

Instruction: Attempt all questions:

Q-1

Answer the following:

- (a) Describe the Osmometric method of determining the molecular weight of macromolecules. (7)

OR

- (a) Explain the poly dispersity index and molecular weight of a polymer. (7)
- (b) Explain the effect of molecular weight and melting point of polymer on glass transition temperature. (7)

OR

- (b) Write note on the practical significance of molecular weight of polymer. Equal number of molecules with $m_1 = 10,000$ and $m_2 = 100,000$ are mixed. Calculate M_n and M_w ($n_1 = n_2 = 10$) (7)

Q-2

Answer the following:

- (a) Discuss micro structures of a polymer molecules based on chemical and geometrical structures. (7)

OR

- (a) Explain the effect of crystallinity on mechanical properties of polymer. (7)
- (b) Explain glass transition temperature and the factors affecting it. What is the effect of melting point on glass transition temperature. (7)

OR

- (b) Explain the effect of crystallinity on mechanical properties of polymer. (7)

Q-3

Answer the following:

- (a) Explain Extrusion moulding process in polyvinyl chloride. (7)

OR

- (a) Explain in brief about the Injection Moulding and Blow Moulding processes of polymers. (7)
- (b) Explain about Compression moulding process. (7)

OR

- (b) Explain the Wet Spinning and the Dry Spinning processes of polymers. (7)

Q-4 Answer the following:

- (a) Explain in brief about shape and size of macromolecules in solution. (7)

OR

- (a) Discuss the Flory-Huggins theory of polymer solutions. (7)
 (b) Write note on viscosity of concentrated and dilute polymer solutions. (7)

OR

- (b) Explain the thermodynamics of polymer solution. (7)

Q-5 Answer the following: (Any Seven-Two marks each)

- (i) What is meant by reduced viscosity?
 (ii) Why polymer molecular weights are taken as average?
 (iii) Give the relation between degree of polymerization and molecular weight of polymers.
 (iv) What is polydispersity index? Is weight average molecular weight is always equal to number average molecular weight?
 (v) Which types of materials are best suited for injection moulding?
 (vi) What is shape and size of macromolecules in solution?
 (vii) How polymers are classified according to their physical properties?
 (viii) What is the difference in the dissolution behavior of low and high molecular weight substances?
 (ix) Which moulding processes are used for thermosetting and thermoplastics?
