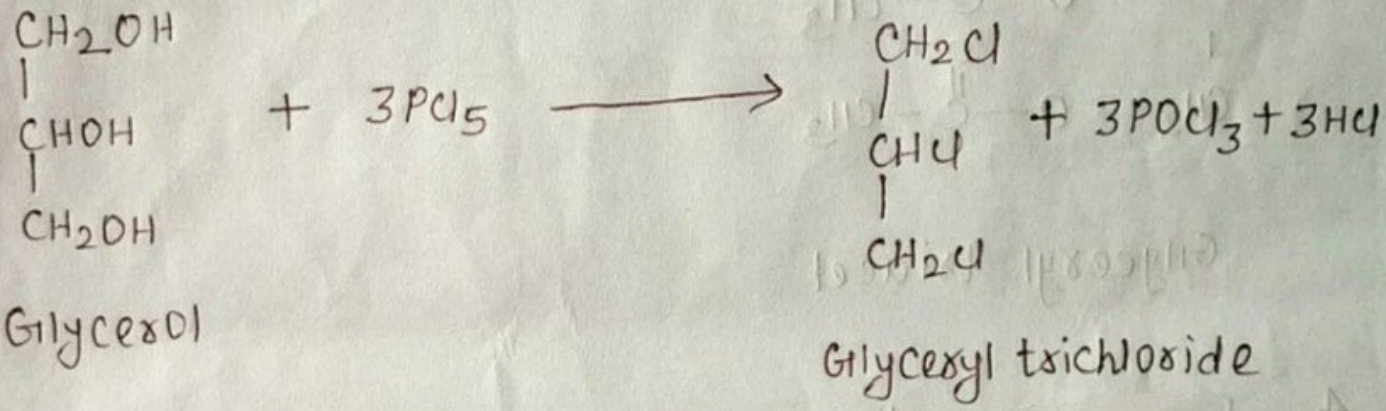
POLYHYDROXY COMPOUNDS

Deg-I Hons. Lecture-11 25/01/2022

Paper-II Group-B Ch-3

Chemical Properties Of Glycerol contd..

2. Reaction with Pcl5



Glycerol

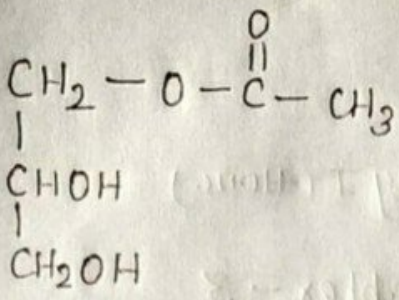
Glyceryl trichloride

3. Reaction with Carboxylic acid

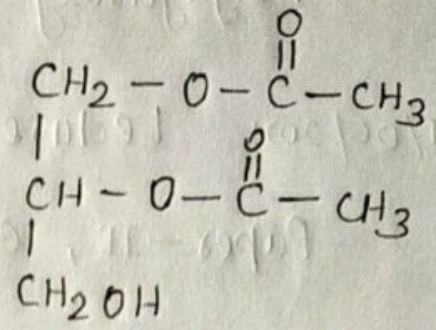
Glycerol reacts with monocarboxylic acids to form mono-, di- and triesters depending on the amount of acid used.

For example, glycerol reacts with a mixture of acetic acid or acetic anhydride to give the following three esters.

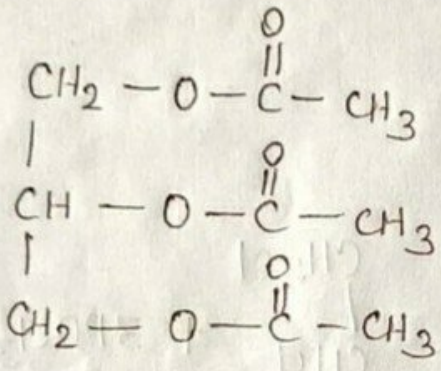
1. Glyceryl monoacetate
2. Glyceryl diacetate
3. Glyceryl triacetate



Glyceryl monoacetate



Glyceryl diacetate

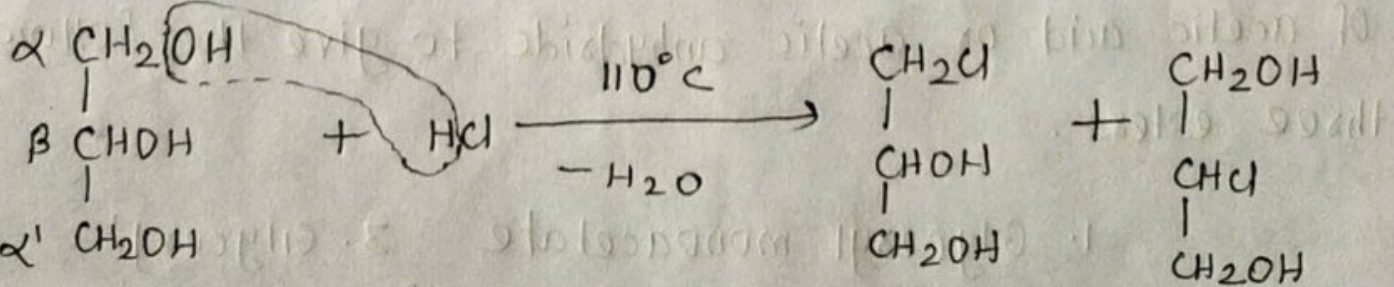


Glyceryl triacet

4. Reaction with Hcl

When HCl is passed into glycerol at 110°C, both α- and β- glycerol monochlorohydrin are formed.

If the reaction is carried for a long time, glycerol α, α'- dichlorohydrin and glycerol α, β- dichlorohydrin are formed.

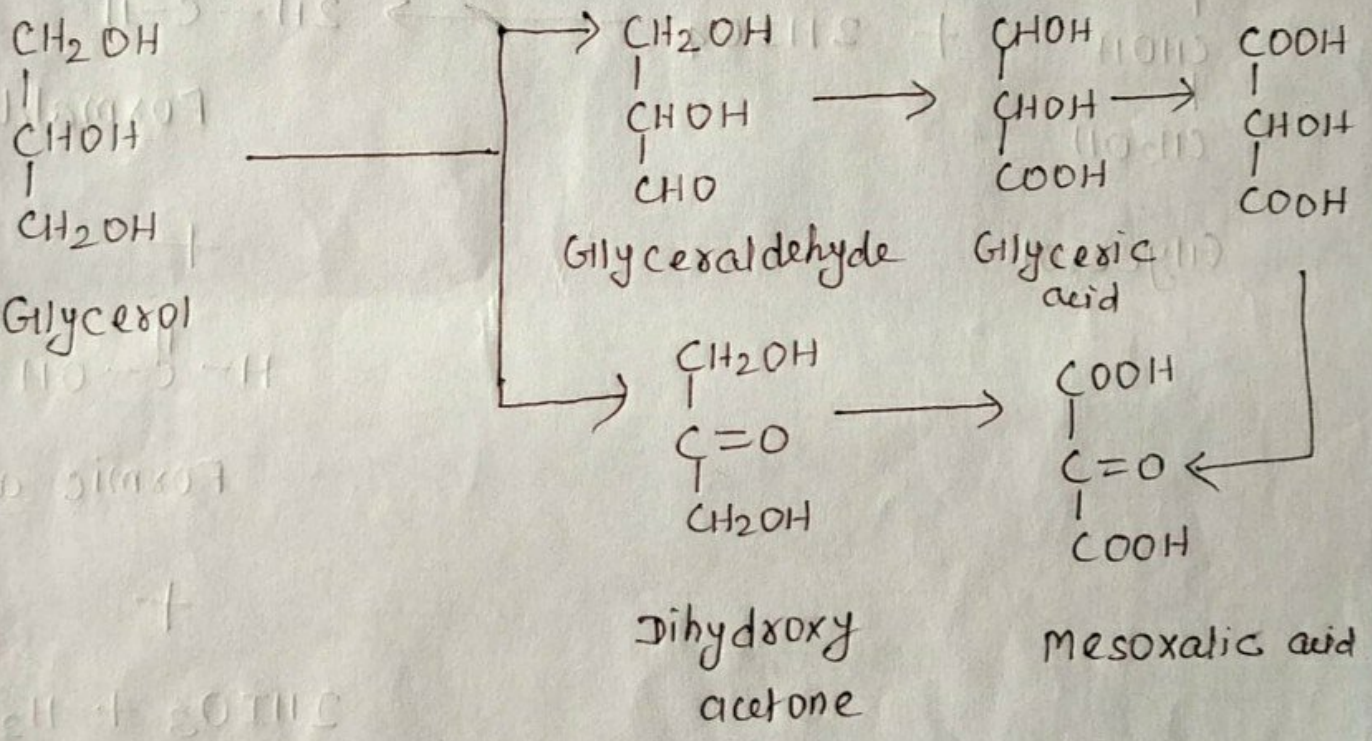


5. Oxidation

Two 1° alcohol group in glycerol are oxidised to aldehyde then carboxylic group.

* The secondary alcohol group can be oxidised to carbonyl group.

Thus, the glycerol can give rise to variety of oxidation product, depending on the nature of the oxidising agent.



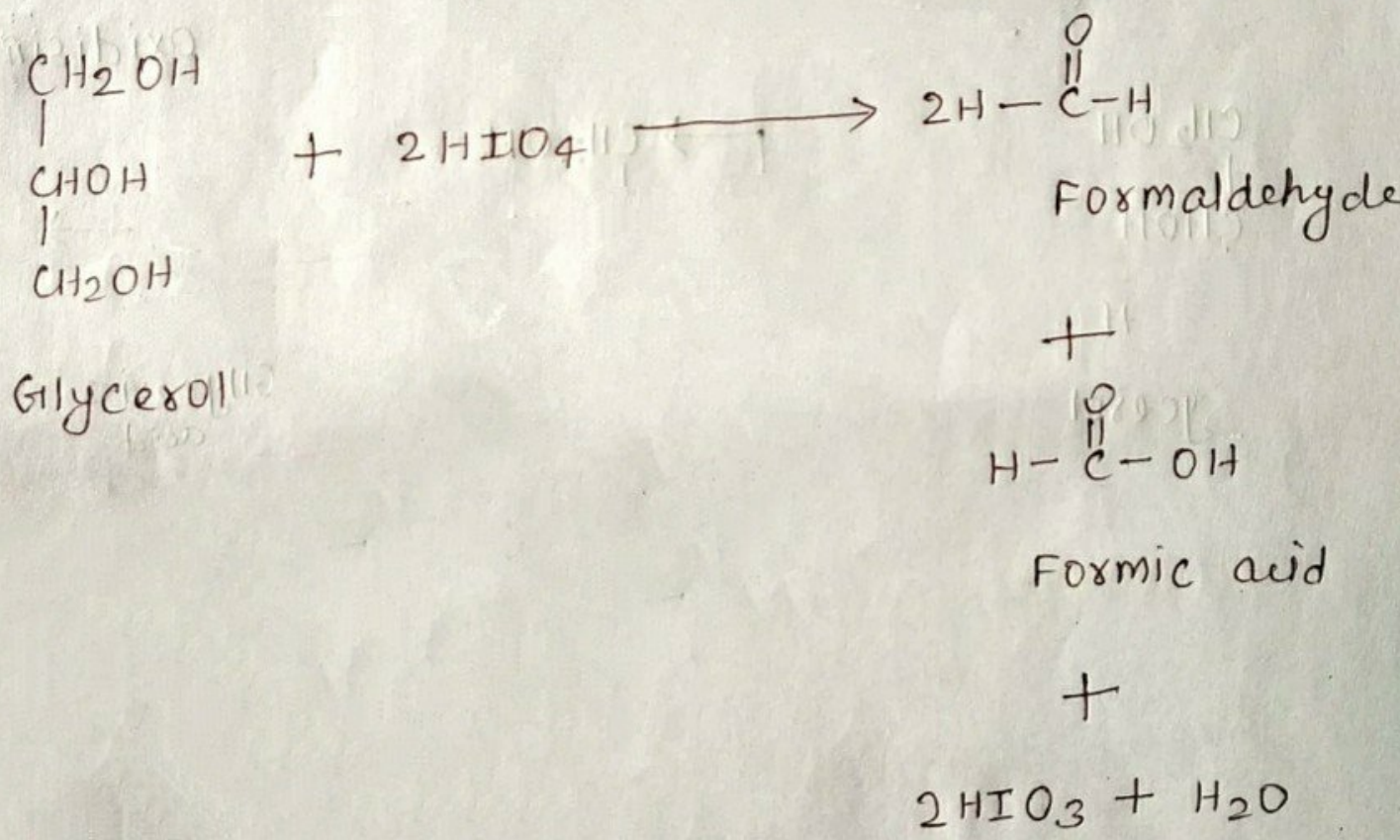
a) Oxidation with dilute HNO_3 gives glyceric acid and tartonic acid.

b) Oxidation with Conc. HNO_3 gives mainly glyceric acid.

c) Oxidation with bismuth nitrate gives mainly mesoxalic acid.

d) Oxidation with Bromine-water, sodium hypobromite or Fenton's reagent ($FeSO_4 + H_2O_2$) gives a mixture of glyceraldehyde and dihydroxy acetone.

e) Oxidation with Periodic acid gives formaldehyde and formic acid.



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