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Matric no: 19/MHS11/029

Course: CHM 102 Assignment

Classification of Alkanols

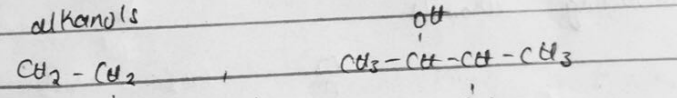
a) Based on the number of Hydroxy functional group (OH) present

Examples

i) Monohydric alkanols: Ethanol (CH_3CH_2OH)

Methanol (CH_3OH)

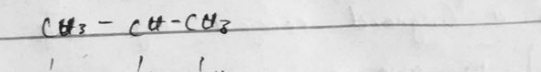
ii) Polyhydric alkanols



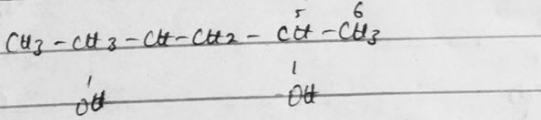
Ethane-1,2-diol

2,3-Butane diol

trihydric alkanols:



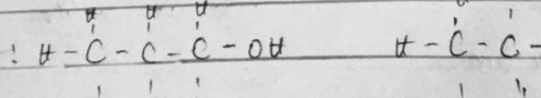
Propane-1, 2, 3-triol (glycerol)



2,3,5-Hexanetriol or Hexane-2,3,5-triol

b) Classification Based on the position of carbon atom holding the OH group

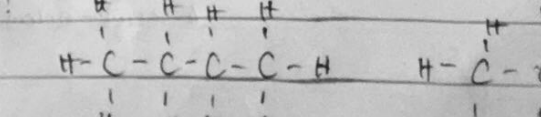
Primary alkanols:



Propanol

Ethanol

ii) Secondary alkanols:

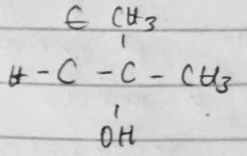


Butan-2-ol

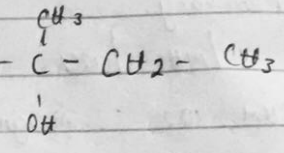
Propan-2-ol

2-Pr

Tertiary Alkanols:



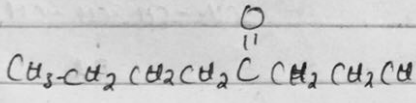
tert-butyl alcohol



2-methyl-butan-2-ol

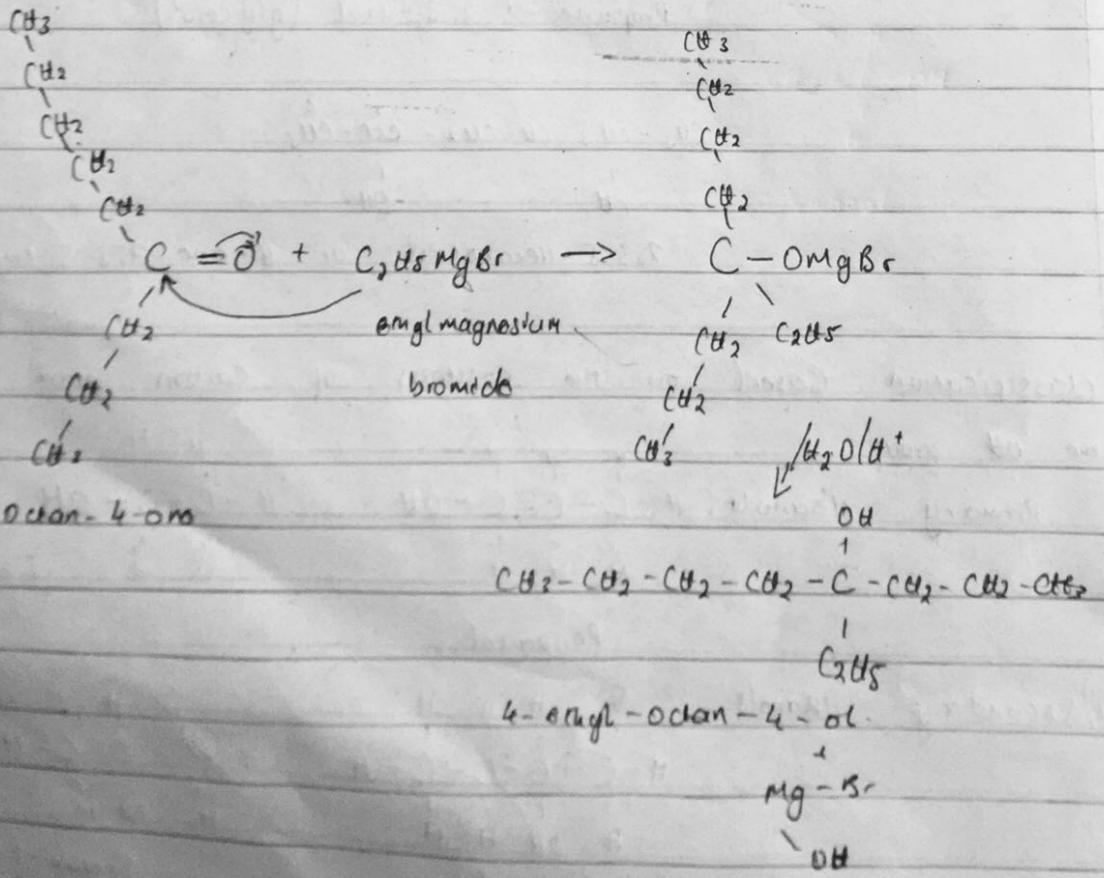
Ques 2

Grignard reagent is an organometallic compound (R-Mgx) that is used in the synthesis of wide arrays of organic compounds including alkanols



Octan-4-one

The compound above (octan-4-one) is a ketone. it will react with a Grignard reagent e.g ethyl magnesium bromide (C_2H_5MgBr) to give a tertiary alkanol



4-ethyl-octan-4-ol

Ques 3

Ethanol is manufactured industrially by the fermentation of starch in the presence of suitable micro organism which produce the enzymes that act as catalyst.

Starch is a polysaccharide carbohydrate and is an important source of ethanol. Usually, Potato, rice, maize or barley are used as source of starch. Potato is mostly used

Extraction of starch

The crushed potato is steamed at 140°C to 150°C under pressure to prepared starch solution known as MASH

Germination

Before hydrolysis, starch is first undergo germination at 10°C to 13°C for few days. This germinated starch is called MALT

Hydrolysis of starch

Starch is hydrolysed to maltose by an enzyme known as dia stase

$$(C_6H_{10}O_5) + nH_2O \xrightarrow{\text{diastase}} (C_{12}H_{22}O_{11})$$

Starch → maltose

Fermentation

Finally yeast is added to maltose. Yeast secrets two enzy

Maltose (Converts maltose to glucose) and zymase

$$C_{12}H_{22}O_{11} + H_2O \xrightarrow[\text{(yeast)}]{\text{maltase}} 2(C_6H_{12}O_6)$$

maltose → glucose

$$C_6H_{12}O_6 \xrightarrow[\text{(yeast)}]{\text{zymase}} C_2H_5OH + 2CO_2$$

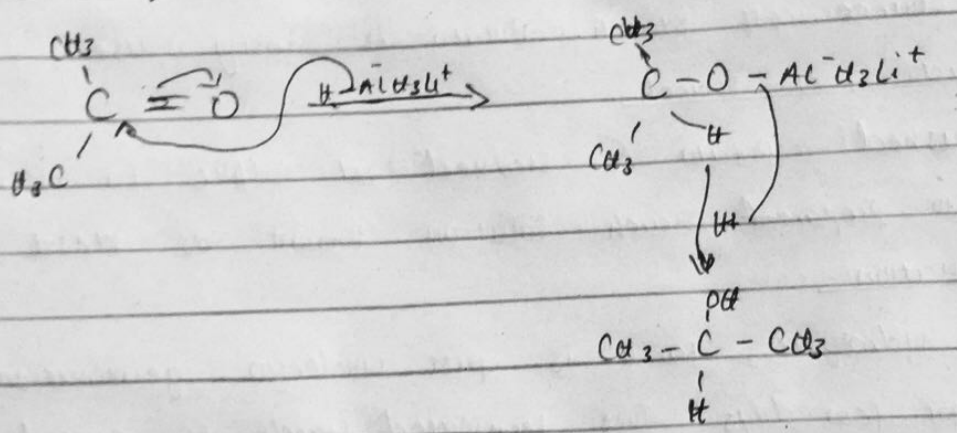
glucose → ethanol

Question 4

Reduction of alkanone or ketone gives secondary alkanol while reduction of an alkanal or aldehyde gives a primary alkanol

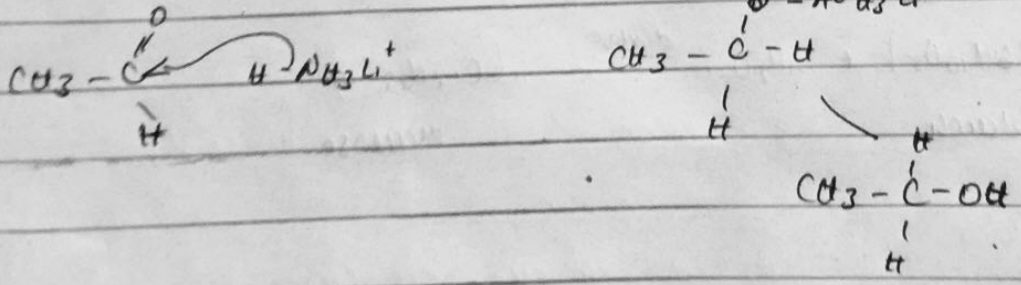
Reduction of alkanone e.g acetone [$CH_3-\overset{O}{\overset{\|}{C}}-CH_3$]

The reducing agent used is Lithium aluminium hydride ($LiAlH_4$) or Sodium borohydride ($NaBH_4$)



Propan-2-ol

Reduction of alkanal e.g ethanal [$CH_3-\overset{O}{\overset{\|}{C}}-H$]



Ethanol