TED (10)–3008

(REVISION—2010)

Reg. No. ....

Signature ....

SECOND SEMESTER DIPLOMA EXAMINATION IN POLYMER
TECHNOLOGY—OCTOBER, 2013

POLYMER SCIENCE

[*Time* : 3 hours

(Maximum marks : 100)

PART—A

Marks

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

1. Define the term oligomer.

2. What are initiators ? Give two examples.

3. Define critical micelle concentration.

4. Write down the expressions for M_n and M_w.

5. What are photostabilisers ? Give two examples. (5×2=10)

PART—B

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

1. Explain the alternate, random and block copolymer with a suitable example.

2. Explain the ring opening polymerisation of caprolactum.

3. What are living polymers ? Why is it called so ?

4. Explain the end group analysis for the determination of molecular weight.

5. Derive the expression for weight average molecular weight (M_w).

6. What are the various factors affecting the degradation of polymers ?

7. Which are the common additives used in polymers ? Give one example for each. (5×6=30)

PART—C

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

UNIT—I

III (a) Differentiate linear, branched and crosslinked polymers with a suitable example. 4

(b) Explain the relationship between the degree of polymerisation and molecular weight. 6

(c) What are the special characteristics of polymers ? 5

OR

[15]

[P.T.O.

Marks

IV (a) Calculate the degree of polymerisation of polyacrylonitrile of molecular weight 58000.   4

     (b) Explain the optical isomerism with an example.   5

     (c) Explain mo, di and polyfunctional monomers with example for each.   6

Unit—II

V (a) Explain the different steps involved in cationic polymerisation.   8

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

Or

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

     (i) addition   (ii) substitution   (iii) curing.

     Give one example for each.   8

    (b) Explain the polymerisation steps involved in ester formation.   7

Unit—III

VII (a) Explain the gel permeation chromatography (GPC) for the determination of molecular weight.   8

     (b) Define Glass transition temperature (Tg). Explain how it is determined.   7

Or

VIII (a) Explain the technique for the determination of molecular weight by vapour phase osmometry.   7

     (b) Explain the scheme of chemical tests for the analysis of polymers.   8

Unit—IV

IX (a) Explain the advantages and disadvantages of polymer degradation.   6

    (b) Explain the physical methods of polymer modification.   6

    (c) What is meant by mechanical degradation of polymers ?   3

Or

X (a) Explain any two methods employed to study the degradation of polymers.   6

    (b) Explain the thermal degradation of polymers. How is it prevented ?   6

    (c) What are interpenetrating network polymers ?   3