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COLLEGE: MHS

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MATRIC NUMBER: 19/MHS11/033

COURSE CODE: Chem 102

1a) Number of hydrogen atoms attached to the carbon atom containing OH group:

If the number of hydrogen atom attached to the carbon atom bearing the hydroxyl group are two or three then it is called primary alcohol and if it is one hydrogen atom then it is called secondary , and if it is no hydrogen atom it is bearing the hydroxyl group.

E.g. CH3OH (methanol)(1oc)

CH3CH(OH)CH3 (Propan-2-ol)(2oc)

b) Number of hydroxyl groups they possess:

Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols are also called Glycols which have two hydroxyl groups present in the alcohol structure while trihydric have three hydroxyl, polyhydric alcohol have more than three.

E.g. CH3CH2CH2OH (Propanol)(Monohydric alcohol)

HOCH2CH2OH(Ethane-1,2-diol)(Dihydric alcohol)

2)CH3CH2MgBr + CH3CH2CH2CH2 = OCH2CH2CH3

d+ d- d- d+

CH3CH2CH2CH2 C = O + CH3CH2MgBr

|

CH2CH2CH3

CH2CH3 CH2CH3

| H+OH- |

CH3CH2CH2CH2 C – OMgBr 🡪 CH3CH2CH2CH2 C ­🡪 OH + Mg(OH)Br

| |

CH2CH2CH3 CH2CH2CH3

The alcohol produced is CH3CH2CH2CH2 C (OH)CH2CH2CH = 4- ethyl octen -4-ol

|

CH2CH3

3)Production of Ethanol:

Starch containing materials that include molasses, potatoes, cereals and on warming with malt to 60oc for a specific period of time are converted to maltose by the enzyme diastase contained in the malt.

2(C6H10O5)n + nH2O 🡪 nC12H22O11

Carbohydrate 60oc/diastase maltose

The maltose is broken down to glucose on the addition of yeast which contains the enzyme maltase and at a temperature of 15oc.

C12H22O11 + H2O 🡪 2C6H12O6

Maltose 15oc/maltase glucose

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

C6H12O6 🡪 2CH3CH2OH + 2C02

Glucose 15oc/zymase Ethanol

4a) The reduction of carbonyl compounds:

CH3CHO 🡪 CH3CH2OH

Ethanal LIAlH4/(CH2H5)2 Ethanol(1o)

CH3CH2C=O 🡪 CH3CH3CHOH

Propanone LiAlH4/(C2H5)2 Propan-2-ol(2o)