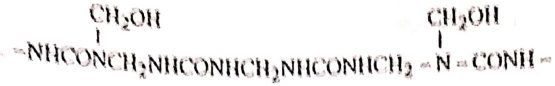
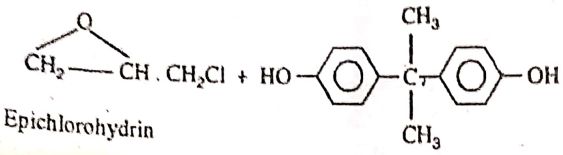
Further reaction produces linear polymers—



When methylol group of one chain reacts with NH–group of an other chain, a linear-branched polymer is produced. Line-branched thermoplastic, after mixing with the desired fillers e.g. cellulose and dyes and heating it in presence of an acid catalyst yields a hard, insoluble & infusible material (resins).

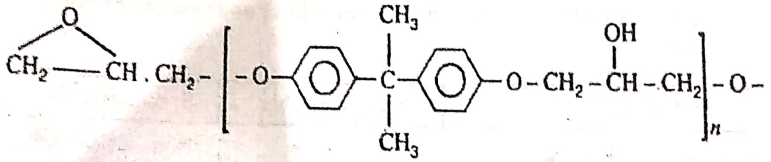
Urea–formaldehyde resins are clear and colourless and hence they can be given any desired colours by adding proper pigments and fillers. Such resins are used in making buttons, bottle caps, surgical items etc. They are also used for enamel and surface coatings. They are used as adhesives in plywood industries.

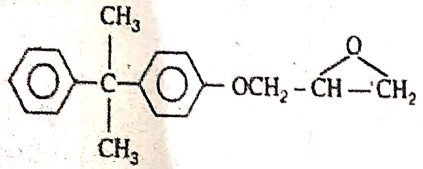
(c) Epoxy resins are polyethers obtained by condensing epichlorohydrin with bisphenol A—



Epichlorohydrin

Bisphenol A





Epichlorohydrin is used in excess to ensure that chains are terminated by epoxide group which will help in cross-linking the polymer during thermosetting of the resin.

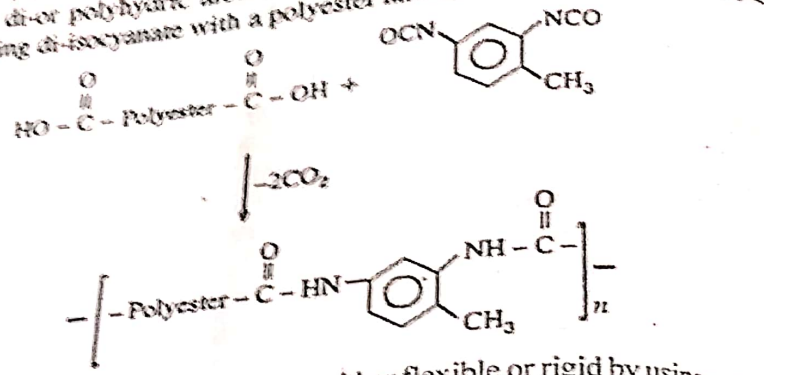
These are used :

(i) In surface coatings such as floor coatings, tank linings etc.

(ii) In the manufacture of reinforced plastics and

(iii) As an adhesive.

(d) Polyurethanes are obtained by reacting a di-or poly isocyan with di-or polyhydric alcohol. Important polyurethanes are prepared reacting di-isocyanate with a polyester having hydroxy groups at ends—



One can produce urethane foams, either flexible or rigid by using polyes having hydroxyl end groups.

They are mainly used to prepare elastomeres and in coating where needs flexibility and resistant to abrasion, resistant to greases & oils and resis to impacts. They are used for coating dance & gym floors. They are also use a leather substitute (corfam).

Q.38. Differentiate between natural rubber and synthetic rubber.

Ans. :

Particulars	Natural rubber	Synthetic rubber
1. Inflammability	Inflammable	Non--inflammable
2. Stability at high temperatures	Unstable	Stable
3. Vulcanisation	Possible	It is itself a thermo-plastic so no need to vulcanise
4. Action of oxygen & ozone	Get destroyed	No action
5. Solubility in petrol, grease and solvents	Destroyed when dissolved	Insoluble