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HUMAN NUTRITION AND DIETETICS
19/MHS04/001
CHEM 102

Assignment

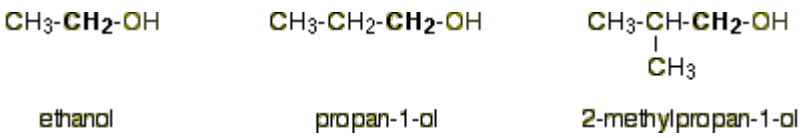
1. Alcohols are very important organic compounds. Discuss briefly their classification and give one example each.
2. Discuss the solubility of alcohols in water, organic solvents
3. Show the three steps in the industrial manufacture of ethanol. Equations of reaction are mandatory
4. Show the reaction between 2-methylpropanal and butylmagnesiumchloride Hint: Grignard synthesis
5. Show the reduction reaction of 2-methylpropanone
6. Show the reduction reaction of 2-methylpropanal
7. Propose a scheme for the conversion of propan-1-ol to propan-2-ol.

Answers

Question 1.

Primary Alcohols

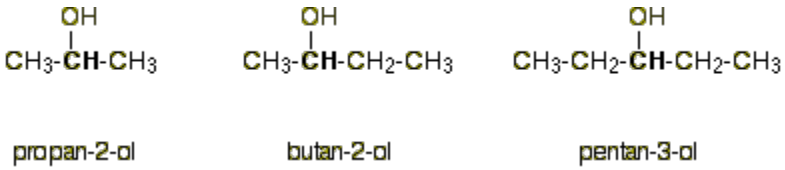
Primary alcohols are those alcohols where the carbon atom of the hydroxyl group (OH) is attached to only one single alkyl group. Some of the examples of these primary alcohols include Methanol (, propanol, ethanol, etc. The complexity of this alkyl chain is unrelated to the classification of any alcohol considered as primary. The existence of only one linkage among –OH group and an alkyl group and the thing that qualifies any alcohol as a primary.



Primary Alcohols – Examples

Secondary Alcohols

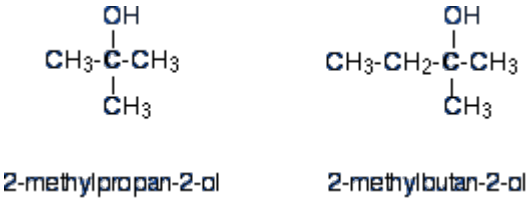
Secondary alcohols are those where the carbon atom of the hydroxyl group is attached to two alkyl groups on either side. The two alkyl groups present may be either structurally identical or even different. Some of the examples of secondary alcohols are given below-



Secondary Alcohol – Examples

Tertiary Alcohols

Tertiary alcohols are those which feature hydroxyl group attached to the carbon atom which is connected to 3- alkyl groups. The physical properties of these alcohols mainly depend on their structure. The presence of this -OH group allows the alcohols in the formation of hydrogen bonds with their neighbouring atoms. The bonds formed are weak, and this bond makes the boiling points of alcohols higher than its alkanes. The examples of tertiary alcohols include-



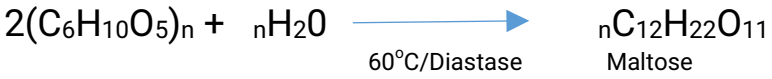
Tertiary Alcohol – Examples

2. 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 decrease with increasing molecular mass. All monohydric alcohols are soluble in organic solvents.

3. Carbohydrates such as starch are major groups of natural compounds that can be

made to yield ethanol by the process of fermentation

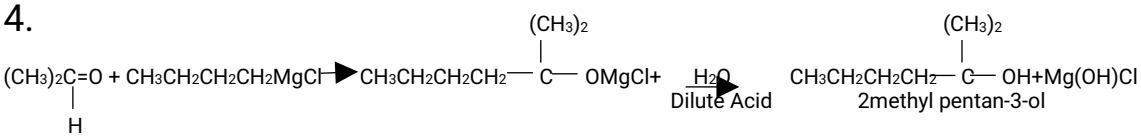
Carbohydrate is converted into Maltose at a temperature of 60°C and by the enzyme diastase



Maltose is broken into glucose on addition of yeast which contains the enzyme maltase at 15°C

Glucose at constant temperature 15°C is converted into alcohol with enzyme zymase contained also in yeast

4.



7.

Propan-1-ol to Propan-2-ol

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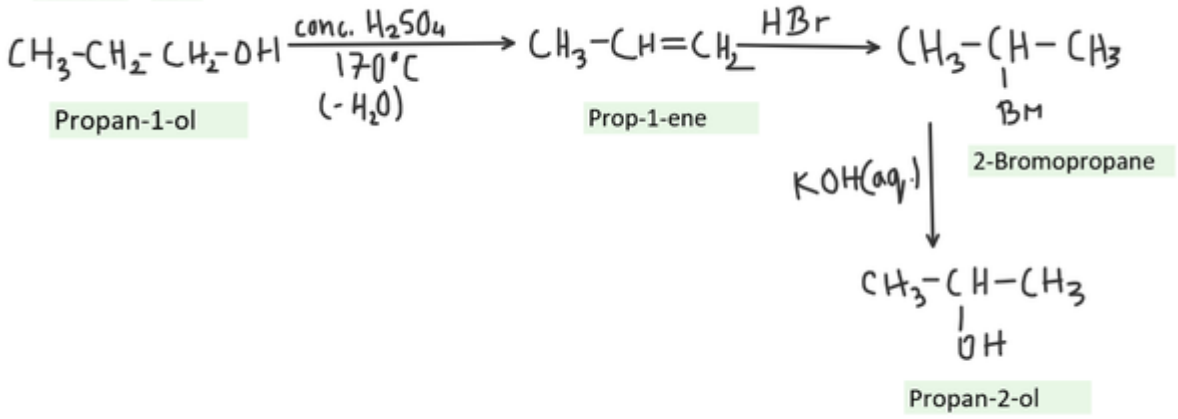

Propan-1-ol

Prop-1-ene

2-Bromopropane

Propan-2-ol