

## Paper – III CHN-603(P) Physical Chemistry

### Unit :- 1

- **Introduction to polymer** : History, Classification on the basis of use and structure (chemical structure and geometrical structure),
- Fibers, Elastomers and Plastics,
- Degree of polymerization, Polydispersity, Average Molecular weight and molecular weight distribution, molecular Forces and chemical Bonding in polymers.

### Unit :- 2

- **Kinetics of polymerization** : Free Radical, cationic & Anionic chain polymerization,
- polycondensation (Acid catalysed & Noncatalysed)
- **Coordination polymerization** :- Ziegler – Natta Catalysts, Mechanism of Ziegler – Natta Polymerization (mono-metallic & Bio-metallic),
- Early kinetics models for Ziegler-Natta catalysts, Active center.

### Unit :- 3

- **Glass Transition Temperature** : Definition of Glass Transition Temp. (state of Aggregate & state of Phase),
- Secondary glass transition temp., Transition and Associated properties. Factors effecting T<sub>g</sub>,
- Relation between T<sub>m</sub> & T<sub>g</sub>, The WLF equation Methods for determination of Glass Transition Temp.

### Unit :- 4

- **Polymer Degradation** : Types of degradation, Photo degradation, Mechanical degradation, Thermal degradation, oxidative degradation, Hydrolytic degradation.
- **Polymer Reaction** : Acidolysis, Aminolysis, Addition, Substitution, Crosslinking and Cyclisation Reaction.
- Crystallisability, Factors effecting the Crystallisability,