

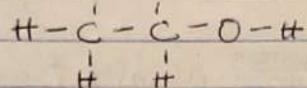
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Department: MBSJ
Course code: Chem 102.

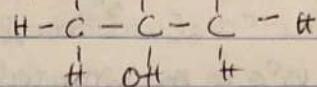
1. Discuss the major classification of Alkanols with two examples each
- a Based on the number of hydrogen atoms attached to the carbon carrying the hydroxyl group.
 - Primary - The carbon carrying the hydroxyl group has two or three hydrogen atoms attached.

E.g Ethanol: H C H



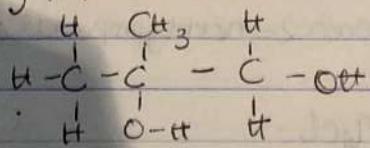
- Secondary - The carbon carrying the hydroxyl group has only one hydrogen atom attached

E.g Propan-2-ol: H H H



- Tertiary alkanols - The carbon carrying the hydroxyl group has no hydrogen atom attached to it

E.g 2-methylpropane-2-ol



2. Discuss the solubility of alcohol in water and in organic solvents

- In water; alcohol is soluble in water due to the presence of the hydroxyl group which can form hydrogen bonds with water. Alcohols with smaller hydrocarbon chains are more soluble than those with higher hydrocarbon chains. All monohydric alkanols are soluble in organic solvent.

1B Classification based on the number of hydroxyl groups they possess

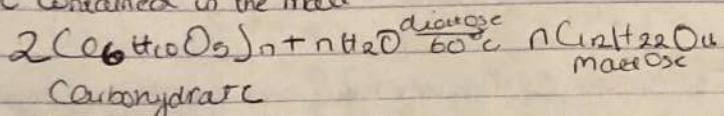
- Monohydric alkanols; It has only one hydroxyl group attached per alcohol structure e.g propanol, ethanol.
- Dihydric alkanols; It has only two hydroxyl groups per alcohol structure. E.g ethan-2,4-diol $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$.
- Trihydric alkanols; It has only three hydroxyl groups per alcohol structure. E.g 1,2,3-Propanetriol.

- Polyhydroxy alcohols; have more than three hydroxyl groups per alcohol structure.

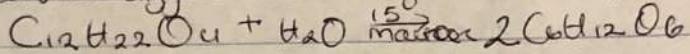
8 Discuss the Industrial manufacture of ethanol showing all reaction equations, enzymes and temperature of reaction.

- Carbohydrate can be made to yield ethanol by the biological process of fermentation.

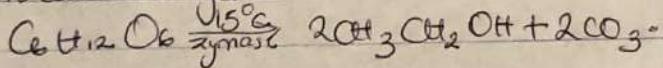
→ Step 1; The Starch containing substance is heated with malt to 60°C for a specific period of time to convert it to maltose by the enzyme diastase contained in the malt.



→ Step 2; The maltose broken down into glucose in addition of yeast which contains the enzyme maltase and at the temperature of 15°C

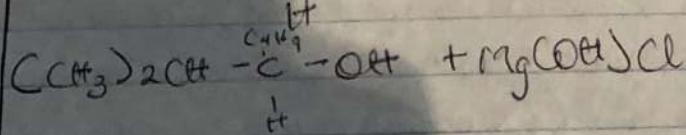
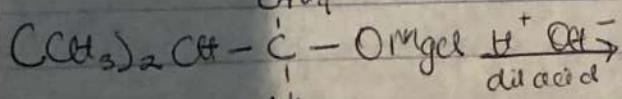
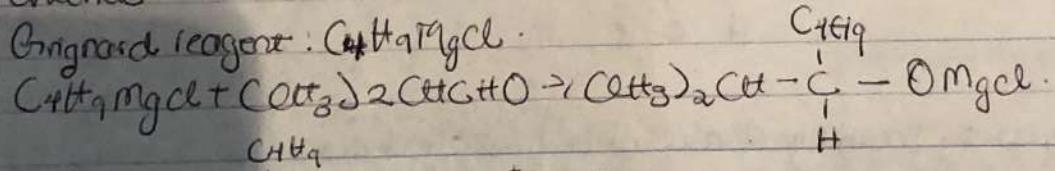


→ Step 3; The glucose at 15°C is converted to alcohol by the enzyme Zymase contained in yeast.

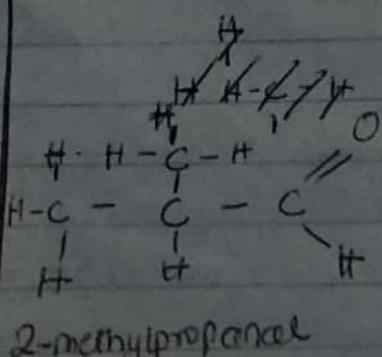


4 Show the reaction between 2-methylpropanal and butyl-magnesium-chloride.

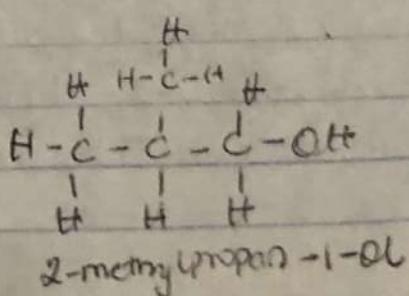
Grignard reagent: $\text{C}_4\text{H}_9\text{MgCl}$.



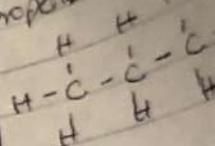
7 Show the reduction reaction of 2-methylpropanal



$\text{LiAlH}_4 / (\text{C}_2\text{H}_5)_2\text{O}$



- 8 Propose a scheme
- Write propene.
- Propene. Then add



Propose a scheme for the conversion of propan-1-ol to propan-2-ol.
Heat propan-1-ol in the presence of sulphuric acid to dehydrate it to
propene. Then add water to form propan-2-ol

