

H 1156

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2006.

Fourth Semester

Textile Chemistry

CH 248 — POLYMER CHEMISTRY

(Common to Textile Technology)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A --- (10 × 2 = 20 marks)

1. State the functionality of the monomers, glycerol, adipic acid, 1,4-divinyl benzene and 1,4-butane diol.
2. What are elastomers and what is meant by resilience?
3. What is induction period?
4. Compare the molecular weight of polymer and its distribution in free radical solution polymerization and suspension polymerisation techniques.
5. What is meant by polydispersity index and what is its significance?
6. Explain the effect of molecular weight on the glass transition temperature of a polymer.
7. What is LLDPE and how is it prepared?
8. What are the materials used for the manufacture of PET by melt polycondensation?
9. Explain the role of water as a blowing agent in the manufacture of polyurethane foams.
10. Explain the function of UV-stabilisers added to plastics.

PART B — (5 × 16 = 80 marks)

11. (i) What are thermoplastics and thermosetting plastics? Give two examples or each type. (8)
- (ii) Explain the following terms with suitable examples :
- (1) Block copolymer
 - (2) Graft copolymer
 - (3) Branched polymer
 - (4) Three dimensional network polymers. (8)
12. (a) (i) Discuss in detail suspension polymerisation techniques. (8)
- (ii) Discuss the mechanism of free radical polymerization taking any monomer as example. (8)

Or

- (b) (i) Describe bulk polymerisation and compare the advantages and disadvantages of the process with solution polymerisation technique. (8)
- (ii) Explain the role of surfactants in suspension and emulsion polymerisation. (8)
13. (a) (i) Define the terms crystallinity and crystallisability and explain how crystallinity occurs in polymers having highly flexible and partly flexible backbones. (8)
- (ii) Discuss the factors affecting crystallinity and crystallisability. (8)

Or

- (b) (i) Explain the phase transitions and the variation of specific volume with temperature of amorphous, crystalline and semicrystalline polymers. (8)
- (ii) State which one in each of the following pairs of polymers has higher glass transition temperature and explain the reasons.
- (1) Polystyrene or poly (α -methylstyrene)
 - (2) Polyethylene adipate or polyethylene terephthalate
 - (3) Poly (methyl acrylate) or poly (butyl acrylate)
 - (4) Nylon-6,6 or Nylon-11. (8)

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(8)
- (a) (i) How are Nylon 6 and Nylon 6,6 manufactured? Mention any two industrial applications for each of them. (8)
- (ii) Describe the manufacture of polystyrene by bulk and emulsion polymerisation techniques and state any two uses. (8)

Or

- (b) (i) Explain the manufacture of polyurethane foams and explain their uses. (10)
- (ii) Explain the formation and applications of carbon fibre. (6)

- (8)
15. (a) (i) State with suitable examples any five compounding materials added to plastics and explain their function. (10)
- (ii) Explain the technique by which continuous polymer films are obtained. (6)

Or

- (b) Write notes on the following :
- (i) Flame retardant polymers. (8)
- (ii) Solubility parameter. (8)
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