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DEPT. : AERONAUTICS (ENGR.)

COURSE: CHM

ASSIGNMENT FROM HOME

1. Discuss the two major classifications of alkanols. Give two examples each for each class.
2. In the Grignard synthesis of Alkanols, react a named Grignard reagent with CH3CH2CH2CH2C=OCH2CH2CH3. Show the reaction steps.
3. Discuss the industrial manufacture of ethanol showing all reaction equation and necessary enzymes and temperature of reaction.
4. Determine the product obtained in the reduction of Alkanone and Alkanal. Use a specific example for each and show the equation of reaction.

ANSWER

1. A. Classification by number of hydrogen atoms surrounding the OH group;If the number of hydrogen atoms surrounding the carbon atom attached to the OH group is three or two, it is a primary alkanol. If it is one, it is a secondary alkanol. If none, then it is a tertiary alkanol.

Example:

CH3OH CH3CH(OH)CH3 (CH3)3C-OH

Methanol (10) Propan-2-ol (20) 2-methylpropan-2-ol(30)

 B. Classification by number of OH group they possess; Monohydric alkanols have one OH group present, trihydic alkanols have three OH group present, polyhydric alkanols have more than three OH group present

EXAMPLES:

CH3CH2CH2OH (Monohydric) – Propanol

HOCH2CH2OH (Dihydric) – Ethan-1, 2-diol

OHCH2CH(OH)CH2OH (Trihydric)

1. CH3CH2CH2CH2C=OCH2CH2CH3 + CH3CH2CH2MgCl

CH3CH2CH2CH2-C-OMgCl H+  OH- CH2CH2CH3

 CH2CH2CH3 dil. Acid CH3CH2CH2CH2-C-OH

 CH2CH2CH3

1. **STEPS OF PREPARATION**
**EXTRACTION OF STARCH** The crushed potato is steamed at 140OC to 150OC under pressure to prepare starch solution known as MASH.
GERMINATION Before hydrolysis, starch is first undergo germination at 10OC to 13OC for few days. This germinated starch is called MALT.
**HYDROLYSIS OF STARCH** Starch is hydrolysed to maltose by an enzyme known as diastase.
2(C6H10O5) + nH2O n(C12H22O11)
Starch Maltose
**FERMENTATION** Finally yeast is added to maltose.
Yeast secrets two enzymes:
1. Maltase: converts maltose into glucose.
2. Zymase: converts glucose into ethanol..
C12H22O11 + H2O 2C6H12O6
C6H12O6 C2H5OH + 2CO2
2. Aldehydes and ketones are reduced to primary and secondary alcohols respectively by reaction. With hydrogen in the presence of platinum or nickel catalyst or with aluminium isopropoxide tetrahydridoaluminate (111) (LiAlH4) or sodium tetrahydridoborate (111) (NaBH4).

EXAMPLES O

 C LiAlH CH2OH

 H2o

 OH

1. CH3 – C =OH H2/NI