J – 4879

Reg. No. : ....

Name : ....

Fourth Semester M.Sc. Degree Examination, May 2020

Polymer Chemistry

PC 241 : POLYMER CHEMISTRY – I

(2018 Admission)

Time : 3 Hours

Max. Marks : 75

Answer two among (a), (b) and (c) from each question :

Section – A

Each sub question carries 2 marks :

1. (a) Define intrinsic viscosity and how it is related to M_v?

   (b) What is poly dispersity index of polymer? Give its significance.

   (c) Osmometry provides number average molecular weight of polymers. Why?

2. (a) Differentiate between conformation and configuration.

   (b) Write four applications of ^{13}C-NMR spectroscopy in polymer characterizations.

   (c) What is the principle of ESR spectroscopy? What is the main application of ESR in polymer characterization?

3. (a) Define cohesive energy density. What is its unit?

   (b) The solubility parameter of aliphatic solvent is decreases with increase in homologous series. Why?

   (c) What is critical solution temperature?

P.T.O.

4. (a) What is meant by reactive compatibilization?

   (b) What are polymer alloys?

   (c) What is fibre reinforced composites? What are its applications?

5. (a) Define bio-degradable polymer? Give two examples.

   (b) On UV-irradiation a yellow colour is developed on polystyrene. Why?

   (c) Explain the cross linking and branching of polymers through degradation process.

$$(10 \times 2 = 20 \text{ Marks})$$

Section – B

Answer either (a) or (b) from each question. Each sub question carries 5 marks.

6. (a) Explain the use of GPC in molecular weight determination of polymers.

   (b) Explain ring opening polymerization with suitable example.

7. (a) Write briefly on free joined chain model.

   (b) Explain fluorescence spectroscopy? Give its applications.

8. (a) Discuss the LCST and UCST behaviour in polymeric systems.

   (b) Define theta condition and theta temperature. How does the temperature affect the solubility of polymer in a solvent?

9. (a) Discuss the application of FTIR and NMR in the characterization of blend morphology.

   (b) Briefly explain the pultrusion technique and vacuum bag molding.

10. (a) Give the reaction taking place in the degradation of polypropylene.

    (b) Explain the degradation of polymers by micro-organisms.

$$(5 \times 5 = 25 \text{ Marks})$$

Section C

Answer **any three** questions. Each question carries **10** marks.

11. Explain the light scattering measurement and end group analysis for the determination molecular weight of polymers.

12. Discuss the following :

    (a) Conformational analysis of polymers

    (b) Tacticity in polymers.

13. How Flory-Krigbaum theory applied to polymer solutions?

14. Describe the compatibilization techniques to improve the morphology of polymer blends. Discuss with examples, the effect of fibrous reinforcement on composite strength.

15. Explain the degradation of polymers through oxidative degradation, chemical degradation and degradation by high energy radiation.

(3 × 10 = 30 Marks)

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