Chemistry Assignment.

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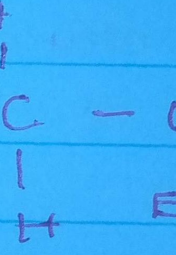
Dpt: MBBS
Course code: CHM 102.
Matric no.: 191MHS01/203

1. Classification of Alcanols

- Classification based on the number of alkyl groups attached to the hydroxyl carbon atom.

a. Primary alkanols ($-CH_2OH$)

- In this group, the hydroxyl carbon atom is attached to only one alkyl group and two hydrogen atoms. e.g

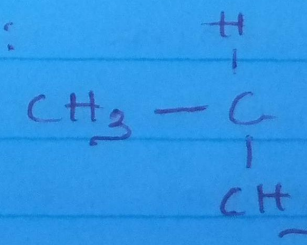


Ethanol.

b. Secondary alkanols ($-CHOH$)

- The hydroxyl carbon atom is attached to two alkyl groups and only 1 hydrogen atom.

Example:

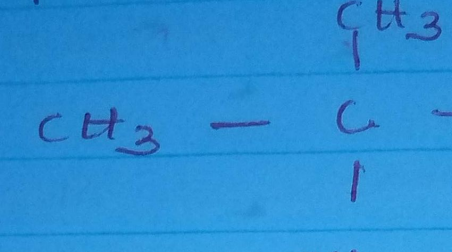


2-methylethanol

c. Tertiary alkanols (-OH)

- The hydroxyl carbon atom is attached to three alkyl groups and no hydrogen atom.

Example:

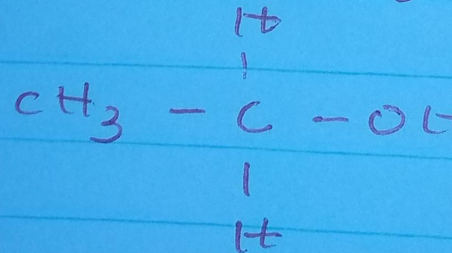


2,2 - dimethylethanol

2. Classification based on the number of hydroxyl groups.

a. Monohydric alkanols

Contains only one hydroxyl group (-OH) e.g



ethan - 1 - ol.

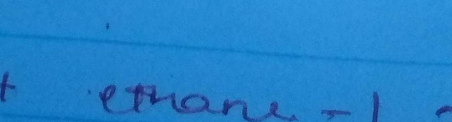
b. Polyhydric alkanols

Contains more than one hydroxyl group (-OH)

They include:

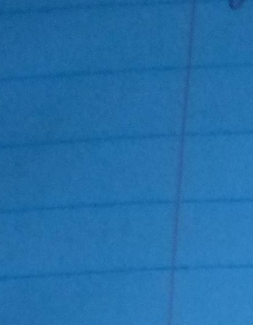
i. Dihydric alkanols - contains 2 hydroxyl groups

e.g



ethane - 1, 2, - diol.

iii Trihydric alkanols - Contains three hydroxyl groups. e.g



propane-1, 2, 3, -triol.

2. Solubility of alkanols in water and organic solvents.

Alkanols are readily soluble in water because of the formation of hydrogen bonds between the alkanol molecules and the water molecules. The solubility decreases with an increasing number of carbon atoms of the alkanol.

3. Preparation of Ethanol

Fermentation

i. $(C_6H_{10}O_5)_{n(s)} + nH_2O_{(l)} \xrightarrow{\text{diastase}} nC_{12}H_{22}O_{11(aq)}$

ii $C_{12}H_{22}O_{11(aq)} + H_2O_{(l)} \xrightarrow{\text{maltase}} 2C_6H_{12}O_{6(aq)}$

Sugar (glucose)

iii- $C_6H_{12}O_{6(aq)} \xrightarrow{\text{zymase}} 2C_2H_5OH_{(aq)} + 2CO_{2(g)}$

Ethanol

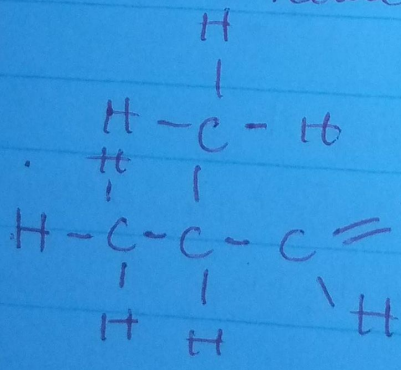
6. Show the reaction between 2-methyl propanal and butyl magnesium chloride.

Grignard reagent : C_4H_9MgCl

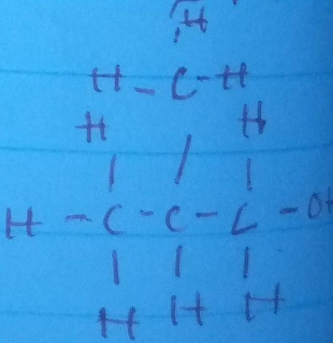
$$C_4H_9MgCl + (CH_3)_2CHCHO \longrightarrow (CH_3)_2CH-\underset{\displaystyle H}{\overset{\displaystyle C_4H_9}{\underset{|}{\overset{|}{C}}}}-OMgCl$$

$$(CH_3)_2CH-\underset{\displaystyle H}{\overset{\displaystyle C_4H_9}{\underset{|}{\overset{|}{C}}}}-OMgCl \xrightarrow[\text{dil acid}]{H^+ \; OH^-} (CH_3)_2CH-\underset{\displaystyle H}{\overset{\displaystyle C_4H_9}{\underset{|}{\overset{|}{C}}}}-OH + Mg(OH)Cl$$

7. Show the reduction reaction of 2-methylpropanal



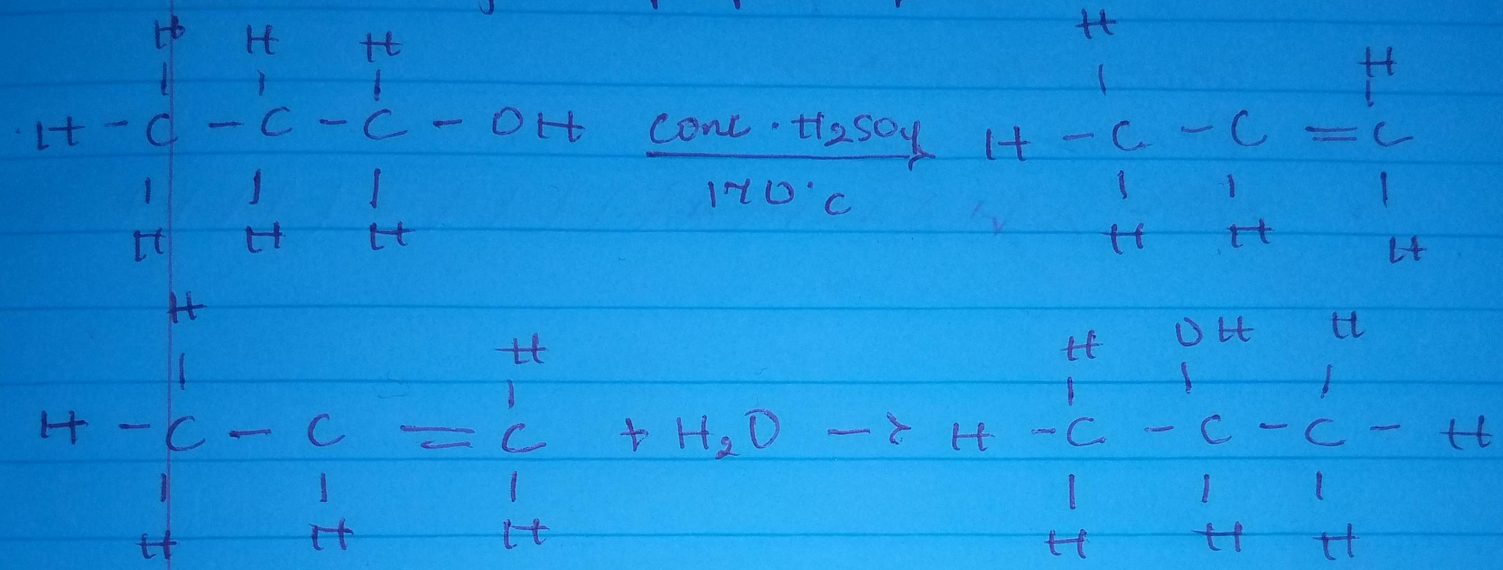
$\xrightarrow{LiAlH_4 \;//\; (C_2H_5)_2O}$



2-methyl propan-

8. 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.



propan-2-ol.