ELEPO IKHADIJAH OPEOLUWA
19/mhs02/046
NURSING.
CHEMISTRY ASSIGNMENT

1) Disauss the two major classification of Alkanols. Give two examples each for each class.

Answer

a) classification based on the number of hydrogen atoms attached to the carbon atoms containing the hydroxyl group. If the numbers of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three or two, it's called a primary alcohol (1°) if it's one hydrogen atom, it's called secondary alcohol (2°) and if no hydrogen atom attached to the carbon atom bearing the hydroxyl group, it's called a tertiary alcohol (3°)

Examples are;

CH_3OH methanol (1°) $CH_3CH(OH)CH_3$ propan-2-ol (2°)

b) Classification based on the number of hydroxyl groups they possess Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols have two hydroxyl groups present in the alcohol structure while trihydric alcohols have three hydroxyl groups present in the structure of the alcohols. Polyhydric alcohols have more than three hydroxyl groups.

Examples are; $CH_3CH_2CH_2OH$ propanol (Monohydric alcohol)

$CH_3CH(OH)CH_2CH(OH)CH_2CH_3$ Hexane-2,4-diol (Dihydric)

2) In the grignard synthesis of Alkanols, react a named grignard reagent with $CH_3CH_2CH_2CH_2C=OCH_2CH_2CH_3$ show the reaction steps. Reagent - CH_3CH_2MgCl

$CH_3CH_2CH_2CH_2C=OCH_2CH_2CH_3 + CH_3CH_2MgCl \longrightarrow$

$CH_3CH_2CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_3C-OMgCl$

$\downarrow H^+OH^-$

$CH_3CH_2CH_3CH_2CH_2CH_2CH_2CH_2CH_2CH_3C-OH + Mg(OH)Cl$

3 Discuss the industrial manufacture of ethanol showing all reaction equations and necessary enzymes and temperature of reaction.

Answer

Carbohydrate such as starch are a major group of natural Compounds that can be made to yield ethanol by the biological process of fermentation. The starch containing materials such as cereals, rice e.t.c and on warming with malt to 60°C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt

$$2(C_6H_{10}O_5)_n + nH_2O \longrightarrow nC_{12}H_{22}O_{11}$$

Carbohydrate — 60°C/diastase — maltose

The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 15°C

$$C_{12}H_{22}O_{11} + H_2O \longrightarrow 2C_6H_{12}O_6$$

maltose — 15°C/maltase — glucose

The glucose at constant temperature of 15°C is then converted into alcohol by the enzyme zymase contained also in yeast

$$C_6H_{12}O_6 \longrightarrow 2CH_3CH_2OH + 2CO_2$$

Glucose — 15°C/zymase — Ethanol.

4 Determine the product obtained in the reduction of alkanone and alkanal. Use a specific example for each and show the equation of the reaction

⇒ Alkanone

Alkanones are reduced to secondary alcohols. Example, propanone is reduced to propan-2-ol.

$$CH_3COCH_3 \xrightarrow[H_2O]{LiALH_4} CH_3CHOHCH_3$$

⇒ Alkanal

Alkanals are reduced to primary alcohols e.g ethanol to ethanal.

$$CH_3CHO \xrightarrow[H_2O.]{LiAlH_4} CH_3CH_2OH$$