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GENERAL CHEMISTRY II
CHEM 102
ACADEMICAL EXCELLENCE
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- Discuss the two major classification of Alkanol Give two Examples each for each class

Alkanols are a member of organic compounds composed of Carbon, hydrogen and OH atom. These are divided into classes:

PRIMARY ALCOHOL

This type of alcohol has three or more hydrogen atom attached to the carbon atom with the hydroxyl group. Methanol CH_3OH , Ethanol CH_3CH_2OH . It is denoted by (1°)

SECONDARY ALCOHOL

This type of alcohol has just one hydrogen atom attached to the carbon atom bearing the OH group. Example: Propan-2-ol $CH_3CH(OH)CH_3$, Butan-2-ol. It is denoted by (2°)

TERTIARY ALCOHOL

This type of alcohol has no hydrogen atom attached to the carbon containing the OH group. Example: Methylpropan-2-ol $(CH_3)_3C-OH$, Methyl pentan-3-ol $CH_3CH_2CH_2C(OH)(CH_3)CH_3$. It is denoted by (3°)

SECOND CLASSIFICATION BASED ON THE NUMBER OF OH GROUP

MONOHYDRIC ALCOHOL

They have just one OH group present in mono alcohol structure. Example: Methanol, ethanol, CH_3OH , CH_3CH_2OH respectively.

Dihydric Alcohols

This type of alcohol has two OH groups present in one alcohol structure. These are also called diols.
 Examples of dihydric alcohol are Ethane-1,2-diol $\text{CH}_2\text{OHCH}_2\text{OH}$, Ethane-1,3-diol $\text{CH}_2\text{OHCH}_2\text{CH}_2\text{OH}$, Propane-1,2-diol $\text{CH}_3\text{CH(OH)CH}_2\text{OH}$, Propane-1,3-diol $\text{CH}_3\text{CH}_2\text{CH(OH)CH}_2\text{OH}$, Butane-2,3-diol $\text{CH}_3\text{CH(OH)CH(OH)CH}_3$, Hexane-2,4-diol $\text{CH}_3\text{CH}_2\text{CH(OH)CH}_2\text{CH(OH)CH}_3$.

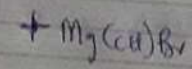
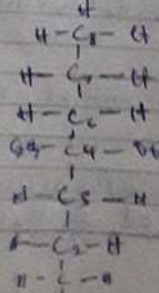
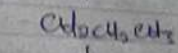
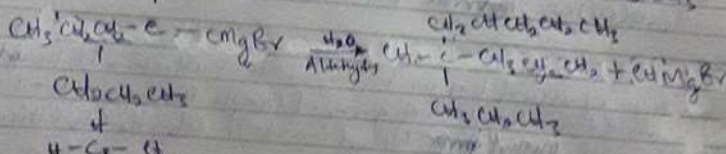
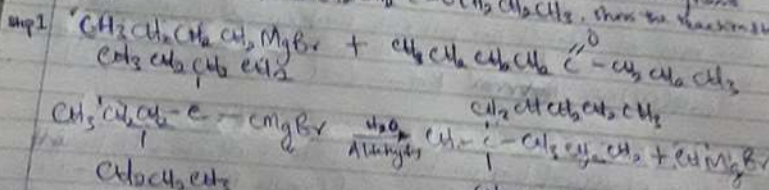
Triol Alcohol

This type has three OH groups present in it alcohol structure.
 Examples of triol are Butane-2,3,4-triol $\text{CH}_3\text{CH(OH)CH(OH)CH}_2\text{OH}$, Hexane-2,4,5-triol $\text{CH}_3\text{CH(OH)CH}_2\text{CH(OH)CH}_2\text{OH}$.

Polyhydric Alcohol

This type of alcohol has more than three OH groups in one alcohol structure. Example:
 Decane-3,5,9-triol $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH(OH)CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH(OH)CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH(OH)CH}_3$
 Pentane-2,3,4,5-tetrol $\text{CH}_3\text{CH(OH)CH(OH)CH(OH)CH}_2\text{OH}$

2. In the Grignard synthesis of ketones, react a named Grignard reagent with $\text{CH}_3\text{COCH}_2\text{CH}_2\text{CH}_3$. Show the reaction steps.

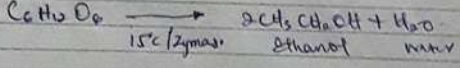
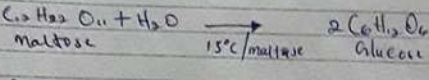
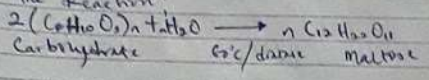


4-propyl-octan-4-ol is the product from Butyl Magnesium Bromide. The named Grignard reagent is Butylmagnesiumbromide. Once it reacts with $\text{CH}_3\text{COCH}_2\text{CH}_2\text{CH}_3$ it gives 4-propyloctan-4-ol.

3 Discuss the Industrial manufacture of Ethanol showing all equations and necessary enzymes and temperature of reaction.

Ethanol is produced from carbohydrates ~~from~~ ~~the~~ starch. Starch is the major constituent that ethanol can be gotten from. This process is called Fermentation. The biological catalysts, enzymes found in yeast break down the carbohydrate molecules into ethanol to give a yield 95%. The starch containing materials include potatoes, cereals etc, and on heating with malt at 60°C for a specific period of time are converted into maltose by the enzymes diastase contained in malt. The maltose is broken down into glucose on addition of yeast which contains the enzyme maltase and at a temperature 15°C.

The Reaction:

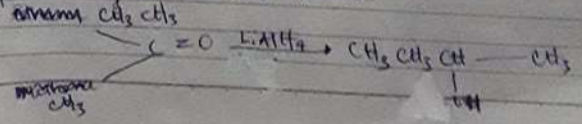


4 Determine the Product obtained in the reduction of Alkanone and Alkanal. Use a specific example for each and show the equation of reaction.

Reduction of Alkanone

Alkanone are also known as ketones. Alkanones are reduced to form secondary alcohol.

Examples using Methone and Ethone



Reduction Of Alkanals

Alkanals are reduced to form Primary Alcohol

