1) Major classifications of alkanols

a) Alkanols are based on the number of hydrogen atoms attached to the carbon atoms containing the hydroxyl group. If the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are two or three, it is called a primary alcohol. If is one hydrogen atom. It is called a secondary alcohol ie. Methanol - CH_3OH

b) There are also classified based on the number of hydroxyl groups they poisess. Monohydric alcohols have one hydroxyl groups present in alcohol structures ie. propanol (Monohydric alcohol).

- $CH_2CH_2CH_2OH$

(2) a) $CH_3CH_2CH_2CH_2C(-OH)CH_2CH_3 + CH_3CH_2MgBr$

CH_2CH_3

$CH_3CH_2CH_2C - MgBr$

CH_2CH_3

$CH_3CH_2CH_2CH_2C(-OH) + Mg(OH)Br$

$CH_3CH_2CH_3$

3-Butylethane-3-ol.

(3)

3) Industrial preparation of Ethanol

Carbohydrates such as starch are major group of natural compounds that can be ~~yield~~ made to yield ethanol by the biological process of fermentation.

- Step 1

The starch containing materials include molasses, potatoes, cereals, rice and on warming with malts to 60°C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt. $2(C_6H_{10}O_5) + nH_2O \longrightarrow nC_{12}H_{22}O_{11}$

- Step 2:

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

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

- STEP 3:

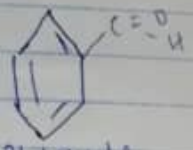
The glucose at constant temperature of 15°C the converted into alcohol by the enzyme zymase contained also in yeast.

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

(4)

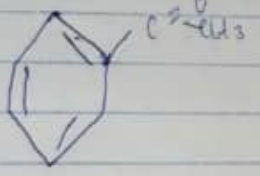
a) Product obtained in the reduction of alkanol and alkanone.

Aldehyde and Ketones are reduced to primary and secondary alcohols respectively by reacting with hydrogen in the presence of platinum or nickel catalyst or with aluminum isopropoxide or with complex metal hydride, such as lithium-aluminium hydride alumbes $NaBH_4$ or sodium tetrahydroborate (III)

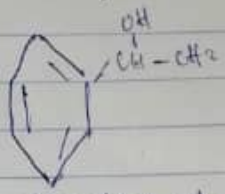


Aldehyde

Primary alcohol



Ketone



Secondary alcohol