

M.Sc. (Chemistry) (CBCS Pattern) Semester-III
PSCHT12.4 - Paper-IV - Polymer Chemistry-I

P. Pages : 2

Time : Three Hours



GUG/S/25/11345

Max. Marks : 80

1. a) Explain tacticity in polymers in detail. 8
b) What are polymers? Give a classification of polymer with an example. 8

OR

- c) Explain thermosetting and thermoplastic polymers. 4
d) Explain cross-linked polymers with suitable examples. 4
e) What is an elastomer? Give the synthesis of chloroprene rubber. 4
f) Explain addition and condensation polymerization giving suitable examples. 4
2. a) Explain end group analysis method for determination of the molecular mass of polymer. 8
b) Explain sedimentation and ultracentrifuge methods for the determination of the molecular mass of polymers. 8

OR

- c) Describe the vapour phase osmometry method for determining the molecular weight of polymers. 4
d) An equal mass of polymer molecules with $M_1 = 20,000$ and $M_2 = 2,00,000$ are mixed, so calculate the average molecular weight M_n and the average molecular weight M_w . 4
e) Write a short note on the light scattering method. 4
f) Write a short note on gel permeation chromatography techniques. 4
3. a) What is glass transition temperature (T_g)? Explain the effect of molecular weight, branching and cross-linking on the glass transition temperature. 8
b) Explain the following terminology- 8
i) Stain-induced morphology of the polymer
ii) Chain topology

OR

- c) Explain the configuration of the polymer chain. 4
 - d) Describe any one method to determine the crystallinity of the polymer. 4
 - e) Discuss the effect of chain flexibility and other steric effect on the melting point of polymers. 4
 - f) Give the relationship between glass transition temperature (T_g) and molecular weight. 4
4. a) Give synthesis, properties and application of Nylon-66 and polyvinyl chloride (PVC). 8
- b) What are polymer additive? Explain fire retarding and conducting polymers with suitable examples. 8

OR

- c) What are the applications of organic polymers? 4
 - d) Give synthesis properties and uses of phenol formaldehyde resin? 4
 - e) Give preparation, properties and uses of polyethylene. 4
 - f) Write short note on epoxy resin. 4
5. Solve all questions.
- a) What is a starting material for the synthesis of Nylon 6 polymer. 2
 - b) What is fibers? 2
 - c) What is viscosity method for determination of molecular weight of polymer. 2
 - d) State the mathematical expression for M_n and M_w . 2
 - e) What is glass transition temperature (T_g)? 2
 - f) Explain the effect of dilimnts on T_g . 2
 - g) Draw the structure of Zeigler Natta Catalyst. 2
 - h) What are biomedical polymers? 2
