19/11/13

(9)

B.E./B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV 2013

MATERIAL SCIENCE AND ENGINEERING BRANCH

THIRD SEMESTER

CY 8302 POLYMER SCIENCE AND ENGINEERING

TIME: 3 hr MAX MARKS: 100

Answer ALL Questions

Part A (10 x 2 = 20 marks)

1. Write the Carother's equation and mention its use.
2. What is the principle of interfacial condensation?
3. Define polydispersity index.
4. What is the relation between molecular weight of a polymer and its monomer?
5. What is the relation between Tg and Tm?
6. What is crystallinity and how do you express it for a polymer sample?
7. What is Power Law?
8. What are non-newtonian fluids?
9. What are RIM and RRIM?
10. What is a calendar roll? What are its major types?

Part B (5 x 16 = 80 marks)

11. (i) What is a copolymer? Write on the important copolymerization concepts. 6

(ii) How are linear polymers prepared by polycondensation process? Explain with examples. 6

(iii) Briefly explain what a gel point is. 4

12. (a) What are the types of MW of a polymer sample? Derive an expression for each one of them. What is a MWD curve? What is its use? 16

OR

(b) What is the principle of GPC? Explain the technique in detail. What useful information is obtained from GPC analysis? 16

13. (a) Explain the thermal transitions in polymers. What is Tg? How do determine it? What is its use? 16

OR

(b) What is crystallization? Elaborately explain the various factors that affect the crystallization of polymer. 16

14. (a) Explain the dissolution of polymers. On what factors, solubility depends on? What is solubility parameter and what are its significances? What governs the solubility of polymers? 16

OR

(b) What is an ideal fluid? Derive the expression for the shear strain of an ideal fluid. 16

15. (a) What is rotational moulding? What is its principle? Explain the process with neat diagrams. Also explain the advantages and disadvantages of this processing method. 16

OR

(b) Briefly write a note on the following processing methods: 16

i. Injection Moulding

ii. Compression and Transfer Moulding