class - B.Sc. Part I (Subsidiary)
Subject - chemistry
Paper - gr. c. Subsidiary
Topic - Properties of Glycerol
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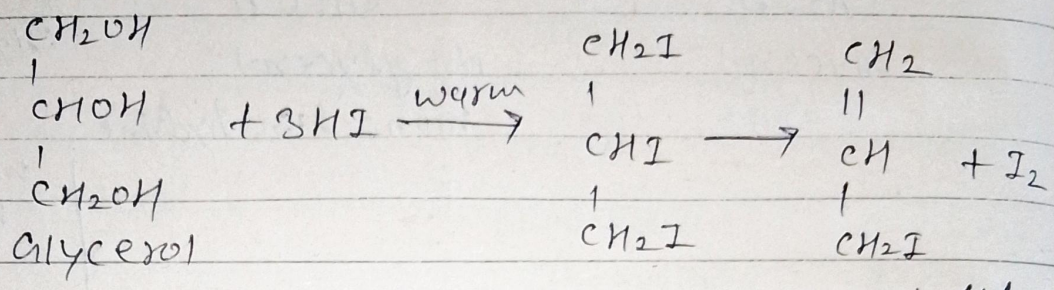
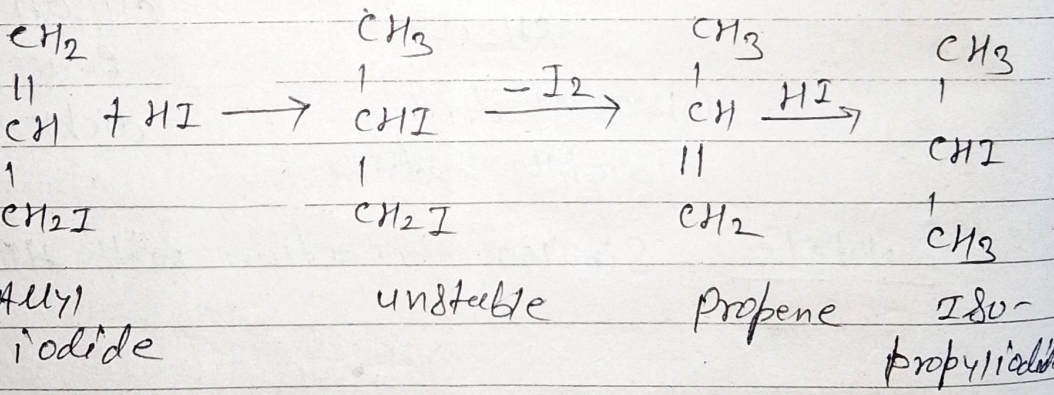
(iv) **Reaction with HI :-** Glycerol reacts with HI in following two conditions :-

a. When glycerol is warmed with a small amount of HI to give allyl iodide.

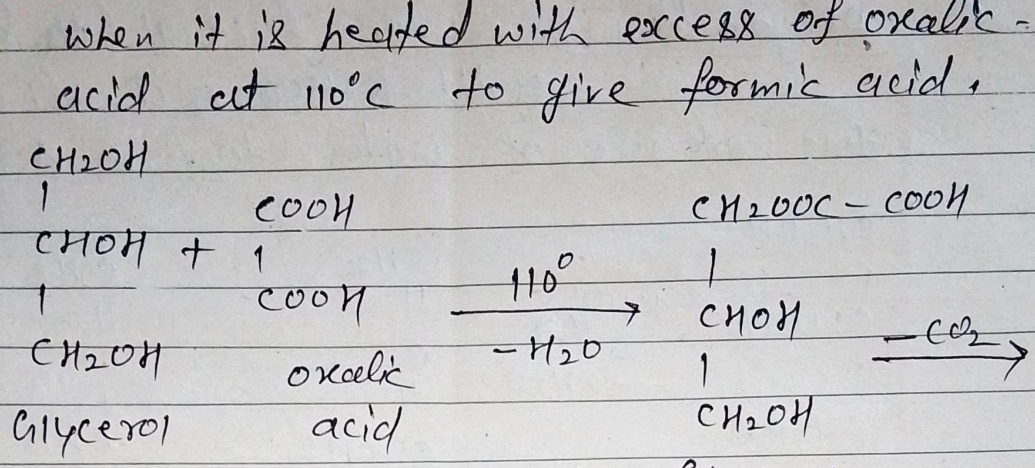


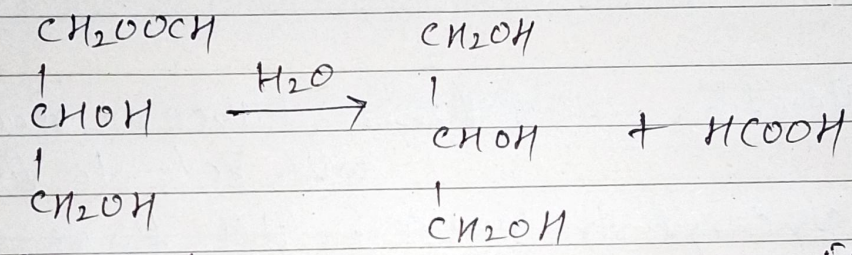
b. When it is heated with a large amount of HI, the allyl iodide first formed and is reduced to propene, which is in presence of excess of HI forming isopropyl iodide.



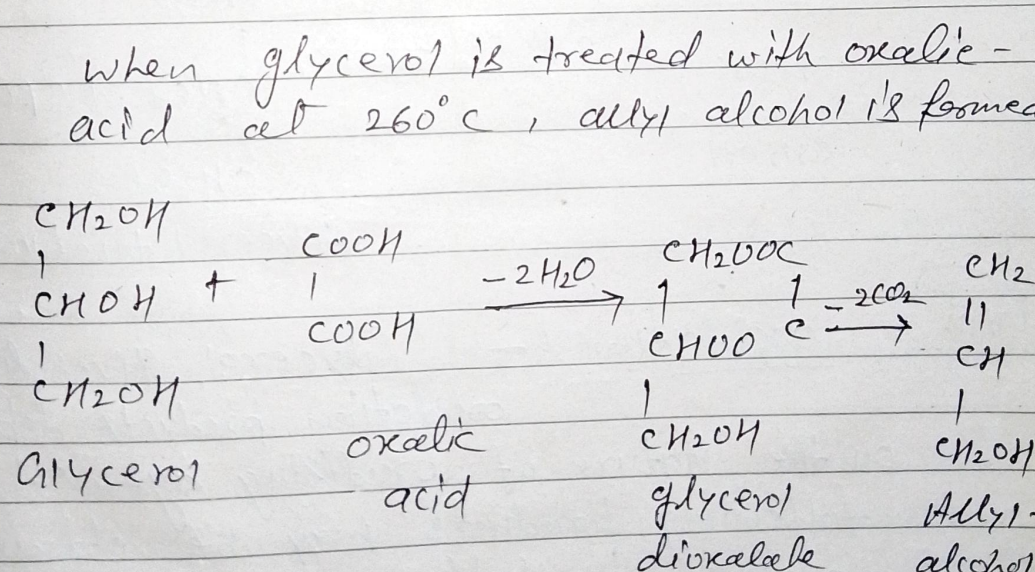
(v) **Reaction with oxalic acid :-** Glycerol reacts with oxalic acid in different conditions and give different products.

a. when it is heated with excess of oxalic-acid at 110°c to give formic acid.

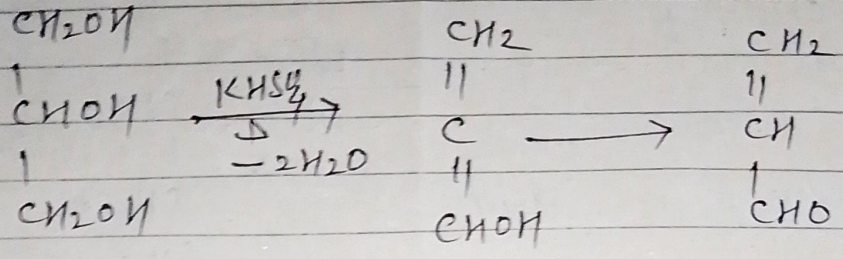




b. when glycerol is treated with oxalic-acid at 260°c, allyl alcohol is formed.

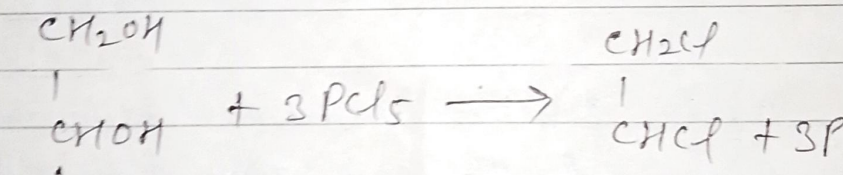


(vi) **Dehydration** :- when glycerol is heated with $KHSO_4$, it eliminates two molecule of water to form Acrolein.



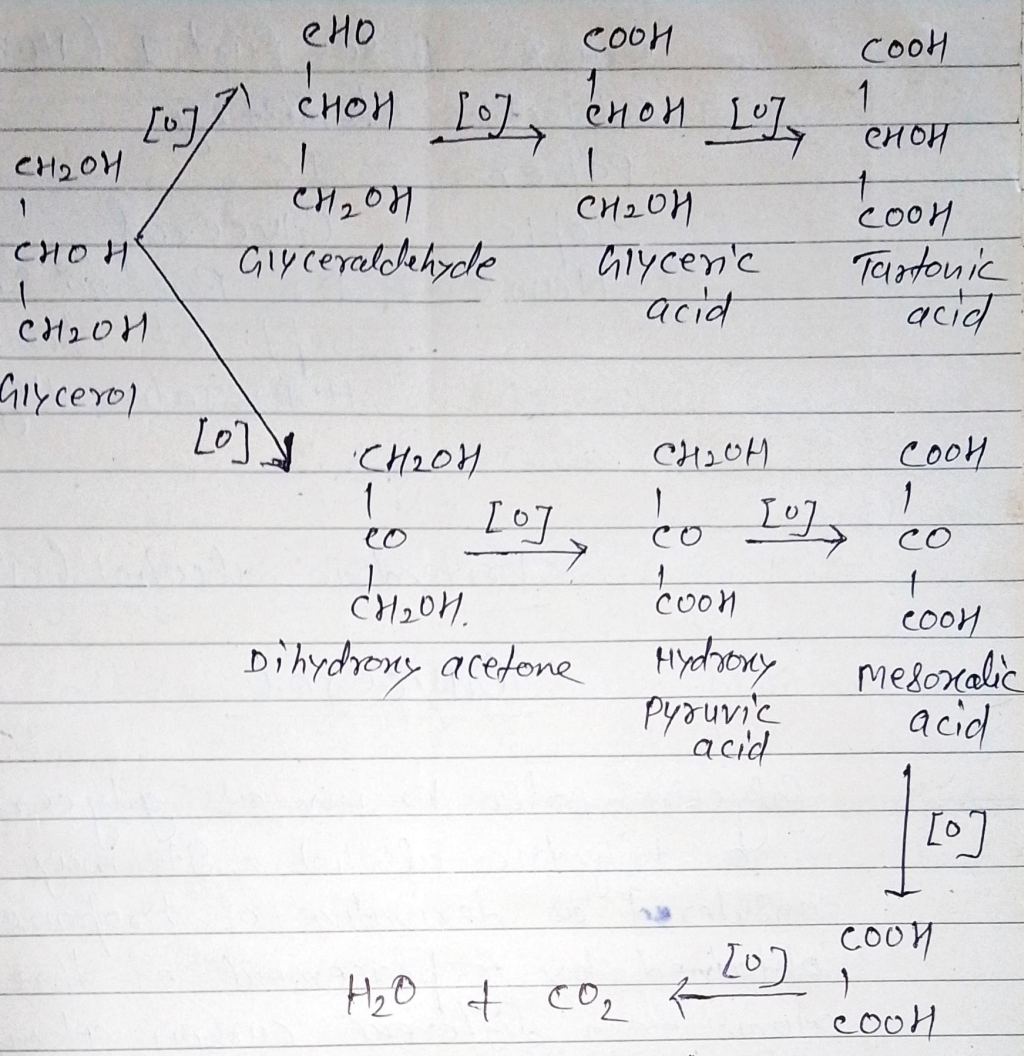
Glycerol — unstable — Acrolein

(vii) **Reaction with PCl_5** :- Glycerol reacts with PCl_5 to form glyceryl trichloride. All three -OH gr. are replaced by Cl atoms.



Glyceryl trichloride

(viii) **oxidation** :- Glycerol gives different oxidation products depending on the nature of oxidising agent. The following products may be obtained during oxidation of glycerol.



a. Dilute HNO_3 oxidises glycerol into glyceric-acid and tartonic acid.

b. oxidation with conc. HNO_3 gives mainly glyceric acid.

c. oxidation with $Bi(NO_3)_3$ gives mainly mesoxalic acid.

d. oxidation with Br_2 water or NaOBr or Fenton's reagent ($FeSO_4 + H_2O_2$) gives a mixture of glyceraldehyde and dihydroxy-acetone.

e. with solid $KMnO_4$ glycerol oxidised to oxalic-acid and CO_2. since this reaction is -

violent and explosive hence used in time-bombs.

f. oxidation with periodic acid (HIO_4) glycerol gives formaldehyde and formic acid.

$$\begin{array}{l} CH_2OH \\ | \\ CHOH \\ | \\ CH_2OH \end{array} + 2HIO_4 \xrightarrow{[O]} \underset{\text{Formaldehyde}}{2HCHO} + \underset{\text{Formic acid}}{HCOOH} + 2HI + H_2O$$