Class – U.G. Semester - IV

Subject - chemistry (MJC)

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Topic – Glycerol

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# Trihydric alcohol (Triol)

## Glycerol

Glycerol also known as glycerine is a trihydric alcohol. It may be considered as derivative of propane, obtained by replacement of three H-atoms from different carbon atoms by three -OH gr.

$$\begin{array}{l} CH_2-OH \\ | \\ CH-OH \\ | \\ CH_2-OH \end{array}$$

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

Glycerol is occur in almost all natural animal fats and vegetables oils as the glyceryl ester of higher organic acids.

**Manufacture :-** Glycerol can be prepared industrially by the following methods :—

**(1) By the hydrolysis of oils and Fats :-**

Natural oils and fats are triesters of glycerol and long chain carboxylic acids (ester of higher organic acids) on hydrolysis with alkali, the fats and oils produce glycerol and the salt of the long chain acids which are called Soaps. The hydrolysis of fats and oils is carried originally for Soap manufacture and glycerol is obtained as a by-product

$$\begin{array}{l} CH_2OOCR \\ | \\ CHOOCR \\ | \\ CH_2OOCR \\ \text{oil or Fat} \end{array} + 3NaOH \longrightarrow \begin{array}{l} CH_2OH \\ | \\ CHOH \\ | \\ CH_2OH \\ \text{Glycerol} \end{array} + \underset{\text{Soap}}{3RCOONa}$$

**(2) From Propene :-** Today much of glycerol is manufactured from propene obtained by the catalytic cracking of petroleum. The reaction involved in following steps :-

a. Propene is treated with $Cl_2$ at 600°C to form allyl chloride.

$$CH_3-CH=CH_2 + Cl_2 \xrightarrow{600^\circ C} ClCH_2-CH=CH_2$$

Propene — Allyl chloride

b. Allyl chloride is treated with dil. NaOH to give allyl alcohol.

$$ClCH_2-CH=CH_2 + NaOH \longrightarrow HOCH_2-CH=CH_2$$

Allyl chloride — Allyl alcohol

c. Allyl alcohol on treatment with dilute hypochlorous acid to give a chlorohydrin

$$HOCH_2-CH=CH_2 + HOCl \longrightarrow HOCH_2-\underset{\underset{OH}{|}}{CH}-\underset{\underset{Cl}{|}}{CH_2}$$

Allyl alcohol — Glycerol α-chlorohydrine

d. Now, the chlorohydrine is treated with dil. NaOH to give glycerol.

$$HOCH-\underset{\underset{OH}{|}}{CH}-\underset{\underset{Cl}{|}}{CH_2} + NaOH \longrightarrow HOCH_2-\underset{\underset{OH}{|}}{CH}-\underset{\underset{OH}{|}}{CH_2}$$

Glycerol