TED (10)–3008 Reg. No. .....

(REVISION—2010) Signature .....

SECOND SEMESTER DIPLOMA EXAMINATION IN POLYMER TECHNOLOGY—MARCH, 2013

POLYMER SCIENCE

[*Time* : 3 hours

(Maximum marks : 100)

Marks

PART—A

I Answer all questions in one or two sentences. Each question carries 2 marks.

1. Define the term degree of polymerisation.
2. Differentiate between thermoplastics and thermosets.
3. Which are the different steps involved in chain polymerisation ?
4. Why polymers have average molecular weight ?
5. What are antidegradants ? Give two examples. (5×2=10)

PART—B

II Answer *any five* of the following questions. Each question carries 6 marks.

1. Explain the geometrical isomerism with a suitable example.
2. Define functionality. Explain the effect of functionality on the structure of polymers.
3. What is interfacial polymerisation ? Give an example.
4. Explain bulk polymerisation technique with its advantages and disadvantages.
5. Derive the expression for number average molecular weight (Mn).
6. Explain the terms polydispersity and molecular weight distribution.
7. Explain the various factors affecting thermal stability of polymers. (5×6=30)

PART—C

(Answer one full question from each unit. Each question carries 15 marks.)

UNIT—I

III (a) Differentiate between micromolecules and macromolecules with suitable examples. 4

(b) Explain the classification of polymers according to their origin, thermal response and applications. 6

(c) What is meant by stereo regularity of polymers ? 5

OR

Marks

IV (a) Calculate the degree of polymerisation of polychloroprene of molecular weight 63000. 4

(b) Explain homo and copolymers with examples. 5

(c) Give the structure and functionality of :

(i) Acetylene (ii) Styrene (iii) Acrylonitrile. 6

UNIT—II

V (a) Explain the free radical mechanism of chain polymerisation of vinyl chloride. 8

(b) Explain the emulsion polymerisation technique. State its advantages and disadvantages. 7

OR

VI (a) What happens when polymer undergoes reactions of :

(i) acidolysis (ii) aminolysis (iii) hydrolysis (iv) hydrogenation. 8

(b) Explain the step growth polymerisation of polyesters. 7

UNIT—III

VII (a) Explain the light scattering technique for the determination of Molecular weight. 8

(b) Explain how the crystallinity of polymers affect the Tg. 7

OR

VIII (a) Explain the technique for the determination of viscosity average molecular weight. 7

(b) Explain the physical method of analysis of polymers by TGA and DSC. 8

UNIT—IV

IX (a) Explain the chain end and random degradation of polymers. 6

(b) Explain the polymer modification by copolymerisation and grafting. 6

(c) What is oxidative degradation of polymers ? 3

OR

X (a) Explain the mechanism of stabilisation of polymers by antioxidants. 6

(b) Explain the photodegradation of polymers. How it prevented ? 6

(c) What are plasticisers and curing agents ? 3