NAME: OJELADE OLUWAPELUMI DEBORAH
MATRIC NO: 19/MHS01/306
DEPARTMENT: Medicine and Sugery
COURSE: ~~Mathematics 104~~ Chemistry 102

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

There are two major ways of classifying alcohols.

a.) This type of classification is based on the number of hydrogen atoms attatched to the carbon atoms containing the hydroxyl group. This classification divides alcohols into three

- Primary alcohols: Alcohols in which there are two or three hydrogen atoms attached to the carbon carrying the hydroxyl group eg CH_3OH (methanol)
- Secondary alcohols: Alcohols in which there is only one hydrogen atom attached to the carbon carrying the hydroxyl group e.g $CH_3CH(OH)CH_3$
- Tertiary alcohols: Alcohols in which there are no hydrogen atoms attached to the carbon bearing the hydroxyl group e.g $(CH_3)_3C-OH$

b.) The second type of classification is based on the hydroxyl groups present in the alcohol. This classification divides alcohols into four.

- Monohydric alcohols: Alcohols which have an hydroxyl group present in their alcohol structure e.g $CH_3CH_2CH_2OH$
- Dihydric alcohols: Alcohols which have two hydroxyl groups present in their alcohol structure e.g $HOCH_2CH_2OH$
- Trihydric alcohols: Alcohols which have ~~two~~ three hydroxyl group present in their alcohol structure e.g $OHCH_2(CH_2(OH)CH_2OH$
- Polyhydric alcohols: Alcohols which have more than three hydroxyl groups in their alcohol structure. They are also reffered to as polyols e.g $CH_3CH(OH)CH(OH)CH(OH)CH(OH)CH(OH)CH_3$

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

NAME: OJELADE OLUWAPELUMI DEBORAH
DEPARTMENT: Medicine and Surgery
MATRIC NO: 19/MHS01/306

2.) 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 decreases with increasing relative molecular mass. All monohydric alcohols are soluble in organic solvent. 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 reaction are mandatory

Generally, starchy foods such as rice, maize or barley are used as a source of starch; potato among the lot is the most common.

a. Extraction of the starch: The potato is crushed and then steamed at 1400°C to 1500°C under pressure to prepare starch solution known as mash. Before hydrolysis, starch undergoes germination at 100°C to 130°C for a few days. This germinated starch is called malt.

b. Hydrolysis of starch: Starch is hydrolysed to maltose by an enzyme known as ~~distas~~ diastase.

$$2(C_6H_{10}O_5)_n + nH_2O \xrightarrow[50^\circ - 60^\circ]{\text{Diatase}} n(C_{12}H_{22}O_{11})$$

maltose.

c. Yeast is ~~often~~ then added at room temperature. Yeast contains 2 enzymes which converts the maltose to glucose.

$$C_{12}H_{22}O_{11(aq)} + H_2O_{(l)} \xrightarrow[15^\circ C]{\text{maltase}} 2C_6H_{12}O_{6(aq)}$$

maltose glucose

NAME: OJELADE OLUWAPELUMI DEBORAH
MATRIC NO: 19/MHS01/306
DEPARTMENT: Medicine and Sugery.

3.) The glucose at constant temperature is then converted into alcohol by the ~~eg~~ enzyme Zymase contained also in yeast.

$$\underset{\text{glucose}}{C_6H_{12}O_6} \xrightarrow[15^\circ C]{\text{Zymase}} \underset{\text{ethanol}}{2\,CH_3CH_2OH} + 2CO_2$$

4.) Show the reaction between 2-metayl propanal and butylmagnesium chloride Hint: gringard synthesis

$$CH_3CH(CH_3)-\overset{O}{\overset{\|}{C}}-H + CH_3CH_2CH_2CH_2MgCl$$

$$\longrightarrow CH_3CH(CH_3)-\underset{\underset{CH_3CH_2CH_2CH_2}{|}}{\overset{O}{\overset{\|}{C}}}-H + MgCl$$

$$\xrightarrow{+H_2O} CH_3CH(CH_3)-\underset{\underset{CH_3CH_2CH_2CH_2}{|}}{\overset{OH}{\overset{|}{C}}}-H + Mg(OH)Cl$$

7.) Show the reduction reaction of 2-metayl Propanal.

$$CH_3CH(CH_3)-\overset{O}{\overset{\|}{C}}-H \xrightarrow[H_2O]{LiAlH_4} CH_3CH(CH_3)CH_2OH$$

2-metayl propan-1-ol

NAME: OJELADE OLUWAPELUMI DEBORAH
MATRIC NO: 19/MHS01/306
DEPARTMENT: Medicine and Sugery

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

Propan-1-ol to propan-2-ol

$CH_3CH_2CH_2OH + H_2SO_4$

Propan-1-ol

$\longrightarrow CH_3CH_2CH_2OH_2OSO_3H$

$\xrightarrow{-H_2O} CH_3CH_2CH_2OSO_3H$

Propyl hydrogen sulphate

$\xrightarrow{-H_2SO_4} CH_3CH=CH_2$

$\xrightarrow{+H_2O} CH_3CH(OH)CH_3$

Propan-2-ol.