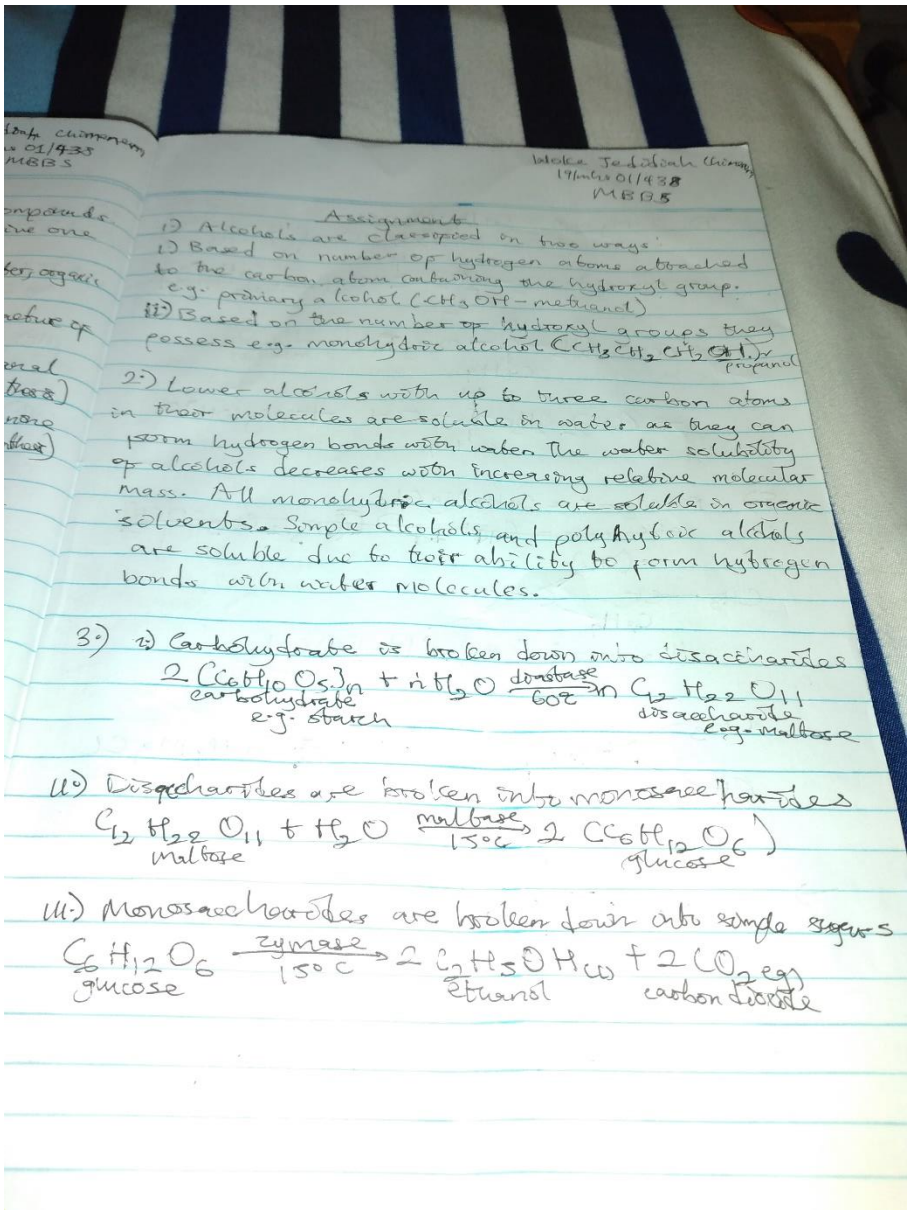
WOKE JEDIDIAH CHIMENEM
19/MHS01/438



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Assignment

1) Alcohols are classified on two ways:
i) Based on number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. e.g. primary alcohol (CH_3OH – methanol)
ii) Based on the number of hydroxyl groups they possess e.g. monohydric alcohol ($CH_3CH_2CH_2OH$) propanol

2.) Lower alcohols with up to three carbon atoms in their molecules are soluble in water as they can form hydrogen bonds with water. The water solubility of alcohols decreases with increasing relative molecular mass. All monohydric alcohols are soluble in organic solvents. Simple alcohols and polyhydric alcohols are soluble due to their ability to form hydrogen bonds with water molecules.

3.) i) Carbohydrate is broken down into disaccharides

$$\underset{\text{carbohydrate e.g. starch}}{2(C_6H_{10}O_5)_n} + nH_2O \xrightarrow[60°C]{\text{diastase}} n\,\underset{\text{disaccharide e.g. maltose}}{C_{12}H_{22}O_{11}}$$

ii.) Disaccharides are broken into monosaccharides

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

iii.) Monosaccharides are broken down into simple sugars

$$\underset{\text{glucose}}{C_6H_{12}O_6} \xrightarrow[15°C]{\text{zymase}} 2\,\underset{\text{Ethanol}}{C_2H_5OH_{(l)}} + 2\,\underset{\text{carbon dioxide}}{CO_{2(g)}}$$

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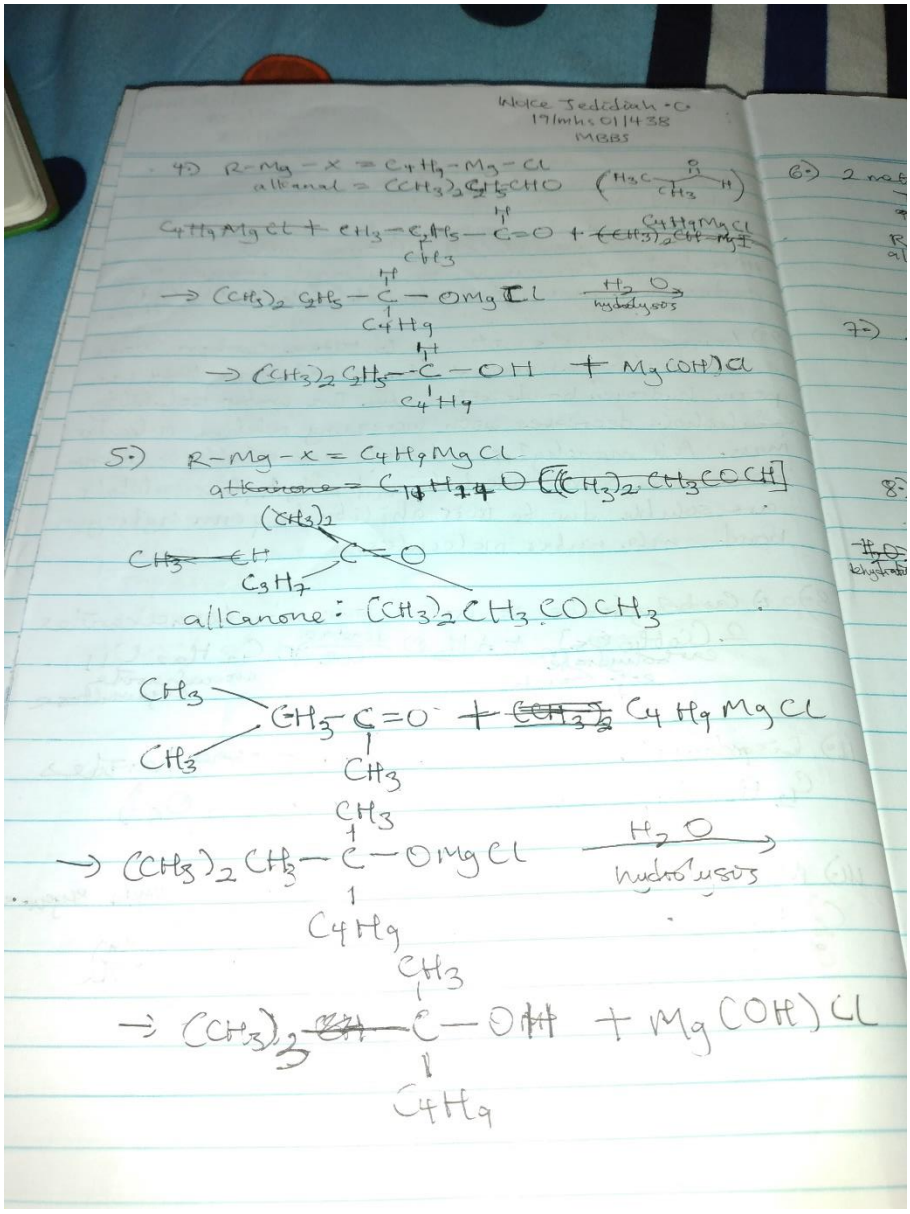

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4.) R-Mg-X = C_4H_9-Mg-Cl
alkanal = $(CH_3)_2C_2H_5CHO$

$C_4H_9MgCl + CH_3-C_2H_5-C=O \rightarrow (CH_3)_2C_2H_5-C-OMgCl \xrightarrow[\text{hydrolysis}]{H_2O} (CH_3)_2C_2H_5-C-OH + Mg(OH)Cl$

5.) R-Mg-X = C_4H_9MgCl
alkanone = $C_{10}H_{14}O$ $[(CH_3)_2CH_3COCH]$

alkanone: $(CH_3)_2CH_3COCH_3$

$(CH_3)_2CH_3-C=O + C_4H_9MgCl$

$\rightarrow (CH_3)_2CH_3-C-OMgCl \xrightarrow[\text{hydrolysis}]{H_2O}$

$\rightarrow (CH_3)_2CH_3-C-OH + Mg(OH)Cl$

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6.) 2 methyl propane = $(CH_3)_2CH_3COCH_3$

$RCHO \xrightarrow{LiAlH_4/(C_2H_5)_2O} RCH_2OH$
aldehyde — 1° alkanol

$RR'C=O \xrightarrow{LiAlH_4/(C_2H_5)_2O} RR'CHOH$
alkanone — 2° alcohol

$(CH_3)_2CH_3COCH \xrightarrow{LiAlH_4/(C_2H_5)_2O} (CH_3)_2CH_3CH(OH)CH_3$

7.) 2 methyl propanal = $(CH_3)_2C_2H_5CHO$

$RCHO \xrightarrow{LiAlH_4/(C_2H_5)_2O} RCH_2OH$
alkanal — 1° alcohol

$(CH_3)_2C_2H_5CHO \xrightarrow{LiAlH_4/(C_2H_5)_2O} (CH_3)_2C_2H_5CH_2OH$

8.) Propan-1-ol → Propan-2-ol

$CH_3CH_2CH_2OH + H_2SO_4 \rightarrow CH_3CH_2CH_2\overset{\oplus}{O}H_2\,HSO_4^-$

$\xrightarrow{-H_2O} CH_3CH_2CH_2OHSO_3 \xrightarrow{-H_2SO_4} CH_3CH_2CH_2 = CH_2$

hydration $\xrightarrow{H^+/OH^-}$ $CH_3CH(OH)CH_2$
hydrolysis

~~propan-2-ol = $CH_3CH(OH)CH_2$~~

propan-2-ol = $CH_3CH(OH)CH_3$