M.Sc.- II (Chemistry) CBCS Pattern Semester-III

PSCHT12.4 - Elective Paper : Polymer Chemistry

P. Pages : 2 **GUG/W/23/11345**

Time : Three Hours * 6 3 5 6 * Max. Marks : 80

---

1. a) What is degree of Polymerization? How will you classify polymers on the basis of stereochemical arrangement? **8**

b) Explain addition and condensation polymer with suitable example. **8**

OR

c) Differentiate between thermoplastics and elastomers. **4**

d) Explain cross linked polymers. **4**

e) Give classification of polymer with example. **4**

f) Discuss ladder polymers. **4**

2. a) Explain sedimentation and ultracentrifuge method for the determination of molecular mass of polymers. **8**

b) Define – Number average, mass average, viscosity, average, molecular mass and find relation between them. **8**

OR

c) Derive an expression for viscosity method for determination of molecular weight of polymer. **4**

d) Write a note on light scattering method. **4**

e) Describe gel permeation chromatography technique. **4**

f) An equal masses of polymer molecule with $M_1 = 40,000$ and $M_2 = 4,00,000$ mixed together calculate $\overline{M}_n$ and $\overline{M}_w$. **4**

3. a) Describe any one method to determine crystallinity of polymer. **8**

b) What is glass transition temperature? Explain effect of molecular weight, branching and cross-linking on glass transition temperature. **8**

OR

c) Find the relationship between T_g & T_t. **4**

d) Write a note on morphology of crystalline polymers. **4**

e) Give relationship between glass transition temperature and molecular weight. **4**

f) Explain strain-induced morphology in polymer. **4**

4. a) Discuss following type of Polymers **8**

i) Conducting Polymers

ii) Fire retarding Polymer

b) Give Synthesis and applications of **8**

i) Polyester

ii) Polyvinyl chloride

OR

c) Give synthesis and application of low density polyethylene (LDPE) and High density polyethylene (HDPE). **4**

d) Write a note on epoxy resin. **4**

e) What is PET? Give its synthesis. **4**

f) Give Synthesis and properties of phenol formaldehyde resin. **4**

5. a) Define fibres. **2**

b) What are natural polymers. **2**

c) What is end group analysis. **2**

d) State mathematical expression for $\overline{M}_n$ and $\overline{M}_w$. **2**

e) What do you mean by configuration of polymer chains. **2**

f) State two types of Brownian movement in Polymer compound. **2**

g) Give two examples of phenolic resin. **2**

h) What do you mean by commercial polymer. **2**

****