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19/MHS 02/045
MEDICINE AND HEALTH SCIENCE
Nursing.

1) Alcohols are very important compound. It can be classified in two ways.

i) Based on the number of hydrogen atom attached to the carbon atom containing the hydroxyl group 3.

i) Primary alcohols: This occurs when the hydrogen atom attached to the carbon group contain the hydroxyl group (OH) are two or three e.g CH_3CH_2OH, ethanol $CH_3CH(CH_3)CH_2OH$ [2-methyl-propan-1-OL].

ii) Secondary alcohols: Secondary alcohols occurs when the hydrogen atom attached to the carbon group caring the hydroxyl group is one.

iii) Tertiary alcohols: This occurs when there is no hydrogen atom attached to the carbon contain the hydrogen group. e.g $CH_3C(CH_3)_2OH$ [2-methyl propan-2-ol].

2) Discuss the solubility of alcohols in water organic solvent.

Alcohols are soluble in water because of the hydroxyl group in the alcohols which is able to formed hydrogen bond with water molecules. Alcohols with a smaller hydrocarbon chain are very soluble. As the hydrocarbon chain increases the solubility in water decreases. This is because it requires a lot of energy to overcome the hydrogen bonds between the alcohol molecules as the molecules are more tightly packed together as the size and mass increase: Alcohol are soluble in organic solvent.

3) Show the three steps in the industrial manufacture of ethanol

Ethanol can be produced by fermentation and biological catalysis. The enzymes found in yeast can be used to break down carbohydrates into ethanol with a yield of 95%. The starch rich substance include molasses, potatoes etc. ~~starch~~ on reacting with maltose at a temperature of 60°c ~~starch~~ produces maltose while the enzymes diastase.

$$2\ (C_6H_{10}O_5)n + nH_2O \xrightarrow[60^\circ C]{\text{diastase}} nC_{12}H_{22}O_{11}$$

maltose.

The maltose is converted to glucose with the addition of yeast at a temperature x 15°C with the enzymes called zymas.

$$\underset{\text{glucose}}{C_6H_{12}O_6} \xrightarrow[\text{zymase}]{15^\circ C} \underset{\text{glucose}}{2C_6H_{12}O_6}$$

The glucose at a constant temperature of 15°C is then converted to alcohols with the addition of yeast and the present of a enzymes called zymax.

$$\underset{\text{glucose}}{C_6H_{12}O_6} \xrightarrow[\text{zymase}]{15^\circ C} \underset{\text{ethanol}}{2CH_3CH_2OH} + CO_2$$

Show the reaction between 2-methyl propanal and ~~buty~~ butyl magnesium chloride.

$$(CH_3)^2CHCH=O + C_4H_9MgCl \rightarrow C_4H_9CH(CH_3)_2CH-OMgCl + H_2O \text{ Dilute acid}$$

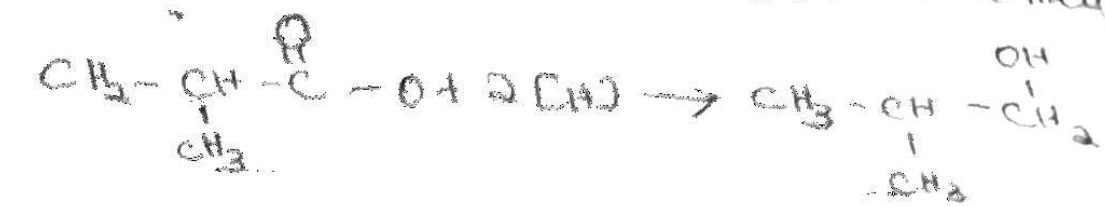
$$C_4H_9CH(CH_3)_2CH-OH + MgClO_4$$

(E) Show the reduction reaction of 2 methyl propanone

$(CH_3)_2CH_2C=O \rightarrow (CH_3)_2CHCH_3OH$

2-methyl propanone

(f) Show the reduction for the conversion of 2-methyl



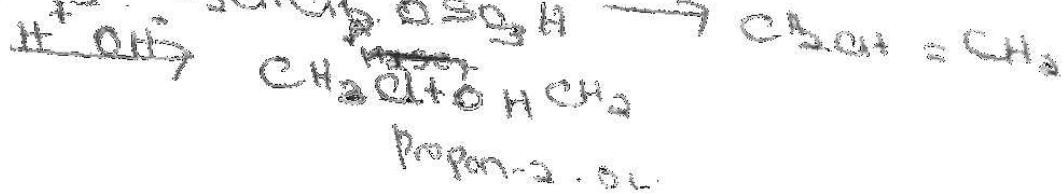
(3) the propose scheme for the conversion of propan-1-ol to propan-2-ol

Propan-1-ol – primary alcohol

Propan-2-ol – secondary alcohol

$CH_3CH_2CH_2OH + H_2SO_4 \longrightarrow CH_3CH_2CH_2OHSO_4H$

it then heated in the presence of concentrated H_2SO_4 to dehydrate form propene.



Propan-2-ol