B.Tech. Third Semester (Polymer (Plastic) Tech.) (CGS)

11095 : Chemistry and Technology of Polymers : 3 PP 01

P. Pages : 2 | AW - 2999

Time : Three Hours | Max. Marks : 80

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Notes :
1. All question carry marks as indicated.
2. Answer **three** question from Section A and **three** question from Section B.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.
5. Diagrams and chemical equations should be given wherever necessary.
6. Illustrate your answer necessary with the help of neat sketches.
7. Discuss the reaction, mechanism wherever necessary.
8. Use of cell phone is not allowed in exam.
9. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION – A

1. a) Define polymer. Explain linear, branched and crosslinked polymer in detail. **8**

b) Give the structural formula and IUPAC names of the following: - **6**

i) Polystyrene.

ii) Polyethylene.

iii) Polyethylene terephthalate.

OR

2. a) Differentiate between the followings:- **8**
i) Thermoplastics and Thermosets.
ii) Block and Graft polymers.

b) Explain the IUPAC nomenclature systems for single strand polymers. **6**

3. a) Explain the manufacturing process for styrene monomer with flowchart. **7**

b) Explain the manufacturing process for butadiene with flow chart. **6**

OR

4. a) Explain the manufacturing process for methyl methacrylate (MMA) with flow chart. **7**

b) Discuss the manufacturing process of phenol with flow chart in detail. **6**

5. a) Explain in detail the application of NMR and IR. **6**

b) Explain in detail X-ray diffraction method for analysis of monomer. **7**

OR

6. Explain the following methods for analysis of monomer of polymer. 13
   i) HPLC
   ii) GLC
   iii) TLC

SECTION – B

7. a) Explain in detail the relationship both functionality extent of reaction and degree of polymerization. 7

   b) Derive the Carothers equation and its application. 7

OR

8. a) What is functionality concept? Which are the functional groups involved in the synthesis of polyamide? 7

   b) Explain the polyaddition reaction by giving suitable example. 7

9. Explain the following methods for determination of molecular weight of polymer:- 13
   i) Osmotic pressure.
   ii) Ultra centrifugation.
   iii) Viscosity.

OR

10. a) Explain the number average molecular weight and weight average molecular weight in detail. 7

    b) Explain the end group analysis method for determination of molecular weight of polymer. 6

11. a) What are different types of degradation? Discuss the chemical degradation and hydrolysis mechanism to achieve stability. 9

    b) Explain mechanical degradation in short. 4

OR

12. a) What is thermal degradation of polymer? Explain with reference to depolymerization. 7

    b) Explain the oxidative type of degradation and how it is stabilized. 6

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