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**CHM 102 ASSIGNMENT**

**ANSWERS**

1(a) Classification based on the number of hydrogen atoms attached to the carbon atom containing the hydroxyl group(OH). If the number of hydrogen atoms attached to it is three or two, it is called a primary alkanol (1o). if it is one hydrogen atom, it is called secondary alkanol (2o), and if no hydrogen atom is attached to the carbon atom, it is called tertiary alkanol (3o). Examples:CH3CH2OH=Ethanol (1o), CH3CH(OH)CH3=Propan-2-ol (2o), (CH3)3C=OH=2-Methyl Propan-2-ol (3o).

1(b) Classification based on the number of hydroxyl group they possess. Monohydric alcohols possess only one hydroxyl group in their structure. Dihydric alcohols (Glycols) possess two hydroxyl groups in their structure. Trihydric alcohols (Triols) possess three hydroxyl groups in their structure. Polyhydric alcohols (Polyols) possess more than three hydroxyl groups in their structure.

Examples: i) CH3CH2CH2OH=Propanol (Monohydric alcohol). ii) HOCH2CH2OH=Ethan-1,2-diol (Dihydric alcohol). iii) OHCH2CH(OH)CH2OH=Propan-1,2,3-triol (Trihydric alcohol). iv) CH3CH(OH)CH(OH)CH(OH)CH(OH)CH(OH)CH3=Heptan-2,3,4,5,6-Pentaol (Polyhydric alcohol).

2) CH3MgBr + CH3CH2CH2CH2C=OCH2CH2CH3

 CH2CH2CH3 CH2CH2CH3

 | NH4Cl |

 CH3CH2CH2CH2 -C- OMgBr CH3CH2CH2CH2 –C- OH + Mg(OH)Br

 | H++OH- |

 CH3 CH3

3) On warming starch containing materials (Carbohydrates) with malt to 60oC for a specific period of time are converted into maltose by the enzyme diastase contained in the malt.

2(C6H10O5)n + nH2O nC12H22O11

Carbohydrate 60oC/Diastase maltose

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/maltose 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

4) The reduction of Alkanal produces primary Alkanol

 H H H H H H H H

 | | | | H2/Pt | | | |

H-C-C-C-C=O H-C-C-C-C-OH

 | | | Pressure | | | |

 H H H H H H H

Alkanal Primary Alkanol

(Aldehyde) (Primary Alcohol)

The reduction of Alkanone produces secondary Alkanol

 H H O H H H HO H

 | | || | H2/Ni | | | |

H- C- C- C- C -H H- C- C- C- C -H

 | | | Pressure | | | |

 H H H H H H H