**CHM 101 ASSIGNMENT**

1. **CLASSIFICATION OF ALKANOLS**

**A)** 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 possessing the hydroxyl group are three or two, it is said to be a Primary Alcohol (10). If it is one hydrogen atom it is a Secondary Alcohol (20) and if no hydrogen atom is attached, it is a Tertiary Alcohol (30).

Examples:

* Methanol CH3OH (10)
* Propan-2-ol CH3CH(OH)CH3 (20)
* 2- Methylpropan-2-ol (CH3)3C-OH (30)

B) Based on the number of hydroxyl groups being possessed. Monohydric Alcohols possess one, Dihydric Alcohols possess two, Tryhydric Alcohols possess three and Polyhydric Alcohols possess more than three hydroxyl groups present in the alcohol structure

Examples:

* Propanol CH3CH2CH2OH (Monohydric)
* Ethane-1,2-diol HOCH2CH2OH (Dihydric)
* Propane-1,2,3-tiol OHCH2CH(OH)CH2OH (Tryhydric)
* Heptane-2,3,4,5,6-pentanol CH3CH(OH)CH(OH)CH(OH)CH(OH)CH(OH)CH3(Polyhydric)

2. **GRINGARD SYNTHESIS OF ALKANOLS**

CH3CH2CH2CH2C=O CH2CH2CH3 + CH3CH2MgBr

CH2CH3

CH2CH2CH2CH2C OMgBr

CH2CH2CH3

CH2CH3

CH2CH2CH2CH2C OH + Mg(OH)Br

CH2CH2CH3

3-Butylhexane-3-ol

3. **INDUSTRIAL PREPARATION OF ETHANOL**

The biological catalysts, enzymes found in yeast break down carbohydrate molecule into ethanol to give a yield of 95%. 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 malt.

2(C6H10O5)n + nH2O nC12H22O11

Carbohydrate 600C/diastase maltose

The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature of 150C

C12H22O11 + H2O 2C6H12O6

Maltose 150C/maltose glucose

The glucose at constant temperature of 150C is then converted to alcohol by the enzyme zymase contained in yeast

C6H12O6 2CH3CH2(OH)+ 2CO2

Glucose 150C/zymase Ethanol

4. **REDUCTION OF ALKANONE & ALKANALS**

RR’C=O RR’CHOH

Alkanones LiAlH4/(C2H5)2O Secondary Alcohols

RCHO RCH2OH

Alkanals LiAlH4/(C2H5)2O Primary Alcohols