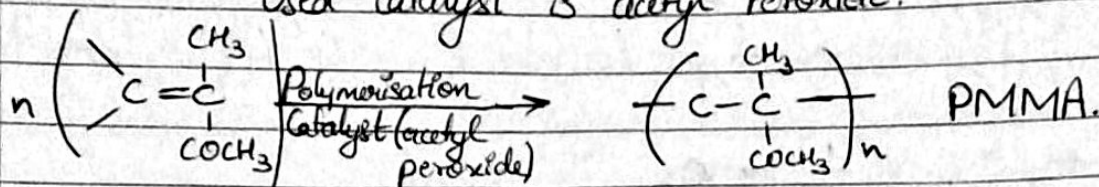


## POLYMERS ASSIGNMENT

## 1) PMMA (Polymethyl Methacrylate)

a) Preparation - PMMA is synthesised by Polymerisation reaction of methyl methacrylate using a catalyst. Most commonly used catalyst is acetyl Peroxide.

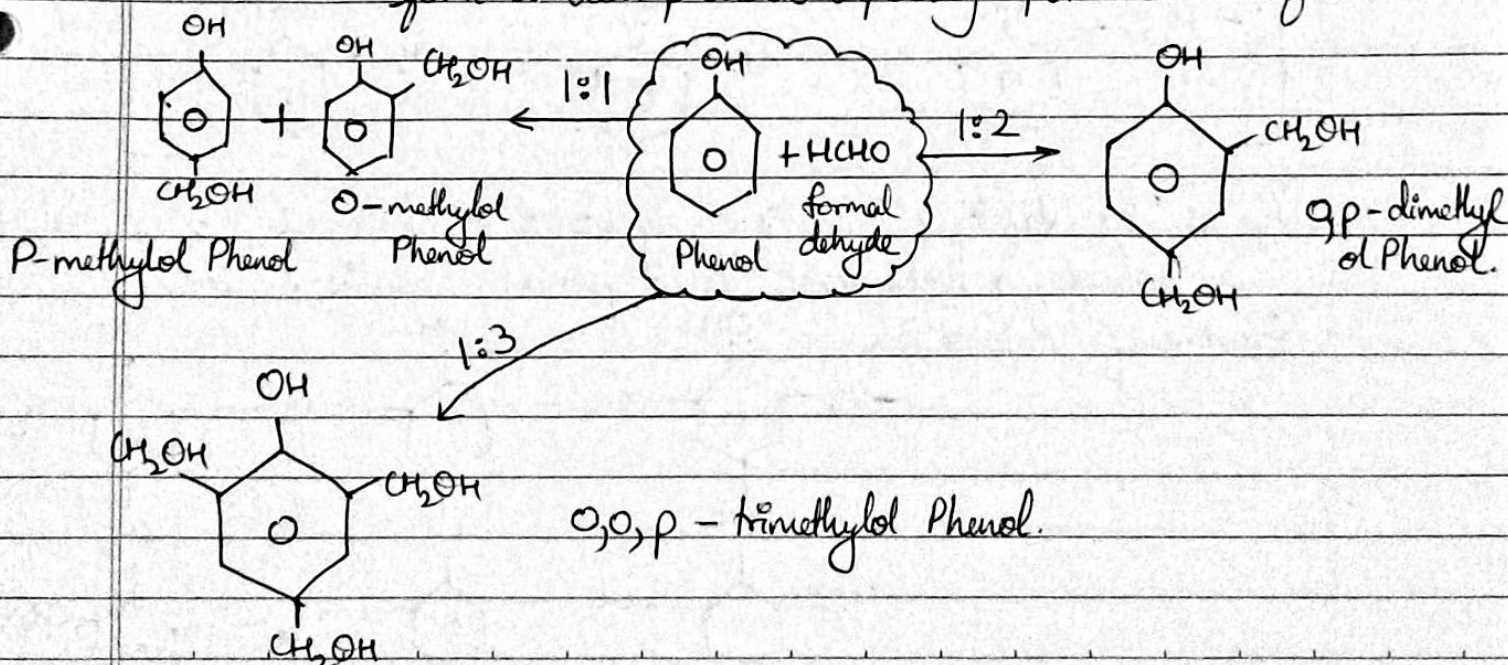


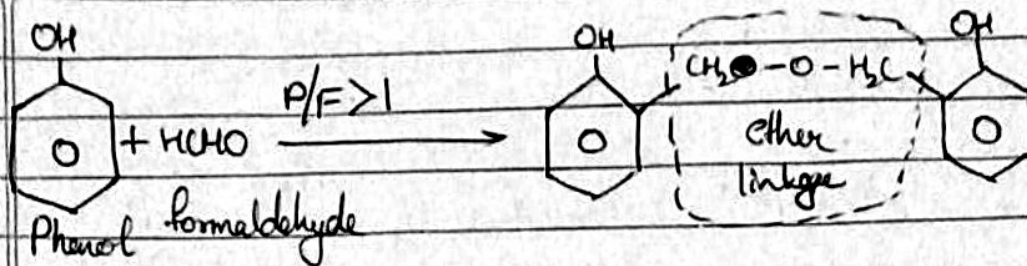
b) Properties - i) transparent and colourless plastic. ii) Easy to mold.  
iii) Refractive index is 1.59.

c) Uses - i) Used for making artificial eyes ii) screens for T.V.s.

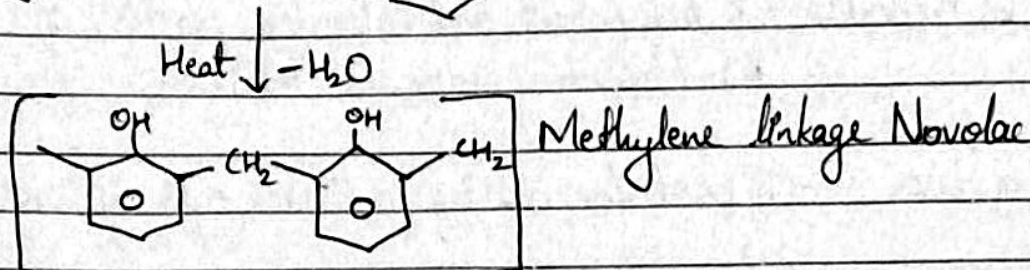
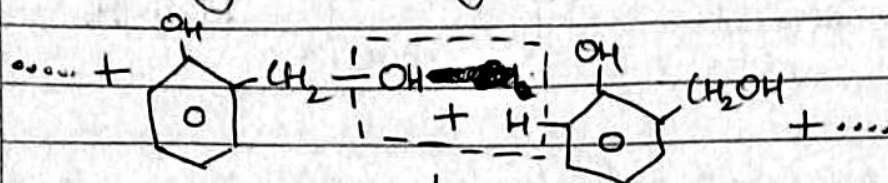
## 2) Phenol Formaldehyde (Bakelite)

a) Preparation - Step 1: Phenyl and Formaldehyde react with each other to form different products depending upon the ratio of reactant.

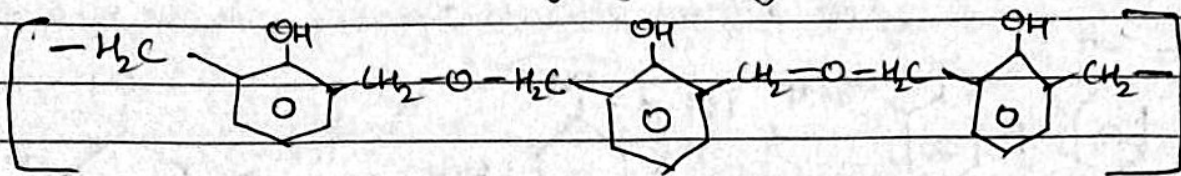




Step 2: Mono-methylol Phenol (i.e. ortho or para) can undergo Polymerisation to give low molecular weight Polymer known as Novolac.

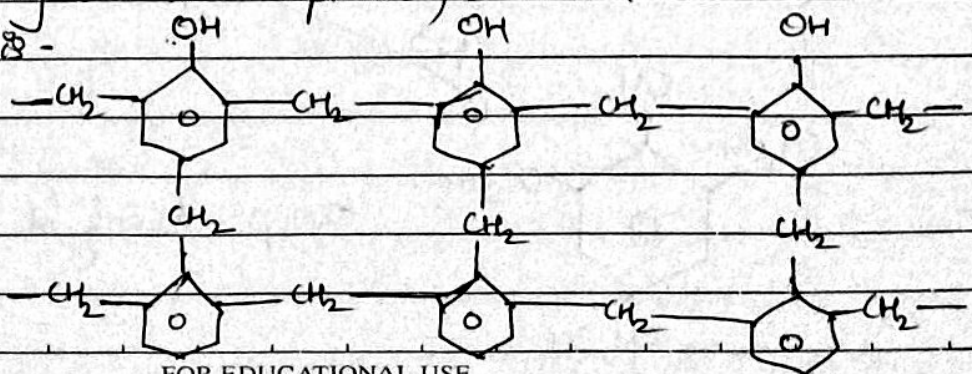


The linear Polymer obtained as above is thermoplastic and dissolves in few aromatic substances. Hence, it is generally converted to a thermoset-bakelite. The product with ether linkage give Polymer called Resole as,



Step 3: The Novolac obtained is simply heated at above  $150^\circ\text{C}$  using catalyst whereby a highly cross linked product, Bakelite is obtained.

Structure of Bakelite is -



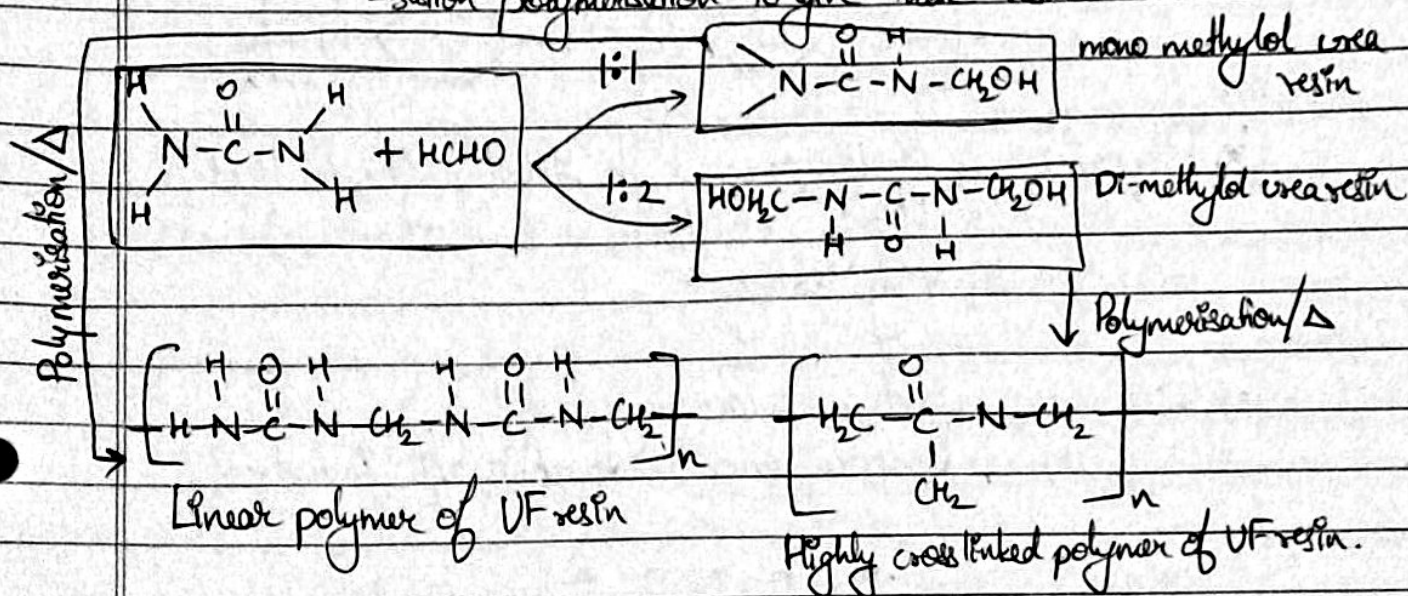


- b) Properties :
- Rigid, hard and infusible solid.
  - scratch resistant, water resistant and insoluble solids.
  - Posses ~~ex~~ excellent electrical insulating character.

- c) Uses :
- Impregnating fabrics, woods and paper
  - binders for grinding wheels.

### 3) Urea Formaldehyde (Urea-methanal)

- a) Preparation :
- also called as amino resins or amino plastics.
  - amino organic compounds and formaldehyde combine by condensation polymerisation to give these resins.

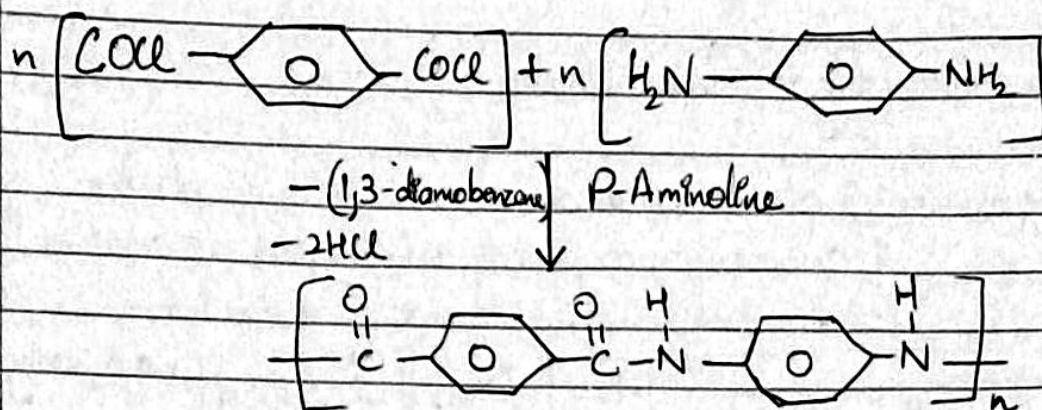


- b) Properties :
- posses good electrical insulating character.
  - Resistant to water?
  - Resistant to Heat/Flame.

- c) Uses :
- Bonding Plywood.
  - Electrical Insulation.

4) Kevlar

- a) Preparation:
- i) Kevlar is aromatic. Polyamide structure. It is similar to Nylon, but contains Benzene rings instead of aliphatic Hydro-Carbon. Benzene is linked to amide groups - CONH.
  - ii) It is Prepared by Polycondensation between aromatic dichloride and aromatic diamine.



- b) Properties:
- i) Kevlar possesses high stability against Heat.
  - ii) Highly flexible
  - iii) Very strong.

- c) Uses:
- i) Helmet manufacturing.
  - ii) Aerospace and  ~~Aero~~ Aircraft industries.

\* \* \* \* \*