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19/MHS01/108
MBBS
CHEM 102
TITLE: NEW ASSIGNMENT

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

→ Based on the number of hydrogen atoms attached to the carbon containing the hydroxyl group.

Primary alcohol is when the no of hydrogen atoms attached to the carbon atoms bearing the hydroxyl group are two or three. When it is one, hydrogen atom, it is secondary alcohol and if no hydrogen atom attached to the carbon atoms bearing the hydroxyl group, it is tertiary alcohol.
Example; CH_3CH_2OH - Ethanol.

→ Based on the number of hydroxyl groups they possess.

Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols/glycols have two hydroxyl groups present in the alcohol structure while trihydric/triols have three hydroxyl groups present in the structure of the alcohol. Polyhydric alcohols/polyols have more than three hydroxyl groups. Example; $CH_3CH_2CH_2OH$ - Propanol which is a monohydric alcohol.

2) Discuss the solubility of alcohols in water, organic solvents.

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

The solubility of alcohols 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) Show the three steps in the industrial manufacture of ethanol. Equations of reactions are mandatory.

$2(C_6H_{10}O_5)_n + nH_2O \xrightarrow[60°C]{\text{diastase}} nC_{12}H_{22}O_{11}$
Carbohydrate → maltose

$C_{12}H_{22}O_{11} + H_2O \xrightarrow[15°C]{\text{maltase}} 2C_6H_{12}O_6$
maltose → glucose

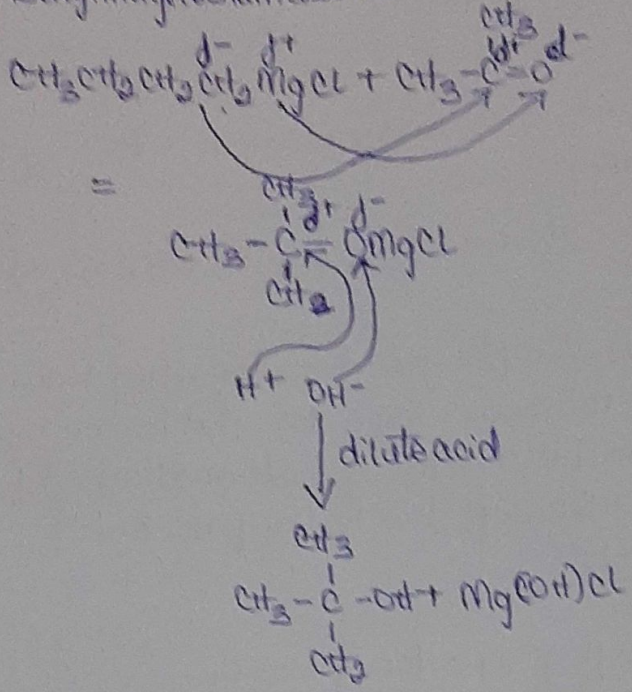
$C_6H_{12}O_6 \xrightarrow[15°C]{\text{zymase}} 2CH_3CH_2OH + 2CO_2$
glucose → ethanol + carbon(IV) oxide which goes off

4) Show the reaction between 2-methyl propanal and butylmagnesium chloride
Hint: Grignard synthesis

C_4H_9 - Butyl

$CH_3CH_2CH_2CH_2MgCl + CH_3-\overset{CH_3}{\underset{}{C}}=O$

Butylmagnesiumchloride



5) and 6) are incorrect

7) Show the reduction reaction of 2-methyl propanal

2 methylpropanal – Aldehyde / Alkanal

$CH_3CH_2CHO \xrightarrow{LiAlH_4/(C_2H_5)_2O} CH_3CH_2OH$

aldehyde — ethanol (primary alcohol)

8) Propose a scheme for the conversion of propan-1-ol to propan-2-ol.

$CH_3CH_2CH_2OH + H_2SO_4 \rightarrow CH_3CH_2CH_2OH\,OSO_3H$

$\downarrow -H_2O$

$CH_3CH_2CH_2|OSO_3H$

propyl hydrogensulphate

$\downarrow$ hydrolysis $(-H_2SO_4)$

$CH_3CH=CH_2 + H_2O$

$\downarrow$ hydration $H^+\ OH^-$

$CH_3\underset{OH}{CH}CH_3$

Propan-2-ol

$\therefore CH_3CH_2CH_2OH \longrightarrow CH_3CH(OH)CH_3$

Propanol — propan-2-ol

P.g(2)