22230

21819

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Use of Non-programmable Electronic Pocket Calculator is permissible.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following: **10**

a) Define elastomer and fibre.

b) Differentiate between thermoplastics with thermosetting polymer on the basis of thermal response and hardness.

c) State merits and demerits of suspension polymerization.

d) Give mechanism of free radical polymerization.

e) Define number average molecular weight, give its formula.

f) Enlist the factors which affect glass transition temperature.

g) Define polymer degradation.

Marks

2. Attempt any THREE of the following: **12**

a) Explain classification of polymers on the basis of their origin.

b) Explain termination mechanism in ionic polymerization.

c) Explain eryoscopic method for determination of average molecular weight of a polymer.

d) Explain initiation mechanism of coordination polymerization.

3. Attempt any THREE of the following: **12**

a) Define copolymer. Explain alternate copolymer and random copolymer with schematic representation.

b) Explain schematically the formation of micelles in emulsion polymerization technique.

c) Calculate weight average mole. wt. of total items given in following table:

Items	No of units in each entity 'n'	Weight of each unit 'm' (g)	Total weight of each unit W = n*m (g)
Pen	2	7	14
Comb	4	15	60
Water bottle	5	75	375
Lunch box	7	150	1050

d) List merits and demerits of bulk polymerization technique (minimum four).

4. Attempt any THREE of the following: **12**

a) Explain termination in step polymerization.

b) Explain average molecular weight. Write mathematical expression for $\overline{M}_w$ and $\overline{M}_n$.

c) Describe photodegradation of polymer. How it will be avoided?

d) Compare addition and condensation polymerization.

e) Explain significance of glass transition temperature.

Marks

5. Attempt any TWO of the following: **12**

a) Explain the classification of polymers based on the basis of their origin.

b) Explain following with an example:

(i) Electrochemical polymerisation

(ii) Solution polymerization.

c) (i) Explain relation between glass transition temperature and molecular weight of polymer. 4

(ii) Define heat distortion temperature. 2

6. Attempt any TWO of the following: **12**

a) Compare solution and suspension polymerization (minimum six points).

b) Explain the terms:

(i) Polydispersity

(ii) Practical significance of polymer molecular weight

c) Explain general oxidative degradation of polymer and how can it be controlled.