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**MATRIC NO.**: 19/ENG03/009

**COURSE CODE**: CHM 101

**ASSIGNMENT**

1. i) This is based on the number of hydroxyl groups they possess. Monohydric alcohols have one hydroxyl group present in the alcohol structure. Dihydric alcohols are also called Glycols have two hydroxyl group presents in the alcohol structure while trihydric alcohols or triols have three hydroxyl groups present in the structure of the alcohol. Polyhydric alcohols or polyols has more than three hydroxyl groups.

Examples are: HOCH2CH2OH – Ethane-1, 2-diol (Dihydric Alcohol)

OHCH2CH (OH)CH2OH – Propane-1,2,3-triol(Trihydric Alcohol)

ii) This is based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group. If the number of hydrogen atoms attached to the carbon atom bearing the hydroxyl group are three or two, it is called a primary alcohol (1o). If it is one hydrogen atom, it is called secondary alcohol (20) and if no hydrogen atom is attached to the carbon atom bearing the hydroxyl group, it is called a tertiary alcohol (30).

Examples are: CH3OH – Methanol (10)

(CH­3)3C-OH – ­2-Methylpropanol-2-ol(3­­0)

CH3CH2 CH2

1. CH3CH2CH2CH2C=OCH2CH2CH3 + CH3CH2MgI CH3CH2CH2CH2-C-OMgI

CH3CH2CH2 H+ CH3CH2

CH3CH2CH2CH2-C-OH + Mg (OH) I OH- (diluted acid)

CH3CH2

4-EthylOctan-4-ol

1. Carbohydrates such as starch are major group of natural compounds that can be made to yield ethanol by the biological process of fermentation. The biological catalysts, enzymes found in yeast breakdown the carbohydrate molecules into ethanol to give a yield of 950. The starch containing materials include molasses, potatoes, cereals, rice and on warming with malt to 600C for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.

2(C6H10O5) n + nH2O  nC12H22O11

60oC/diastasemaltose

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

C12H22O11 + H2O 2C6H12O6

Maltose 15oC/Maltase glucose

The glucose at constant temperature of 15oC is then converted into alcohol by the enzyme Zymase contained also in yeast

C6H12O6  2CH3CH2OH+ 2CO2

Glucose 15oC/ Zymase Ethanol

1. Alkanones are reduced to secondary alcohols by reaction with hydrogen in the presence of a platinum or nickel catalyst or with complex metal hydride.

R

H2 (Ni or Pt) cat. or

LiAlH4

C = O RCH2 R’

R’ OH

Secondary alcohol

O OH

C CH – CH3

CH3

H2/Ni



Alkanals are reduced to primary alcohols by reaction with hydrogen in the presence of a platinum or nickel catalyst or with aluminum isopropoxide (the Meerwein-Pondoff reaction).

R

H2(Ni or Pt) cat.

Or LiAlH4

C = O  RCH2OH

R Primary alcohol

O

C CH2OH

H

LiAlH4

H20

