

VEER NARMADA SOUTH GUJARAT UNIVERSITY

Third Year B. Sc.

Chemistry

Polymers

(Effective from July 2002 – Revised in B O S dated 23/10/2002)

70 Marks (External)

Total 60 Hrs

30 Marks (Internal)

Time 3 Hrs.

(Uni. Exam)

UNIT – I

Basic: 10 Hrs

Importance of polymers, Basic concepts : Monomers, repeat units of polymerization, Nomenclature and classification of polymers, Isomerism in polymer chain, history of polymers, intermolecular forces in polymers.

UNIT – II

Polymerisation: 10 Hrs

Chain and step polymerization, free radical, anionic, cationic and coordination polymerization and their mechanism, polymerization in homogeneous and heterogeneous system, Thermodynamic aspects of polymerization, Copolymerisation.

UNIT – III

Industrially Polymers: 10 Hrs

Synthesis of polymers (and their monomers), polyolefins, polydienes, Vinyl polymers, Acrylic polymers, Fluoro polymers, Nylon, Polyesters, Polyurethane, Polycarbonate, Phenolic resins Silicones.

UNIT – IV

Polymer analysis and characterisation: 10 Hrs

Identification : physical testing, introduction to application of spectral and chromatographic methods molecular weight : polydispersity, number and weight average molecular weight, Significance of mol. Wt., Mo. wt. determination by end group analysis, viscometry, osmotic pressure methods.

UNIT – V

Crystalline and amorphous Polymers : 10 Hrs

Crystalline polymers, determination of degree of crystallinity, super molecular structure of polymers.

Thermal instructions in polymers, glass transition temperature and its importance.
Dilatometric method for its determination.

UNIT – VI

Polymers reactions and processing : **10 Hrs**

Dissolution of polymers chemical reactions of polymer, curing and cross linking reactions, polymer degradation, characteristic features of plastics elastomers and fibers, polymer additives, plasticizers and antioxidants. Moulding of plastic , spinning of fibers.

Reference Books:

- (1)Text Book of Polymer Science, F. W. Billmeyer Jr. Wiley.
- (2) Polymer Science, V. R. Growariker , N. V. Viswanathan and J. Sreedhar, Wiley-Estern.
- (3) Functional Monomers and Polymers, K. Takemoto, Y. Inaki and RM. Ottanbrite.
- (4) Contemporary Polymers Chemistry, H. R. Alcock and F. W. Lambe, Prentice Hall.
- (5) Physics and Chemistry of Polymers, J. M. G. Cowie, Blacki Academic and Professional.