**CHM 102 ASSIGNMENT**

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**COLLEGE:** Medicine and Health Sciences

**LEVEL:** 100

ANSWERS

1. One of the major classification of alcohols is according to the number of hydrogen atom attached to the carbon atom with the hydroxyl functional group.
2. Primary alcohols: they have two or three hydrogen atoms attached to the carbon atom of the alcohol with hydroxyl group e.g.; ETHANOL [CH3CH2OH], PROPANOL [CH3CH3CH2OH], etc.
3. Secondary alcohols: they have one hydrogen atom attached to the carbon atom carrying the hydroxyl functional group e.g.; PROPAN-2-OL [CH3CH(OH)CH3], BUTAN-2-OL [CH3CH2CH(OH)CH3], etc.
4. Tertiary alcohols: they have no hydrogen atom attached to the carbon atom carrying the hydroxyl functional group e.g.; 2-METHYLPROPAN-2-OL [(CH3)3C-OH], 1-ETHYL-1-METHYLBUTANOL [(CH3)(CH3CH2)C(OH)CH2CH2CH3 ], etc.

One of the other major classification of alcohols is according to the number of hydroxyl group they possess.

1. Monohydric alcohols: they have one hydroxyl functional group e.g.; BUTANOL [CH3CH2CH 2CH2OH], PENTANOL [CH3CH2CH2CH2CH2OH] etc.
2. Glycols (dihydric) alcohols: they have two hydroxyl functional group e.g.; PROPANE-1,2-DIOL [HOCH2CH2CH2OH], BUTANE-1,3-DIOL [CH3CH2(OH)CH2CH2(OH)] etc.
3. Triols (trihydric) alcohols: they have three hydroxyl functional group e.g.; PROPANE-1,2,3-TRIOL [HOCH2CH(OH)CH2OH], PENTAN-1,3,5-TRIOL [CH2(OH)CH2CH(OH)CH2CH2(OH)] etc.
4. Polyols (polyhydric) alcohols: they have more than three hydroxyl functional group e.g.; PENTAN-1,2,3,4,5-PENTAOL [CH2(OH)CH(OH)CH(OH)CH(OH)CH2(OH)], HAXAN-1,2,5,6-TETRAOL [CH2(OH)CH(OH)CH2CH2CH(OH)CH2(OH)] etc.
5. STEP 1: the reaction of the ketones with a Grignard reagent, RMgX where R can be an alkyl group. CH3CH2

CH3CH2CH2CH2 C=O + CH3CH2MgCl CH3CH2CH2CH2 C-OMgCI

CH2CH2CH3 CH3CH2CH2

STEP 2: the intermediate alkylmagnesiumhalide is hydrated with dilute acid which would lead to the yield of an alcohol.

CH3CH2 CH3CH2

CH3CH2CH2CH2 C-OMgCI CH3CH2CH2CH2 C-OH + Mg(OH)Cl

H20+

CH3CH2CH2 CH3CH2CH2

1. INDUSTRIAL PREPARATIONS OF ETHANOL

Starch containing materials are converted into maltose by the enzymes diastase contained in the malt.

2(C6H10O5)n + nH2O nC12H22O11

Carbohydrate 60 C/diastase maltose

The maltose is then broken down into glucose on addition of yeast which contains the enzymes maltase and at a temperature of 15 C.

C12H22O11 + H2O 2C6H12O6

Maltose 15 C/maltase glucose

The glucose is then converted into alcohol by the enzymes, Zymase contained also in yeast.

C6H12O6 2CH3CH2OH + 2CO2

Glucose 15 C/Zymase ethanol

1. (a) REDUCTION OF ALKANAL

RCHO LiAlH4/(C2H5)2O RCH2OH

alkanal H2+ primary alcohol

Example;

CH3CHO LiAlH4/(C2H5)2O CH3CH2OH

ethanal H2+ ethanol

(b) REDUCTION OF ALKANONE

R’RC=O LiAlH4/(C2H5)2O R’RCHOH

alkanone H2+ secondary alcohol

Example;

(CH3)2C=O LiAlH4/(C2H5)2O CH3CH(OH)CH3

Propanone H2+ Propan-2-ol