

D 318

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2003.

Fourth Semester

Textile Technology

CH 248 — POLYMER CHEMISTRY

(Common to Textile Chemistry)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define the terms (a) Oligomers (b) Degree of polymerization.
2. Differentiate natural polymers from synthetic polymers. Give atleast two examples for each type.
3. What are inhibitors? Give two examples.
4. What are surfactants? What are their characteristics?
5. Give a very brief account of sperullites.
6. Account for the higher viscosity of polymer solution.
7. Name and draw the structure of the polymer which is an excellent substitute for glass.
8. How is Terglene obtained?
9. What is meant by compounding?
10. What is foaming? Explain.

PART B — (5 × 16 = 80 marks)

11. (i) Discuss the various steps involved in free-radical polymerization. (8)
(ii) Write a brief account of
 - (1) Bulk polymerization
 - (2) Solution polymerization. (4 + 4)

12. (a) (i) What is functionality? Discuss the term as applicable to
- (1) bifunctional and
 - (2) polyfunctional monomers. (8)
- (ii) Draw the structure of monomer and repeating units for
- (1) Poly isoprene
 - (2) Polyacrylonitrile
 - (3) Polyamides
 - (4) Polymethacrylic acid. (8)

Or

- (b) (i) Explain the following terms with suitable diagrammatic representation :
- (1) Three dimensional polymers
 - (2) Block co-polymers
 - (3) Hetero chain polymers
 - (4) Graft co-polymers. (8)
- (ii) Write a brief account on the classification of polymers based on their source, properties and mechanical and thermal characteristics. (8)
13. (a) (i) What is glass transition temperature? Enumerate the importance of glass transition temperature. (10)
- (ii) Bring out the relationship between molecular weight and degree of polymerization. (6)

Or

- (b) (i) What is meant by degree of crystallinity? Discuss its importance. How is it measured? (8)
- (ii) What is polymer degradation? Examine the factors responsible for thermal degradation. (8)

14. (a) (i) How will you obtain polyacrylonitrile? Mention any two methods. Show any two of its industrial applications. (8)
- (ii) What are polyamides? How are fully aromatic polyamides obtained? Give two examples. (8)

Or

- (b) (i) Discuss any one method of obtaining polystyrene. Mention any four important copolymers of polystyrene and their uses. (8)
- (ii) How will you obtain LDPE and HDPE? Show their important applications. (8)
15. (a) (i) Discuss the characteristics and function of
- (1) Fire-retardants
 - (2) Stabilizers
 - (3) Anti-oxidants
 - (4) Fillers. (10)
- (ii) With a neat sketch, discuss the functioning of wet spinning process. (6)

Or

- (b) (i) With a schematic diagram, explain Extrusion moulding. (10)
- (ii) Discuss the process involved in coating fabrics and papers. (6)