

POLYHYDROXY COMPOUNDS ^{1.}

18/06/2021 Lecture-9 Deg-I (Hons.)

Paper-II Group-B Chapter-3

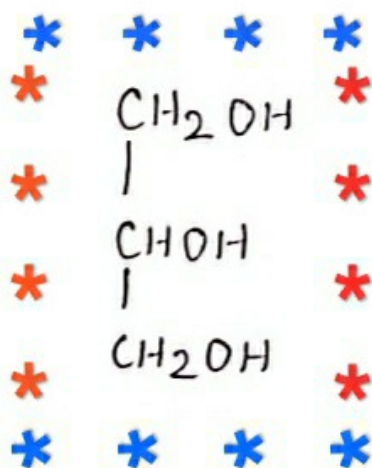
Trihydric Alcohol

* Alcohols containing three $-OH$ groups are called Trihydric Alcohols or Triols.

* The introduction of the third $-OH$ group in a diol molecule raises the boiling point by about $100^{\circ}C$, increasing the viscosity.

* An increase in the no. of $-OH$ groups also enhances the H-bonding ability and association thereby raising the boiling point.

GLYCEROL



Propan-1,2,3-triol (or 1,2,3-propanetriol)

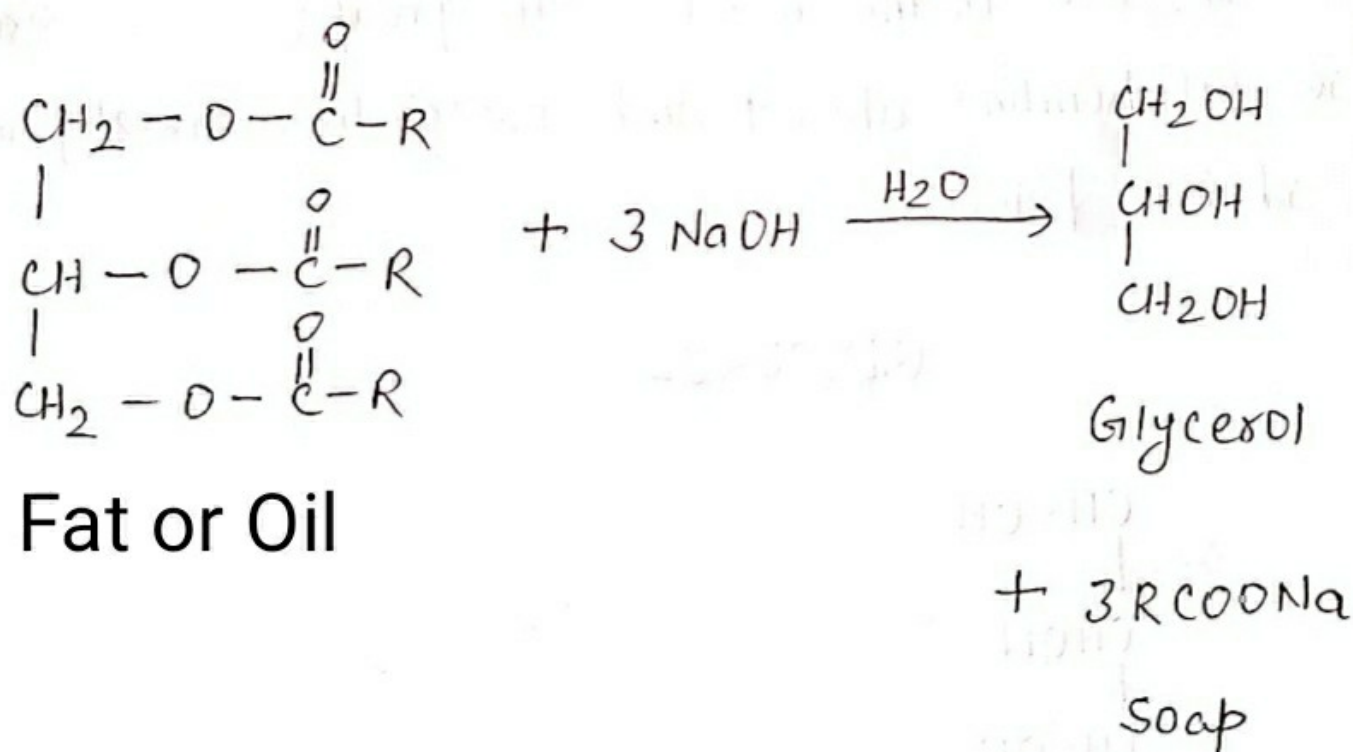
Manufacture

2.

Glycerol can be prepared industrially by the following methods.

1. From Fats and Oils :-

Natural oils and fats are triesters of glycerol and long chain carboxylic acid (mainly palmitic, stearic, and oleic acid). On hydrolysis with alkali, the fats and oils produce glycerol and the salt of the long chain acids which are called soaps.



('R' must have 9 to 17 Carbon)

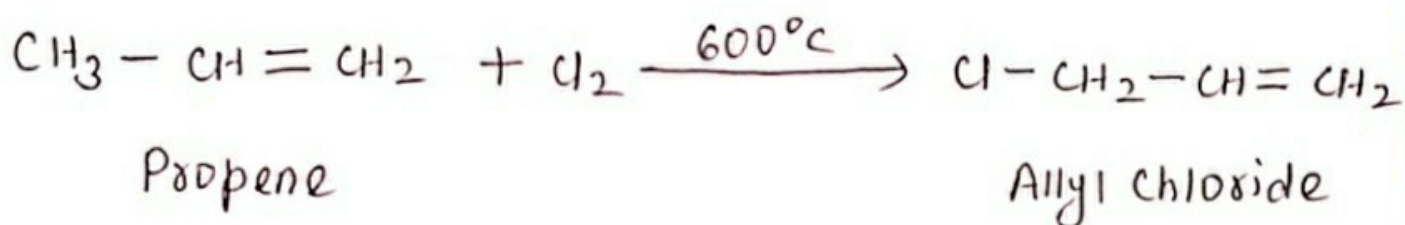
2. From Propene

3.

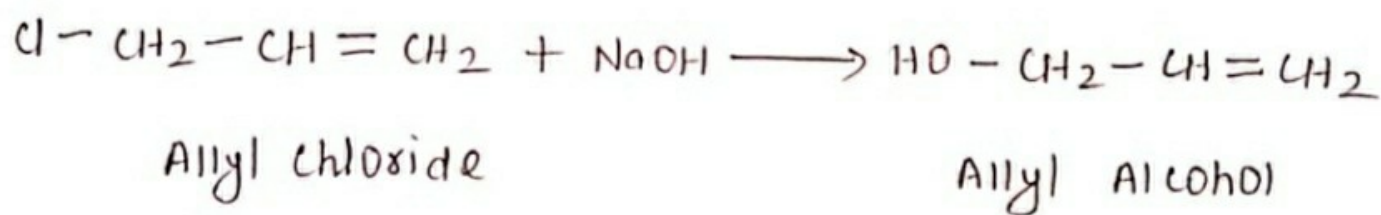
* Glycerol is manufactured from propene obtained by the catalytic cracking of petroleum.

* Following four steps are involved.

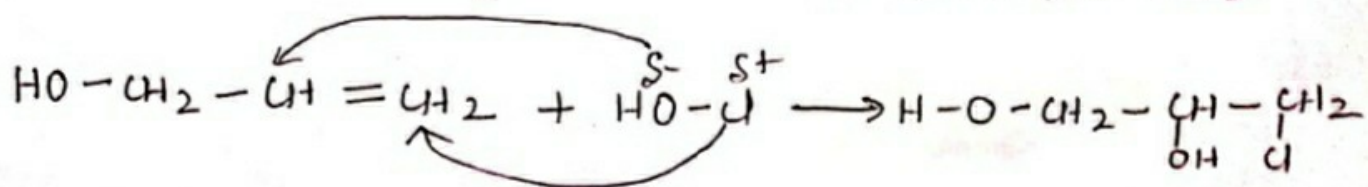
Step 1 Propene is treated with Cl_2 at 600°C to give allyl chloride.



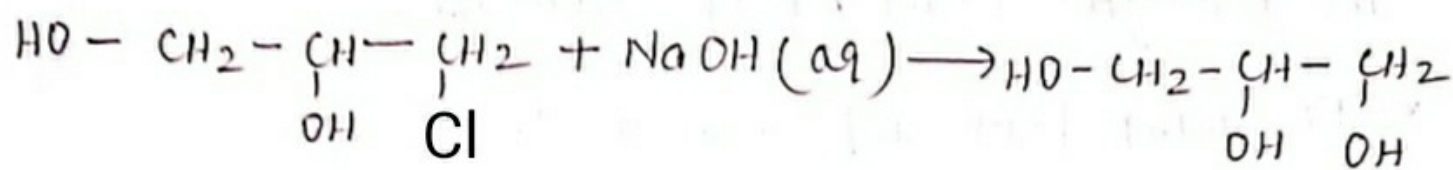
Step 2 Allyl chloride is treated with dil NaOH to give allyl alcohol.



Step 3 Allyl alcohol is treated with dilute hypochlorous acid to give a chlorohydrin. The addition of HOCl to the carbon-carbon double bond takes place according to the Markownikov rule.



Step 4 The chlorohydrin is treated with aq. NaOH to yield glycerol. 4.



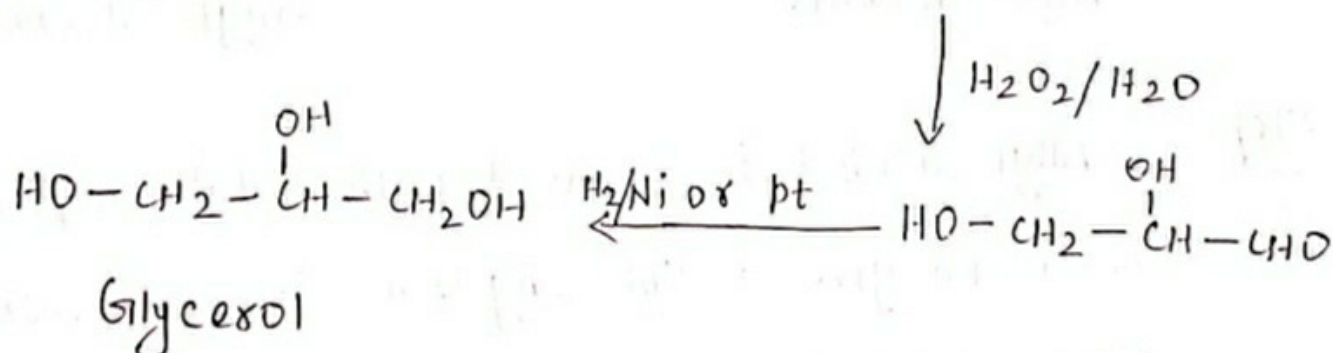
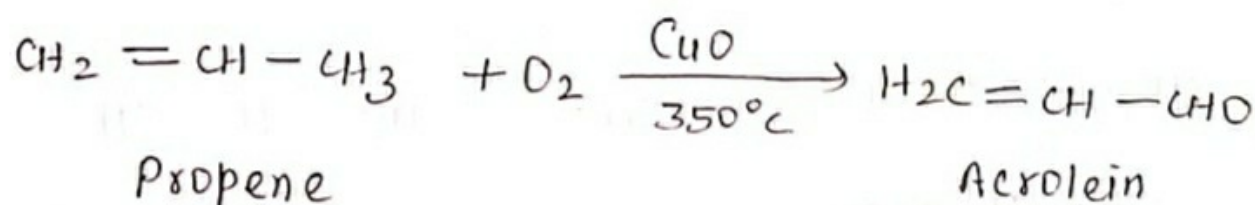
Glycerol- α -chlorohydrin

Glycerol

Alternative Method

Propene may be oxidised with oxygen (air) in the presence of CuO at 350°C to give acrolein.

Acrolein is then treated with hydrogen peroxide followed by reduction to produce glycerol.



* In a country like India where petroleum is not found in abundance, propene required for the above synthesis may also be obtained from acetone of the wood distillation industry. //

Manufacture Completed