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**DEPARTMENT: NURSING**

**COURSE: CHM102**

**MATRIC NO: 19/MHS02094**

**ASSIGNMENT**

1. Alcohols are very important organic compounds. Discuss briefly their classification and give one example each.

*ANSWER*

THEY INCLUDE;

* **Based on the number of hydrogen atom attached to the carbon atom containing the** **hydroxyl group**: Under this classification, the alkanol that consist of two or three hydrogen atoms attached to the carbon atom and the hydroxyl group is called PRIMARY ALKANOLS. When it has only hydrogen atom it is known as SECONDARY ALKANOLS. When it has no hydrogen atom attached to the carbon atom it is called TERTIARY ALKANOLS. Their examples includes respectively;

A] CH₃OH {METHANOL} and CH₃CH₂OH {ETHANOL}

B] CH₃CH[OH]CH₃ {PROPAN-2-OL} and CH₃CH[OH]CH₂CH₃ {BUTAN-2-OL}

C] CH₃C[CH₃][OH]CH₃ {2-METHYL PROPAN-2-OL} and CH₃C[CH₃][OH]CH₂CH₃ {2-METHYL BUTAN-2-OL}

* **Based on the number of hydroxyl groups:** An alkanol with one hydroxyl group is called a **MONOHYDRIC ALKANOL. EXAMPLE: CH₃CH₂CH[OH] PROPANOL and CH₃CH[OH] ETHANOL.** ALKANOLS with two hydroxyl groups are **called DIHYDRIC ALKANOLS or** **GLYCOLS**. **EXAMPLE: CH₂[OH]CH₂[OH] ETHAN-1,2-DIOL and CH₃CH[OH]CH[OH]CH₃ BUTAN-2,3-DIOL.** ALKANOLS with three hydroxyl groups are called **TRIHYDRIC ALKANOLS OR TRIOL. EXAMPLE: CH₂[OH]CH[OH]CH₂[OH] PROPAN-1,2,3-TRIOL and CH₂[OH]CH[OH]CH[OH]CH₃ BUTAN-1,2,3-TRIOL.** ALKANOLS that contains more than three hydroxyl groups are called **POLYHYDRICS**.

1. **Discuss the solubility of alcohols in water, organic solvents.**

**Answer**

Lower alcohols with up to three carbon atoms in their molecules are soluble in water because these lower alcohols can form hydrogen bond with water molecules and all monohydric alcohols are soluble in organic solvents. The water solubility of alcohols decreases with increasing relative molecular mass.

1. **Show the three steps in the industrial manufacture of ethanol. Equations of reactions are mandatory.**

**Answer**

The industrial process in producing ethanol includes:

* The starch containing material such as rice is converted to maltose by an enzyme diastase in malt which is warmed at a specific period of time at 60◦C.

2[C₆H₁₀O₆]n + nH₂O 60◦C nC₁₂H₂₂O₁₁

{Carbohydrate} Diastase {Maltose}

* Maltose is broken down with maltase enzyme at 15◦C to give glucose.

C₁₂H₂₂O₁₁ + H₂O Maltase/ 15◦C 2[C₆H₁₂O₆]

{Maltose} {Glucose}

* Finally glucose at constant temperature 15◦C with the enzyme zymase contained in yeast is then converted to ethanol.

2[C₆H₁₂O₆] Zymase/15◦C 2CH₃CH₂OH + 2CO₂

1. Show the reaction btw 2-methypropanal and buthylmagnesiumchloride. Hint: Grignard synthesis.