MATRIC NO: 19/HBTS 02/080

Chemistry Assignment

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Based on the Number of Hydrogen Atoms Attached to the Carbon Atom Containing the hydroxyl group.

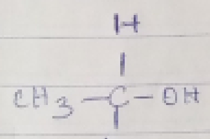
Based on this classification, Alkanol can be classified into the following:

a) Primary Alkanol:

If the number of Hydrogen atoms attached to Carbon atom Bearing hydroxyl group are three or two (1°).

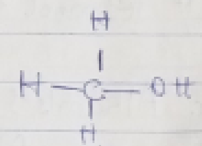
Example!

a)



Ethanol (1°)

b) CH_3OH



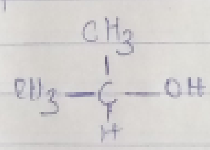
Methanol (1°).

b) Secondary Alkanol:

If It has only one hydrogen attached to it (carbon) that carries the hydroxyl group. (2°)

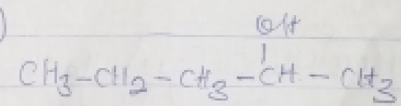
Example

a)



Propan-2-ol (2°)

b)

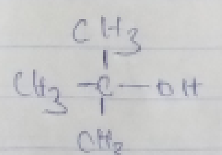


2-Butanol (2°).

c) Tertiary Alkanol:

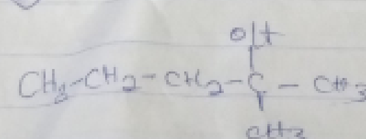
If it has no hydrogen atom is attached to the carbon atom Bearing hydroxyl group.

a)



2-methyl propan-2-ol (3°)

b)

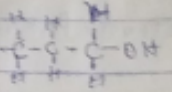


2-methyl Butan-3-ol.

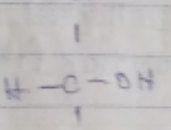
2. Based on the number hydroxyl group they possess.

(a) Monohydric Alkanols:

They have one hydroxyl group present in the Alcohol structure.

(i) $CH_3CH_2CH_2OH$ 

Propanol (Monohydric Alkanol)

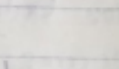
(ii) 

Ethanol (Monohydric Alkanol).

(b) Dihydric Alkanols:

They are also called Glycol. They have two hydroxyl groups present in the Alcohol structure.

Example:

i) $HOCH_2CH_2OH$ or 

Ethane-1,2-diol (Dihydric Alkanols).

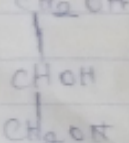
ii) $CH_3CH(OH)CH_2CH(CH_3)CH_2CH_3$

Hexane-2,4-diol (Dihydric Alkanols).

(c) Trihydric Alkanols:

They are also called triols. They have three hydroxyl groups present in the Alcohol structure.

Example:



Propane-1,2,3-triol (Trihydric Alkanols)

7 $OHCH_2(OH)CH(OH)CH(OH)CH(OH)CH(OH)CH(OH)CH(OH)H_3$.

2) $CH_3CH_2CH_2MgBr + CH_3CH_2CH_2CH_2C=OCH_2CH_3$
Propyl magnesiumbromide 4-octanone
(Grignard Re-agents) or (Octan-4-one)

$CH_3CH_2CH_2CH_2\underset{CH_2CH_2CH_3}{C}=O + CH_3CH_2MgBr$

$CH_3CH_2CH_2CH_2-\overset{CH_2CH_3}{\underset{CH_2CH_2CH_3}{C}}-OMgBr \rightarrow CH_3CH_2CH_2CH_2-\overset{CH_2CH_3}{\underset{CH_2CH_2CH_3}{C}}-OH + Mg(OH)Br$

The Alcohol produced is $CH_3CH_2CH_2\underset{CH_2CH_3}{C}(OH)CH_2CH_2CH_3$.

4 ethyl octan-4-ol.

3> The Starch containing material including molasses, potatoes, cereals, rice and on warming with malt to 60°C -
For a specific Period of time are converted into maltose by the enzymes diatase contained in the maltose by the enzymes diatase contained in the malt.

$2(C_6H_{10}O_5)_n + nH_2O \longrightarrow n(C_{12}H_{22}O_{11})$
Carbohydrate 60°C/Diatase Maltose.

The Maltose is Broken down into glucose on edit in of yeast which contains the enzymes, maltase and at a temperature of 15°C.

$C_{12}H_{22}O_{11} + H_2O \longrightarrow 2C_6H_{12}O_6$
Maltase 15°C/maltase glucose

The glucose at constant temperature of 15°C is then converted by the enzmes, zymase contained also in yeast.

$C_6H_{12}O_6 \xrightarrow{15^{oC}/3\text{days}} 2CH_3CH_2OH + 2CO_2$

Glucose — Ethanol

4. Alkanals and Alkanones are Reduced to primary and Secondary Alkanol by hydrogenation of carbon-oxygen double Bond in the Presence of a catalyst such as Platinum (Pt), Nickel (Ni), palladium (Pd) Catalyst or with Sodium tetrahydrate (III) [$NaBH_4$]

Examples: Reduction of an Alkanol Yield an Alkanal are Reduced to primary Alkanals e.g

$CH_3CH_2CH_2CHO \xrightarrow[(C_2H_5)_2O]{LiAlH_4} CH_3CH_2CH_2CH_2OH$

Primary Alcohol-

The Reduction of Alkanol give Secondary Alcohol.

$CH_3CH_2CH_2-\underset{CH_3CH_2CH_3}{\overset{}{C}}=O \xrightarrow[(C_2H_5)_2O]{LiAlH_4} CH_3CH_2CH_2CH_2CHCH_2CH_3OH$

Alkanone — Secondary Alcohol.