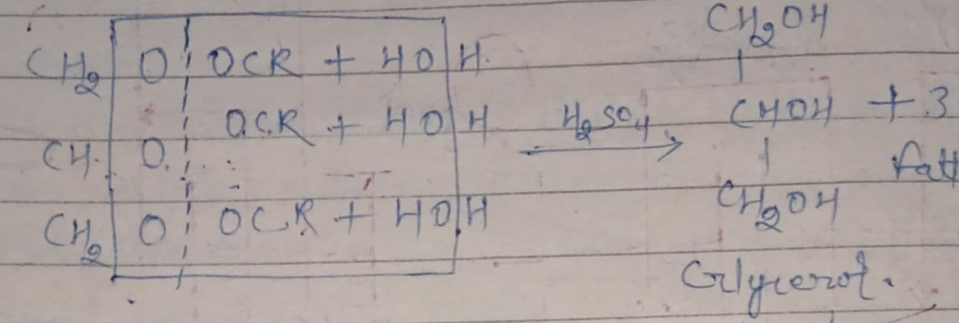
class - B.Sc. Part I (subsidiary)
subject - chemistry
Paper - gr. e (subsidiary)
Topic - Glycerol Continue
Name - Dr. Rashmi sinha
Dept. of chemistry
H. D. Jain college, Ara

Spentlye

(b) Glycerol from Candle :→

Stearic acid is used in manufacture of Candle. This acid is obtained by treating oils or fats with dillute H_2SO_4 at super heated steam and reduced pressure.

Solid stearic acid is aperted by filtration and remaining filtrate solution is known as sweet water. (Glycerol)



Glycerol is found in sweet water.

Recovery of Glycerol from sweet water

In sweet water acid is present which is nutralised by Na_2CO_3. Now solution is distilled at reduced pressure and dillute solution of glycerol is obtained. It is Concentrated by over mentioned method.

(ii) By the fermentation of Sugar :-

Glycerol is also obtained by fermentation of sugar in presence of sodium sulphite.

$$\underset{\text{Glycose}}{C_6H_{12}O_6} \xrightarrow{Na_2SO_3} \underset{\text{Glycerol}}{C_3H_5(OH)_3} + \underset{\text{acetaldehyde}}{CH_3CHO} + CO_2$$

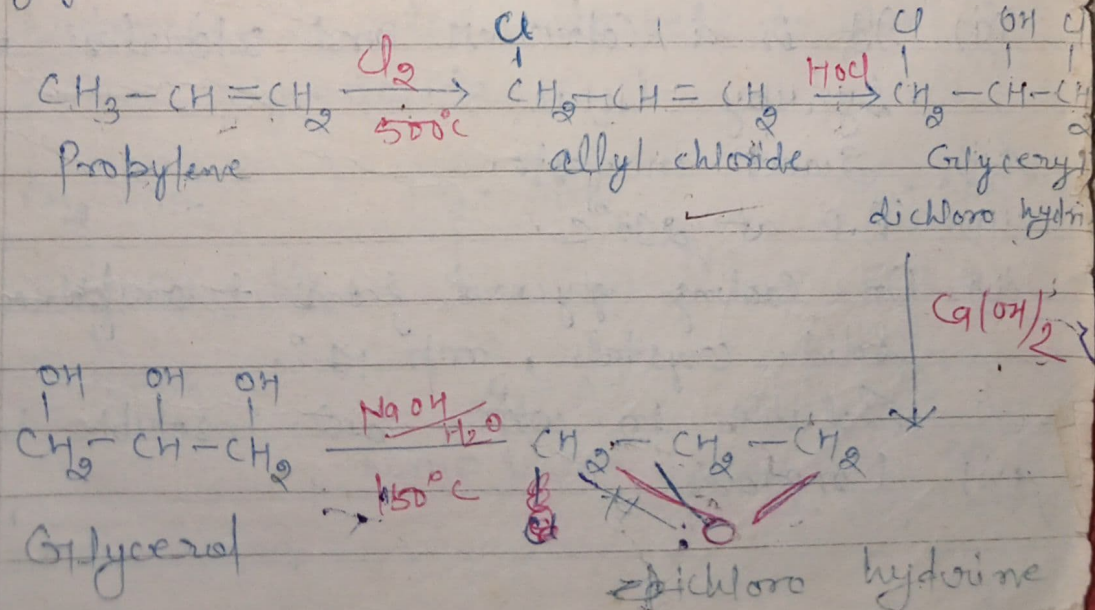
Sodium sulphite upon hydrolysis yields an alkaline medium

which favours the above - course of fermentation. The yield of glycerol is high as 20-25 percent.

(iii) **Synthetic Methods** :→ It is a modern process which is used in USA. There over half the annual production of glycerol is now made by synthetic methods.

In the following two - methods propylene obtained from petrolium is starting meterial.

(a) **From allyle chloride** :→ Propylene is chlorinated at 500°C to give allyl chloride which upon treatment with hypochlorous acids gives glyceryl dichloro - hydrin. The dichlorohydrine when reacted with formed epichlorohydrine which when hydrolysed with sodium hydroxide yields glycerol.



(b) From Acrolein :→ Propylene is oxidised with oxygen in presence of CuO catalyst at 350°C to produce acrolein. This is then reduced to allyl alcohol by iso-propyl alcohol in presence of MgO + ZnO catalyst at 400°C. The allyl alcohol upon addition by hydrogen peroxide in presence of tungsten oxide (WO_3) as catalyst yields glycerol.

$$CH_2=CH-CH_3 \xrightarrow[CuO,\ 350^\circ C]{O_2} \underset{\text{Acrolein}}{CH_2=CH-CHO} \xrightarrow[MgO+ZnO,\ 400^\circ C]{(CH_3)_2CHOH} CH_2=CH-CH_2OH$$

allyl alcohol

$$\xrightarrow[H_2O_2]{WO_3} \underset{\text{Glycerol}}{\begin{array}{l} CH_2-OH \\ | \\ CH-OH \\ | \\ CH_2-OH \end{array}}$$