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**DEPARTMENT: NURSING**

**COURSE CODE:CHM102**

 **ASSIGNMENT**

1. **Classifications of alcohols.**
* **Alcohols can be classified based on the number of hydrogen atom attached to the carbon atom containing the hydroxyl group. primary alcohols is when they are two or three hydrogen atoms attached to the carbon atom bearing the hydroxyl group, Secondary alcohols is when only one hydrogen atom is attached to the carbon atom bearing the hydroxyl group and Tertiary alcohols is when there is no hydrogen atom attached to the carbon atom bearing the hydroxyl group.**

 **EXAMPLE: CH3CH2OH (ethanol) – primary alcohol**

* **Alcohols can be classified based on the number of hydroxyl group they possess. Monohydric alcohols have one hydroxyl group present in the structure, Dihydric alcohols are also called glycerol and they have two hydroxyl groups present in the structure, Trihydric alcohols are also called triols and they have three hydroxyl groups present in the structure and Polyhydric alcohols are also called polyols and they have more than three hydroxyl groups present in the structure.**

 **EXAMPLE: HOCH2CH2OH (ethane-1,2- diol) –dihydric alcohol**

1. **Solubility of alcohols:**

 **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. The water solubility of alcohols decreases with increasing molecular mass. All monohydric alcohols are soluble in organic solvents, the solubility of simple alcohols and polyhydric alcohols is largely due to their ability to form hydrogen bonds with water molecules.**

1. **Industrial manufacture of Ethanol:**

 **Carbohydrate is fermented through a biological process.**

 **2(C6H10O5)n + nH2O 60°/ diatase  nC12H22O11**

 **Carbohydrate  maltose**

 **Maltase is broken down into glucose on addition of yeast at 15°c.**

**C12H22O11 + H2O  15°/ maltase  2(C6H12O6)**

**maltase glucose**

 **The glucose is converted into alcohol by the enzyme zymase at 15°c constant temperature.**

  **C6H12O6**  **15°/ zymase**  **2CH3CH2OH + 2CO2**

 **Ethanol is produced.**

1. **Grignard synthesis between buthylmagnesiumchloride and 2-methylpropanal**

 **H CH3 O**

**H C C + C4H9MgCl**

 **H** **H H**

 **H CH3 OMgCl H H H H**

 **H C C C C C C C H**

 **H H H H H H H**

 **H+**

 **dil. Acid**

 **H CH3 OH H H H H**

**H C C C C C C C H + Mg(OH)Cl**

 **H H H H H H H**

**7. The reduction reaction of 2-methylpropanal**

 **H CH3 O H CH3 H**

 **H C C C  LIAH4  H C C C OH**

 **H H H H2O  H H H**

**8. Scheme for the conversion of propan-1-ol to propan-2-ol**

1. **Dehydration of propan-1-ol to propene;**

 **When propan-1-ol is treated with concentrated sulfuric acid (H2SO4) the phenomenom called dehydration takes place. Due to this occurrence a water molecule from propan-1-ol gets eliminated. Due to this propan-1-ol is converted into propene.**

**The reaction involved is;-**

 **CH3CH2CH2OH conc H2SO4 CH3CH CH2**

**propan-1-ol propene**

1. **Hydrolysis of propene to prpan-2-ol;**

**Propene can be hydrolysed to propan-2-ol through a mechanism called Markownikoffs rule which states that ‘‘when an unsymmetrical alkene reacts with hydrogen halide to give an alkyl halide, the hydrogen adds to the carbon of the alkene that has the greater number of hydrogen substituents, and the halogen to the carbon of the alkene with the fewer number of hydrogen substituents’’.**

 **In this case the unsymmetrical reagent used is H2O which composes of H+**  **and OH-** . **Due to the hydrolysis of water the negative part attaches it self to the propene and thus converts it to propan-2-ol.**

 **The reaction involved is**

 **CH3 CH CH2**  **H2O  CH3 CH2 OH CH3**

 **propene propan-2-ol**