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MATRIC NUMBER: 19/MHS 01/226

COLLEGE: MEDICINE AND HEALTH SCIENCES

DEPARTMENT: MEDICINE AND SURGERY

100 LEVEL

CHM 101 ASSIGNMENT

Question 1:

Alcohols are very important organic compounds. Discuss briefly their classification and give one example each.

Answer

- a Alcohols can be classified based on the number of hydrogen atoms attached to the carbon containing the hydroxyl group. If the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three or two, it is called a primary (1°) alcohol, if it is one hydrogen atom, it is called a secondary alcohol (2°) and if there are no hydrogen atoms, it is called a tertiary alcohol (3°).

Examples include CH_3OH which is methanol is (1°)

$\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$ propan-2-ol is (2°) and

$(\text{CH}_3)_3\text{C}-\text{OH}$ which is 2-methyl propan-2-ol is (3°)

- b This classification is based on the number of hydroxyl groups the alcohol possess. Monohydric alcohols have one hydroxyl group present in the alcohol structure. While dihydric alcohols (glycols) have two hydroxyl groups present in the alcohol structure and trihydric alcohols (triols) have three hydroxyl groups present in the alcohol structure. Polyhydric alcohols have more than three hydroxyl groups.

$\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ Propanol is a monohydric alcohol

$\text{HOCH}_2\text{CH}_2\text{OH}$ Ethane-1,2-diol is a dihydric alcohol

$\text{OHCH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$ Propane-1,2,3-triol is a trihydric alcohol

$\text{CH}_3\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}(\text{OH})\text{CH}_3$ Heptane-2,3,

4,5,6-pentanol is a polyhydric alcohol

Question 2:

Discuss the solubility of alcohols in water, organic solvents

ANSWER:

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

All monohydric alcohols are soluble in organic solvents

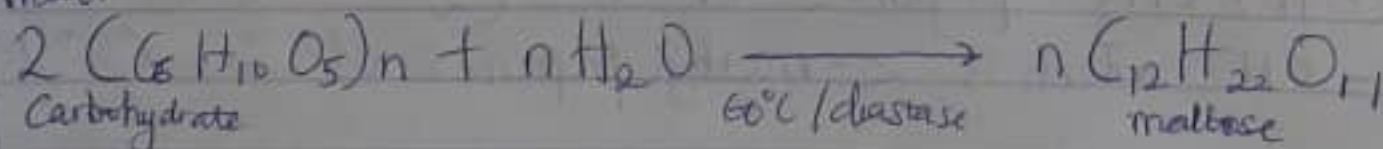
Question 3:

Show the three steps in the industrial manufacture of ethanol.

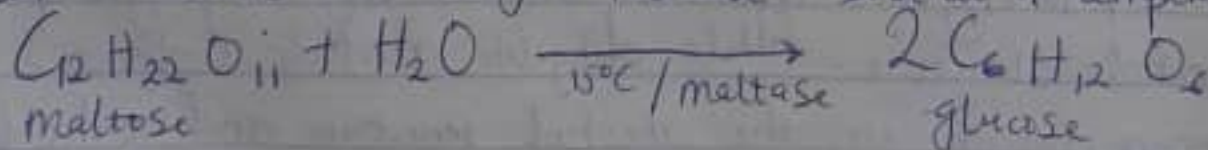
Equations of reaction are mandatory

ANSWER:

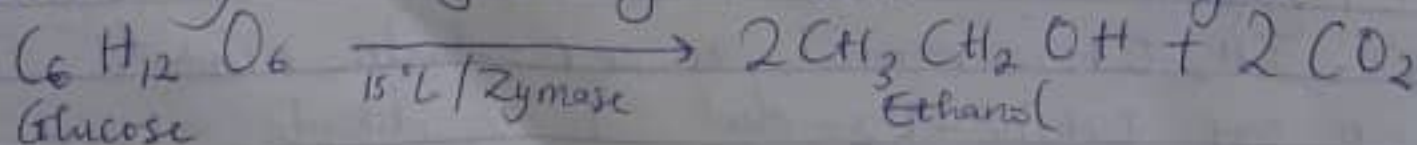
- a) Starch containing materials such as molasses, potatoes, cereals, rice are warmed with malt to 60°C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt



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



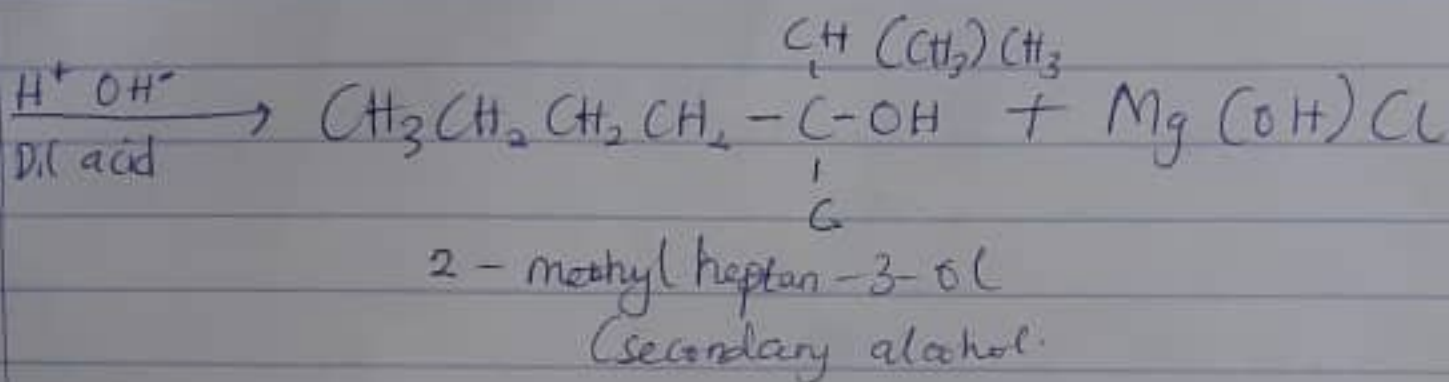
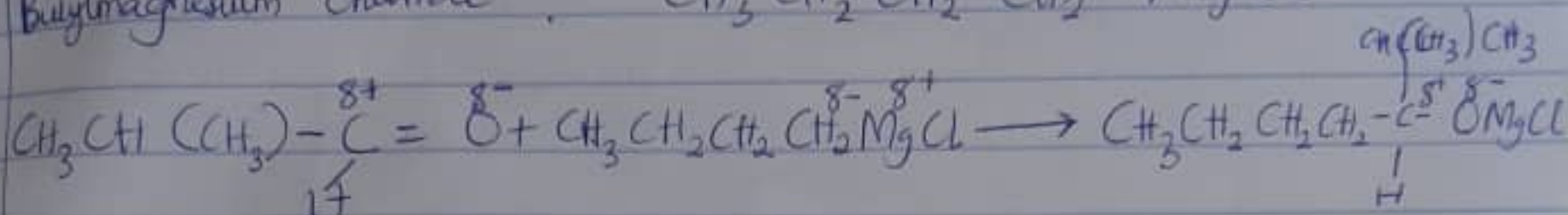
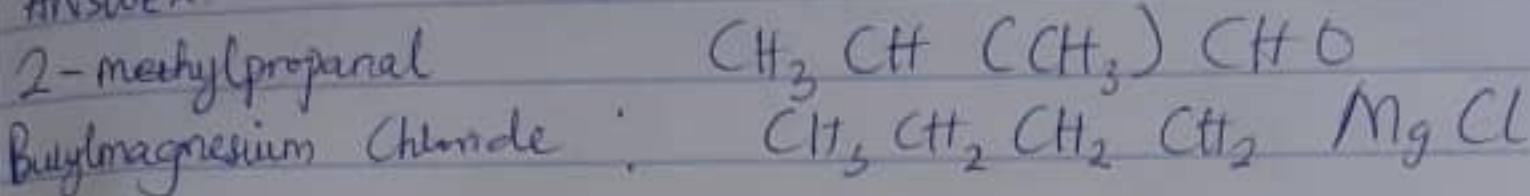
The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme Zymase contained also in yeast



Question 4

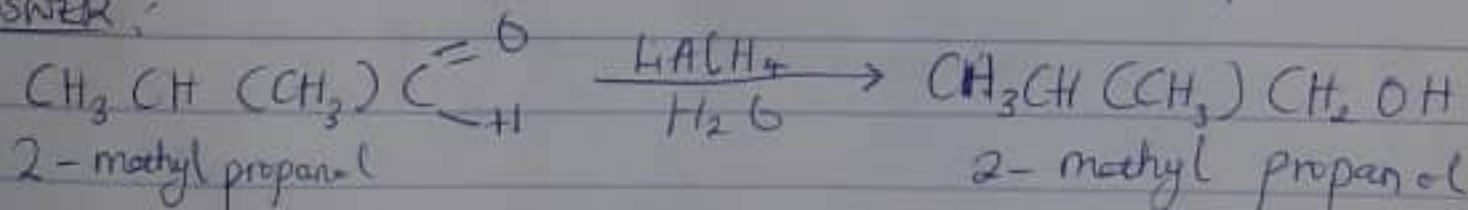
Show the reaction between 2-methylpropanal and butylmagnesiumchloride.
 Hint: Grignard synthesis. Note: Show all structures

ANSWER:



QUESTION 7: Show the reduction of 2-methylpropanal

ANSWER:



Question 8: Propose a scheme for the conversion of propan-1-ol to propan-2-ol

ANSWER

