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**COURSE CODE: CHEM 102.**

**ASSIGNMENT.**

1. The two major classifications of alkanols are:
2. Based on the number of carbon atoms attached to the hydroxyl group:

If the number of carbon attached to the hydroxyl group is two or three, it is referred to as a **PRIMARY ALKANOL (1).** When just one carbon atom is attached to the hydroxyl group, it is referred to as **SECONDARY ALKANOL (2)** then if no carbon atom is attached to the hydroxyl group, it is called a **TERTIARY ALKANOL (3).**

Examples are:

CH3CH2OH – Ethanol (Primary Alkanol).

CH3CH(OH)CH3 –Propan- 2- ol (Secondary Alkanol).

1. Based on the number of hydroxyl group they possess:

Alcohols which possess just one hydroxyl group are called **MONOHYDRIC ALCOHOLS.** While alcohols which possess two hydroxyl groups are called **DIHYDRIC ALCOHOLS;** Alcohols that possess three hydroxyl groups are called **TRIOLS** and those that possess more than three hydroxyl groups are referred to as **POLYHYDRIC ALCOHOLS.**

Examples are:

CH3CH2CH2OH – Propanol or Propan-1-ol (Monohydric alcohol).

HOCH2CH(OH)CH3 – Propan-2,3-diol (Dihydric alcohol).

1. In Grignard synthesis of Alkanols,

CH3CH2CH2CH2C=OCH2CH2CH3 reacts with CH3MgBr (Grignard reagent) to produce:

CH3

CH3CH2CH2CH2 C=OCH2CH2 CH3 +CH3MgBr CH3CH2CH2CH2C- OMgBr

CH2CH2CH3

H+

OH-

CH3

CH3CH2CH2CH2C-CH2CH2CH3 +Mg(OH)Br

OH

1. The industrial manufacturing of ethanol is carried out by the process of FERMENTATION

**STEP 1: Hydrolysis of starch**.

Starch is hydrolyzed to maltose by an enzyme known as **DIASTASE** under 60oC.

2(C6H10O5) + nH2O n (C12H22O11)

(STARCH) Diastase (60C) (MALTOSE)

**STEP 2: Conversion of maltose.**

Maltose is converted to glucose by an enzyme known as **MALTASE** under 15C.

C12H22O11 + H2O 2C6H12O6

(MALTOSE) Maltase (15C) (GLUCOSE)

**STEP 3:** **Conversion of glucose.**

Glucose is converted into ethanol using an enzyme known as **ZYMASE** under 15C.

C6H12O6 yeast CH3CH2OH + 2CO2

(GLUCOSE) Zymase (15C) (ETHANOL)

1. Alkanones and Alkanals can be reduced using LiAlH4 or (C2H5)2O

**ALKANONES:** The reduction process of propanone to propanol.

CH3CH2CHO CH3CH2CH2OH

LiAlH4/ (C2H5)2O

**ALKANALS:** The reduction process of propanal to propanol.

CH3CH2C=O CH3CH2CH2OH

LiAlH4/ (C2H5)2O