AU – 2553

Third Semester B. Tech. (Polymer Technology) Examination

CHEMISTRY AND TECHNOLOGY OF POLYMERS

Paper – 3 PP 01

(USC – 11095)

P. Pages : 3

Time : Three Hours] [Max. Marks : 80

Note : (1) Answer **Three** questions from Section A and **Three** questions from Section B.
(2) Due credit will be given to neatness and adequate dimensions.
(3) Assume suitable data wherever necessary.
(4) Diagrams and Chemical equations should be given wherever necessary.
(5) Illustrate your answer wherever necessary with the help of neat sketches.
(6) Discuss the reaction, mechanism wherever necessary.
(7) Use of cell phone is strictly prohibited in exam.
(8) Use pen of Blue/Black ink/refill only for writing the answer book.

SECTION A

1. (a) Discuss the IUPAC and Non-IUPAC nomenclature system for polymers. 7

   (b) Classify the polymers. Also give the significance and importance of polymeric material in our day to day life. 6

OR

2. (a) Differentiate between thermoplastics and thermosets. 6

   (b) Explain the linear, branch, cross-linked, block and graft co-polymer with the help of suitable example. 7

3. (a) Discuss the manufacturing of styrene with the help of process flow diagram. 7

   (b) What are the important Physical and chemical properties of monomer phenol ? 7

OR

4. Explain in detail the manufacturing of monomer propylene using process flow diagram, process description and major engineering problems in manufacturing. 14

5. Explain in detail the theory, principle, mechanism involved in NMR for analysis of polymers. 13

OR

6. Explain the working mechanism of following methods :

   (i) HPLC

   (ii) X-Ray Diffraction. 13

SECTION B

7. (a) Calculate the average functionality :

   (i) For the reaction between 2 moles of hexamethylene diamine and 1 mole adipic acid.

   (ii) For the reaction between equal moles of hexamethylene diamine and adipic acid. 7

   (b) Discuss the distinctive features of polycondensation polymerization. 7

OR

8. (a) Derive the Carother's equation. Give the applications and significance of Carother's equation. 7

   (b) Discuss in detail the concept and importance of functionality for polymerization reaction. 7

9. Explain in detail the following methods of polymer molecular weight determination by :—

   (i) Ultra centrifugation

   (ii) Cryoscopic method. 13

OR

10. (a) How will you determine the molecular weight of polymer by end group analysis method ? 6

    (b) Explain the concept of number average and weight average molecular weight of polymer with the help of suitable example. 7

11. (a) Explain the mechanism of mechanical degradation occurring in polymers. 7

    (b) What do you mean by polymer degradation ? Explain in detail the types of degradation with the help of suitable example. 6

OR

12. Explain the followings with reference to degradation of polymers :

    (i) Thermal degradation

    (ii) Chemical degradation

    (iii) Photo degradation. 13