

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted during the academic year 2011-12 & thereafter)

SUBJECT CODE: 11CH/PE/PM14
M.Sc. DEGREE EXAMINATION, NOVEMBER 2012
BRANCH IV- CHEMISTRY
FIRST SEMESTER

REG.NO

COURSE: ELECTIVE

PAPER : POLYMER MATERIALS AND APPLICATIONS

TIME : 30 MINUTES

MAX.MARKS : 20

SECTION – A (20x1=20)
ANSWER ON THE QUESTION PAPER ITSELF.

Answer all the questions.

I Choose the correct answer:

1. Characteristic of all polyurethanes is the presence of
(a) acid group (b) amide group (c) carbamate group (d) ester group
2. The method used to determine the weight average molecular weight is
(a) osmometry (b) end group analysis (c) cryoscopy (d) light scattering
3. A polymerisation technique that involves surfactant micelles in a heterogeneous mixture is
(a) emulsion polymerisation (b) solution polymerisation
(c) bulk polymerisation (d) suspension polymerisation
4. The process used for the continuous manufacture of sheet or film is called
(a) extrusion (b) mastication (c) moulding (d) calendaring

II Fill in the blanks:

5. Glass transition is _____ order thermal transition.
6. Mark Houwink equation is _____.
7. DSC curves are drawn between temperature and _____.
8. A measure of mechanical strength of materials expressed as the ratio of stress to strain is called _____.

III State whether the following statements are True or False:

9. Above T_g value, the polymer exists in glassy state.
10. A filled or reinforced plastic is often called as composite.
11. Hardness of materials is often measured in Mohs scale.
12. The imperfect crystalline regions made from bundles of ordered chains are called crystallites.

IV Match the following:

- | | |
|--------------------|------------------------------|
| 13. Mark – Houwink | Co-polymerisation |
| 14. Zeigler nutta | Polymer solution |
| 15. Flory-Higgin | Co-ordination polymerisation |
| 16. Graft | intrinsic viscosity |

V Answer in sentence or two:

17. What is a conducting polymer?

18. Name the 3 steps involved in free radical polymerisation

19. What is stress relaxation?

20. Mention the monomers involved in polyurethane

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TIME : 2½ HOURS

MAX.MARKS : 80

SECTION – B

(5x8=40)

Answer any five questions:

1. Discuss the structure, properties and applications of silicone polymers
2. Explain the kinetics of Free radical polymerisation
3. a) What is group transfer polymerisation? Explain with example.
b) Write a brief note on Zeigler Natta Catalysts
4. How is the molecular weight of a polymer sample determined by a GPC technique?
5. Calculate the number average molecular weight and weight average molecular weight of a polymer sample containing 6 moles of molecular weight 24000 and 8 moles of molecular weight 48000
6. Differentiate between
(i) Newtonian and non-Newtonian flow (ii) Amorphous and crystalline polymers
7. Define glass transition temperature. Explain the factors affecting glass transition temperature.

SECTION – C

Answer any two questions.

(2x20=40)

8. a) Discuss briefly on the structure properties and applications of
(i) IPN (ii) polymer composites. (5 + 5)
b) Give an account of different types of degradation of polymers. (10)
9. a) Describe the various phase techniques followed in polymerisation reaction. (10)
b) Explain (i) Light scattering method
(ii) viscometry for the determination of absolute molecular weight of polymers. (5+5)
10. a) Draw schematically the stress-strain curves for various polymers with varying hardness and toughness. (10)
b) Write notes on thermal analysis of polymers by TGA and DTA . (10)
