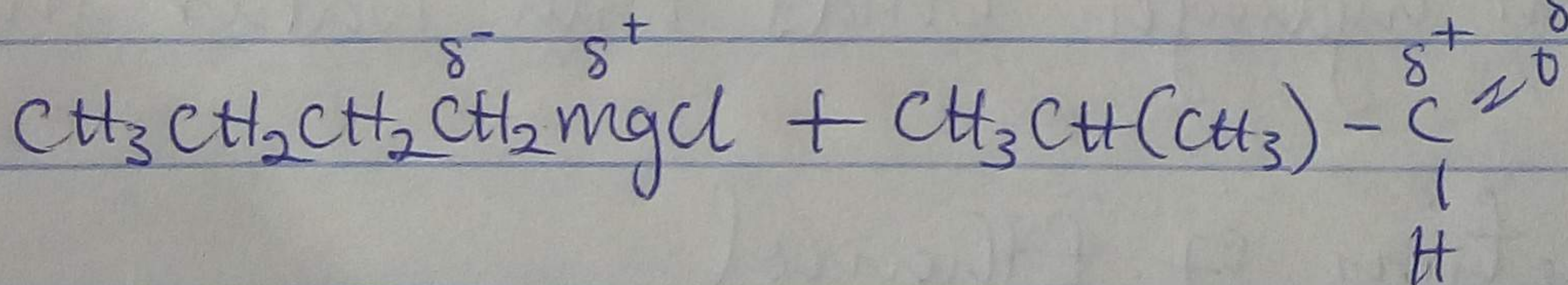
The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 15°C.



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

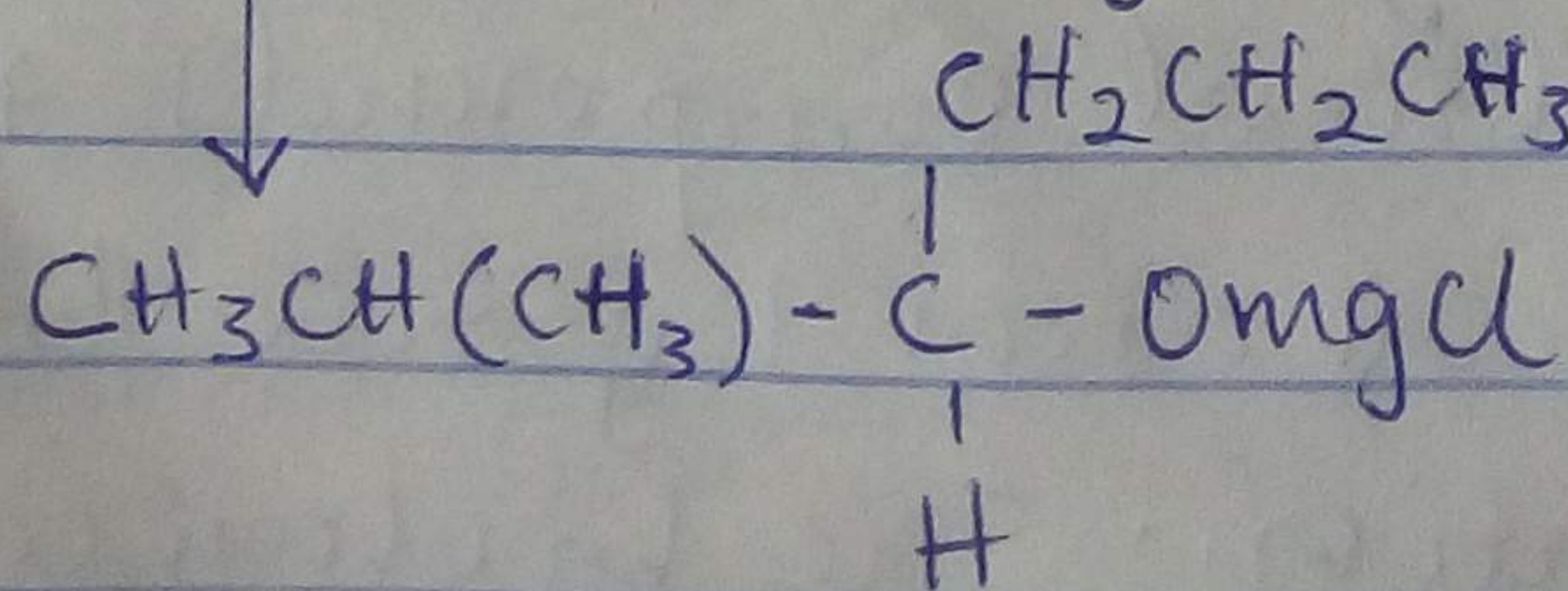


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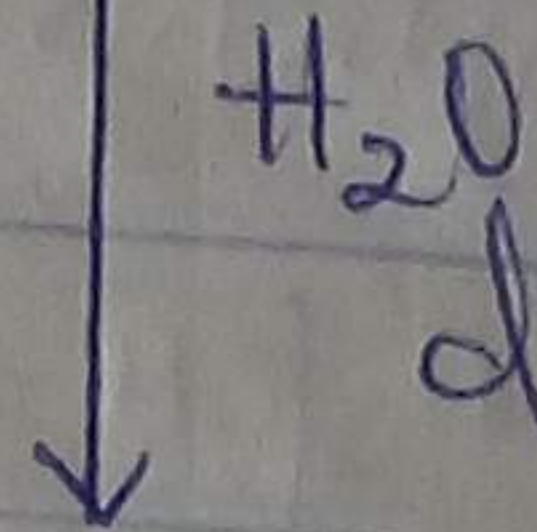
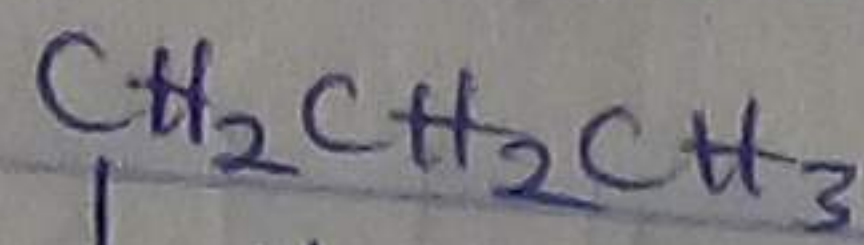
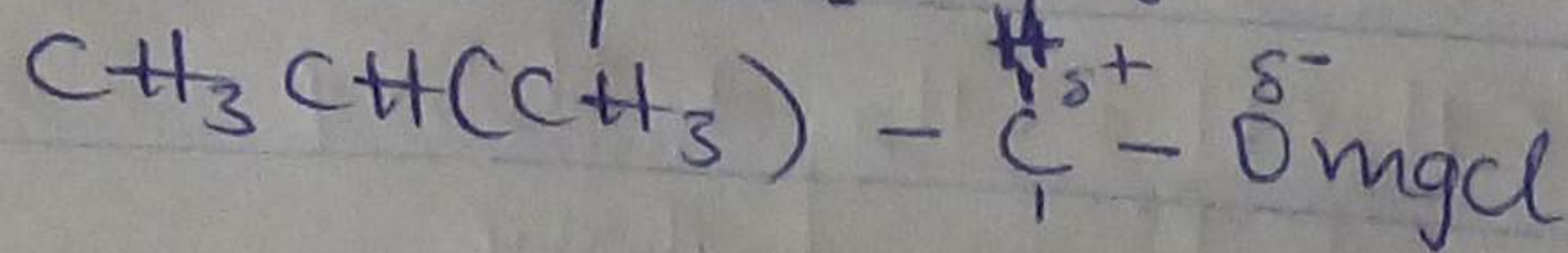


butylmagnesium
chloride.

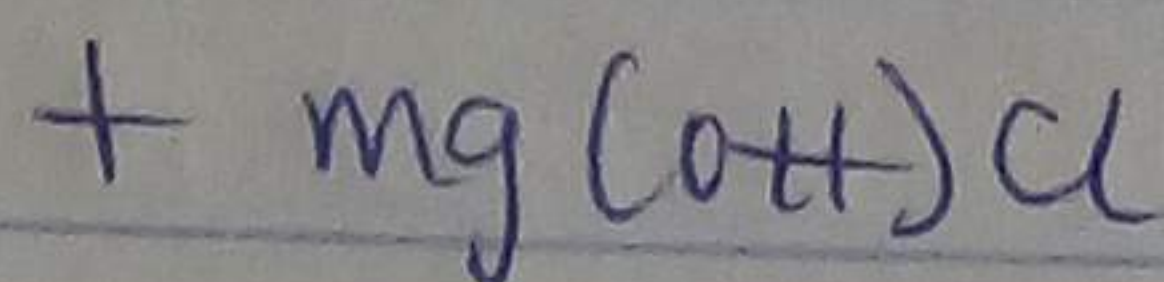
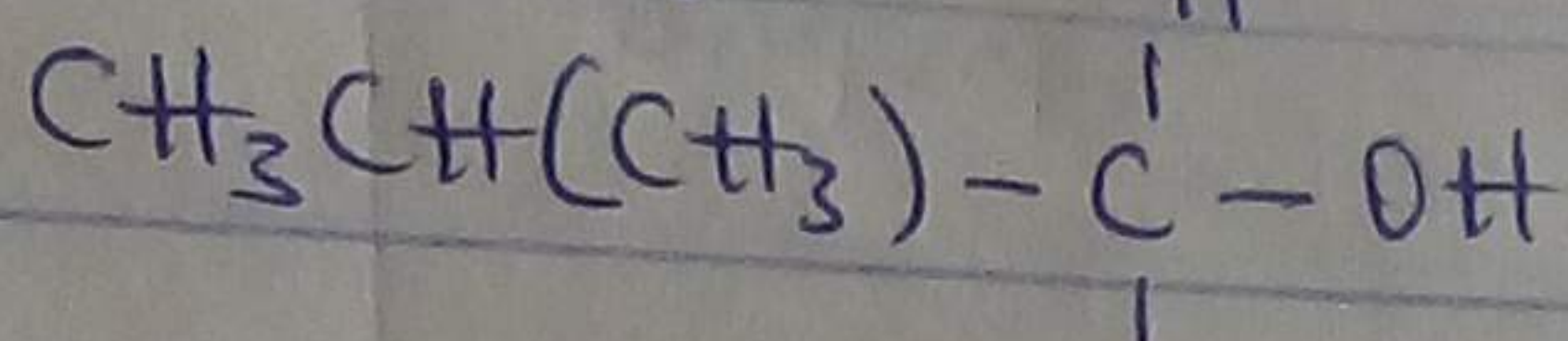
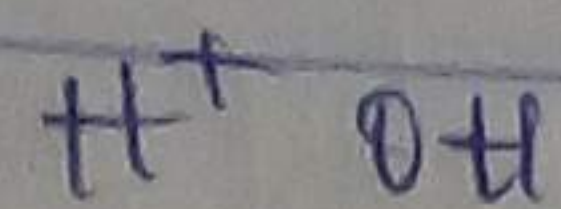
2-methylpropanal.



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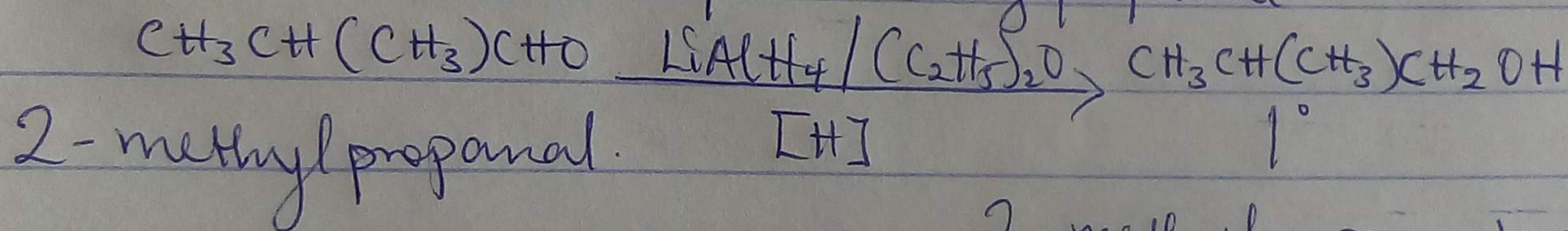
dilute acid



2-methylheptan-3-ol

or 2-methyl-3-heptanol.

(7) Reduction reaction of 2-methylpropanal.



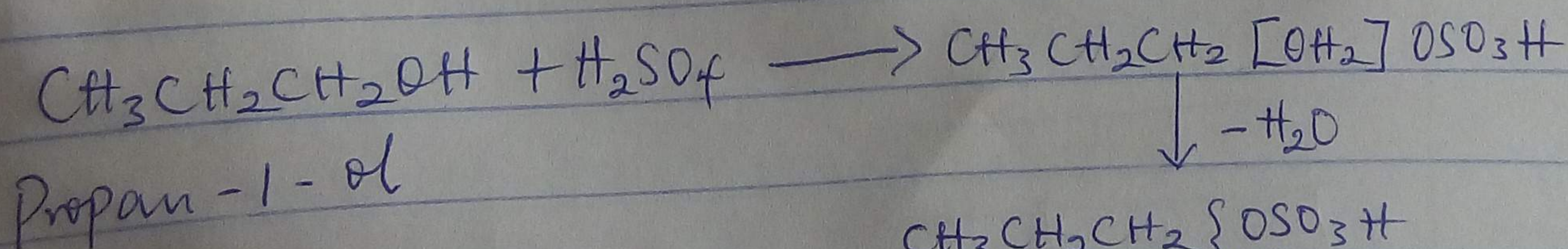
2-methylpropanal.

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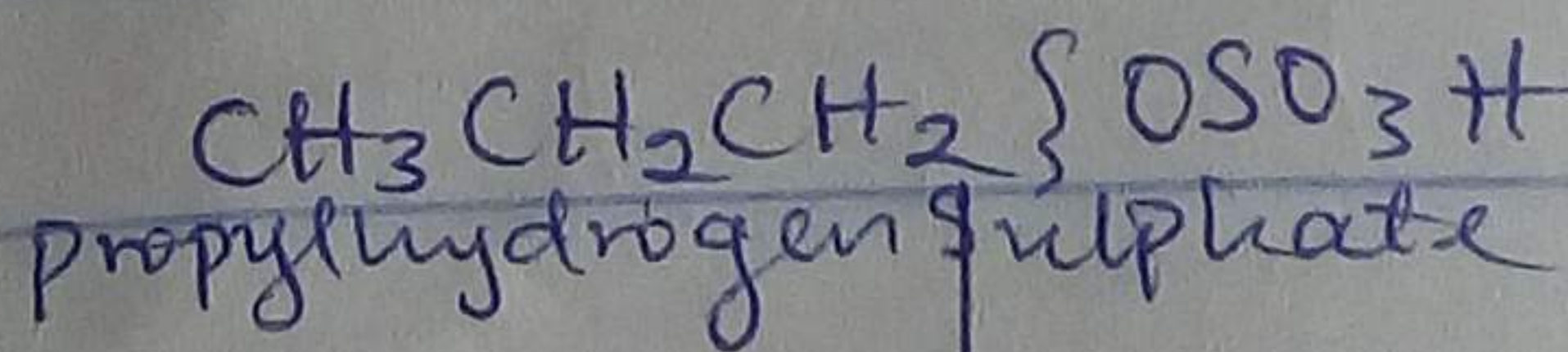
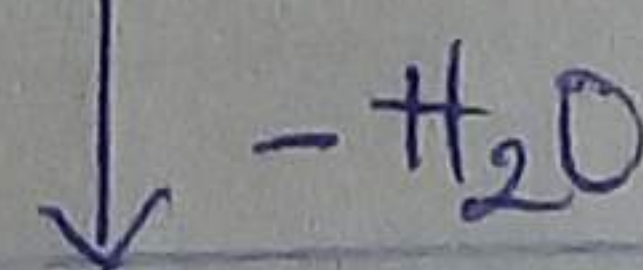
1°

2-methylpropan-1-ol
or 2-methylpropanol.

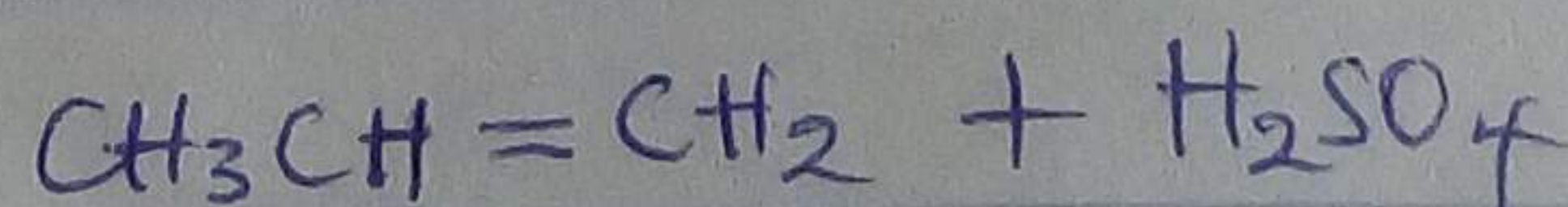
(8) In converting a primary alcohol to a secondary alcohol, it involves dehydration process. i.e. dehydrating the primary alcohol with the aid of tetraoxosulphate (vi) acid (H_2SO_4) to give a secondary alcohol.



Propan-1-ol

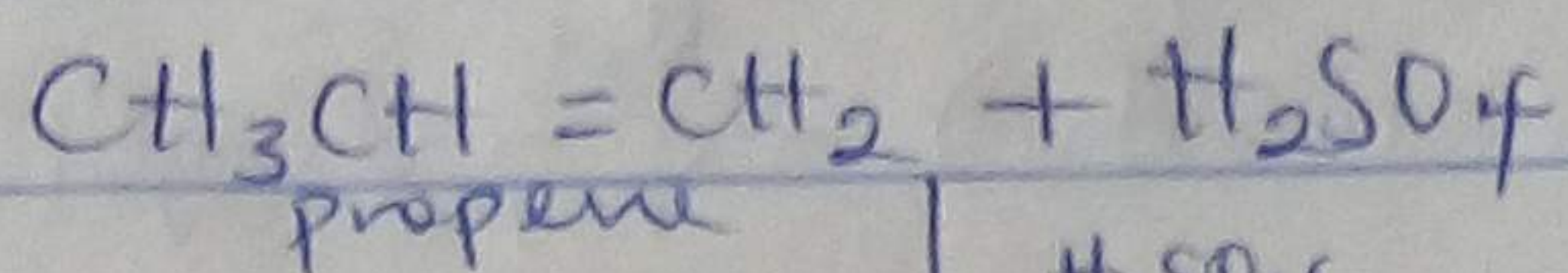


propylhydrogen sulphate

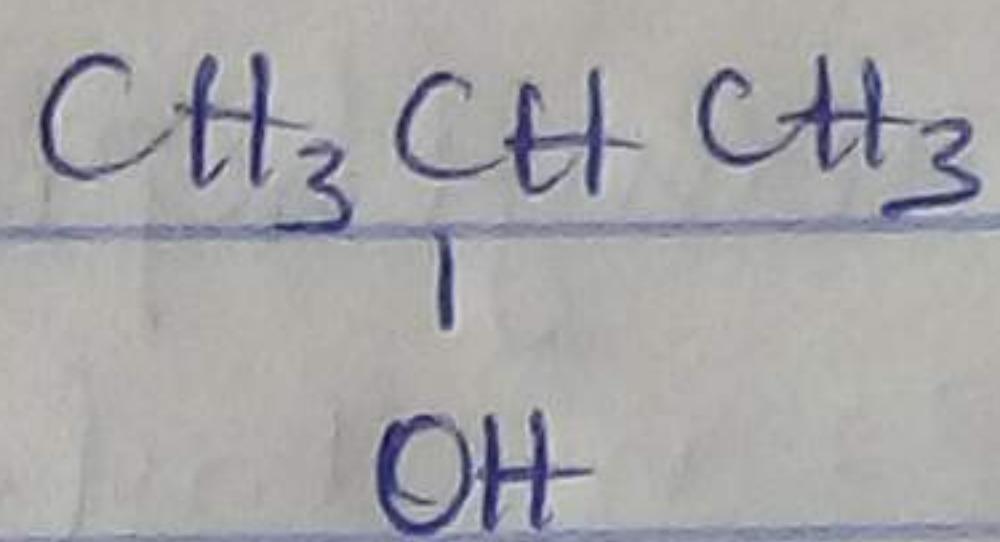
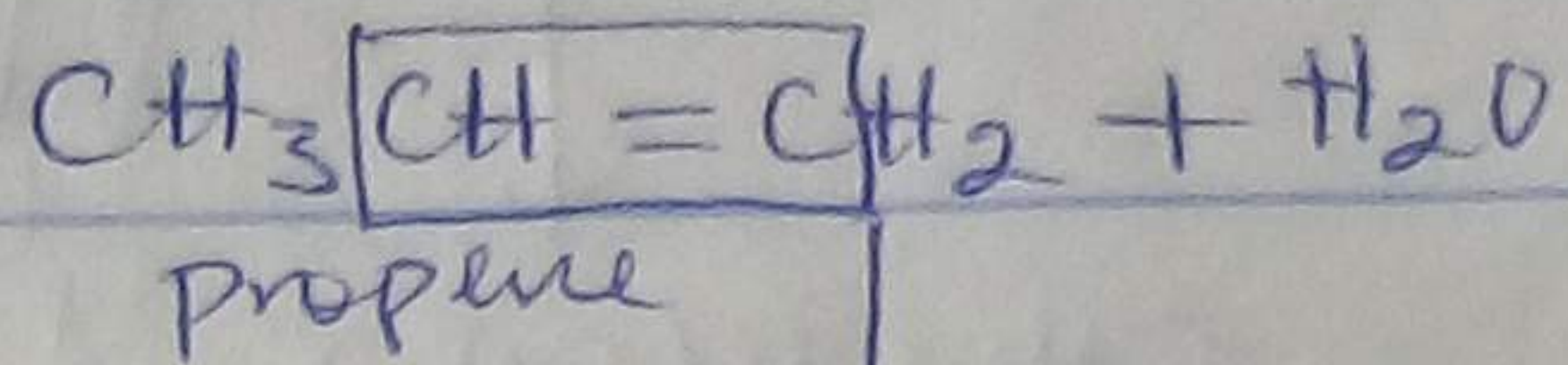
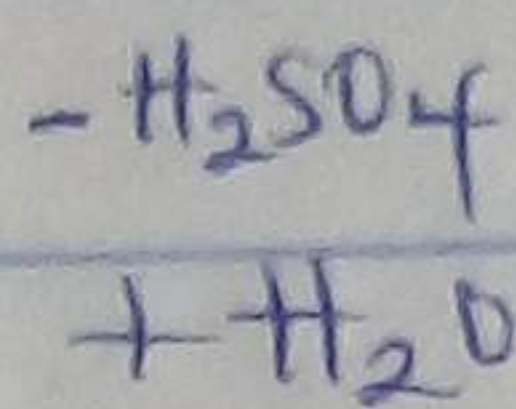


Propene

Continuation of no. 8:



Hydrolysis



Propan-2-ol.