

THIRD SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2017

(CUCSS)

Chemistry

CH 3E 03—POLYMER CHEMISTRY

(2010 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Part A

Answer all questions.

1. How are polymers classified based on (a) response to temperature (b) type of monomer ?
2. What are the factors affecting Glass Transition Temperature of a polymer ?
3. Explain living polymerization with an example.
4. What is number-average molecular weight ? How does it differ from weight-average molecular weight ?
5. Explain structural similarities and differences between PVC and PE and explain the role of chlorine in determining the final properties of PVC.
6. Explain Total Internal Reflection with the help of an example.
7. What is meant by colligative property ? Give one example.
8. What are important cellulose derivatives ? Explain major applications.
9. Define 'polymer degradation'. Explain degradation as a function of backbone structure.
10. What is meant by 'degree of polymerization' ?
11. Explain ring-opening polymerization, giving a suitable example.
12. What are the advantages and disadvantages of bulk polymerization ?
13. Which one shows better electrical properties Phenol-formaldehyde or Urea formaldehyde ? Why ?
14. Write a short note on the structural changes occurring during T_m and T_g .

(14 × 1 = 14 weightage)

Part B

Answer any seven questions.

15. Explain Kinetics of Free-radical Polymerization.
16. What are Ion-Exchange Resins ? Explain one method of preparation and propose its applications.

Turn over

17. Explain principle of Gel Permeation Chromatography. How is it used for molecular determination of polymers ?
18. Explain high pressure and low pressure processes for the production of Polyethylene. What are the advantages of Ziegler Process ?
19. Write short notes on (a) graft co-polymers ; (b) biodegradation of polymers.
20. Compare and contrast Nylon 6 and Nylon 66.
21. What is meant by molecular weight distribution ? How does it play a key role in the processibility of a polymer ?
22. Write short notes on (a) factors affecting polymer solubility ; (b) solubility parameter.
23. Explain properties of unsaturated polyester with special reference to their structure. What is the role of diluent in unsaturated polyester ?
24. What is suspension polymerization ? Compare and contrast with bulk polymerization.
(7 × 2 = 14 weightage)

Part C

Answer any two questions.

25. What are different types of copolymerizations ? Explain the mechanism of each type using suitable examples.
26. Explain the thermodynamics of polymer solution with the help of Flory-Huggins mathematical model.
27. Explain molecular weight determination by (a) Light scattering ; (b) Osmotic Pressure method.
28. Explain steps involved in solid phase peptide synthesis, its advantages and disadvantages.
(2 × 4 = 8 weightage)