

Unit II

4. (a) Why Molecular weight of polymers are taken as average ? Explain the end group analysis and viscosity light scattering experiment method of determining molecular weight of polymers. **8**
- (b) The suspension contains equal number of molecules with molecular weight 15000. Calculate $\bar{M}_n$ and $\bar{M}_w$ of particles with molecular weight 15500 and 30500. **5**
- (c) Explain Polydispersity Index. **3**
5. (a) Equal masses of polymer molecules with $M_1 = 10000$ and $M_2 = 100000$ are mixed. Calculate $\bar{M}_n$ and $\bar{M}_w$. **5**

31541

M. Sc. EXAMINATION, 2025

(Fourth Semester)

(Regular & Re-appear)

CHEMISTRY

Polymer Chemistry

(2020-21 Onwards)

Time : 3 Hours]

[Maximum Marks : 80

Before answering the question-paper, candidates must ensure that they have been supplied with correct and complete question-paper. No complaint, in this regard will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory containing eight short answer type questions. All questions carry equal marks.

1. Answer the following in short : $8 \times 2 = 16$

- (a) Mention the factors affecting glass transition temperature ?
- (b) Discuss Fire Resistant Polymers.
- (c) How are Fibre classified ?
- (d) Explain Insertion Polymerization with examples.
- (e) Explain Reinforcing of Polymers.
- (f) Write a short note on Inhibitors.
- (g) Discuss the preparation and use of PVC.
- (h) How molecular weight distribution curve are affected by Mono and polydispersed polymer sample ?

Unit I

2. (a) What are basic difference between addition and condensation polymerization ? Derive equations of cationic mechanism of addition polymerization process. 8

(b) Compare salient features of Bulk and Solution Polymerization Technique. 5

(c) Write a short note on degree of Polymerization. 3

3. (a) Explain Kinetic chain length in Free-Radical Polymerization and derive equation of Rate of Polymer formation. 8

(b) Discuss the effect of Temperature and pressure on chain polymerization. 3

(c) What are functionality of monomer and how it affect the product (polymer) formation ? Give an account of synthetic criteria of polymer formation. 5

- (b) What are Number average and weight average molecular mass of Polymers ?
Explain the Ebulliometry osmometry and Ultracentrifugation methods of determination of Molecular weight of Polymers. **8**
- (c) Explain Instantaneous composition of Polymers. **3**

Unit III

6. (a) What is glass transition temperature (T_g) ?
Discuss the various factors influence T_g of polymers and comment on T_g of Isotactic and Atactic Polypropylene. **8**
- (b) Discuss the heat of fusion and degree of crystallinity in polymers and give one method of their determination. **5**

(c) Write short notes on the following : 3

(i) Volume Resistivity

(ii) Power Factor

(iii) Dielectric Strength.

7. (a) Predict the effect of T_g on Williams Landau Ferry (WLF) model for Polymer melts. 3

(b) Write short notes on the following : 5

(i) Geometrical Arrangements of Polymers

(ii) Texture of Polymers.

(c) Explain, how mechanical properties can be used in physical testing of polymers. 5

(d) Write a short note on Vulcanization. 3

Unit IV

8. (a) Distinguish between Fibres and Rubbers. 5

(b) Explain Application of Biopolymers in detail, Artificial Heart and Blood Cell. 5

(c) Using Schematic diagram, explain the process of following technique : 6

(i) Injection Moulding

(ii) Rotational Casting.

9. (a) Describe the following : 5

(i) Polymethylmethacrylate

(ii) Epoxy Resin.

(b) Explain any one technique used for production of reinforced plastic. 5

(c) (i) Describe the process of calendering with heat diagram. 3

(ii) What is Extrusion ? Explain plastic extrusion. 3

