

M.Sc.(Chemistry) (NEP Pattern) - Semester-III
STPG03CHE04 - Paper-IV : Polymer Chemistry-I

P. Pages : 2

Time : Two Hours



GUG/W/24/15963

Max. Marks : 40

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1. a) What is addition polymerization? Explain with suitable examples. 4
- b) What are polymers? Give a classification of polymer with an example. 4

OR

- c) Write any four differences between thermosetting and thermoplastic polymers. 2
- d) Explain cross-linked polymers with suitable examples. 2
- e) What is an elastomer? Discuss the importance of elastomer. 2
- f) Write a note on atactic and syndiotactic polymer. 2
2. a) Describe the Viscosity average molecular weight M_v method for molecular weight determination of polymer. 4
- b) Explain sedimentation method for the determination of the molecular mass of polymers. 4

OR

- c) Describe the vapour phase osmometry method for determining the molecular weight of polymers. 2
- 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 . 2
- e) Write a short note on the light scattering method. 2
- f) Write a short note on gel permeation chromatography techniques. 2
3. a) Explain the effect of molecular weight, and cross-linking on the glass transition temperature. 4
- b) Explain the stain-induced morphology of the polymer. 4
- c) Explain the configuration of the polymer chain. 2
- d) Describe any one method to determine the crystallinity of the polymer. 2

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| e) | Discuss the effect of chain flexibility and other steric effect on the melting point of polymers. | 2 |
| f) | Give the relationship between glass transition temperature (T_g) and molecular weight. | 2 |
| 4. | a) Give synthesis and application of polyvinyl chloride. | 4 |
| | b) What are fire retarding polymers. Explain with suitable examples. | 4 |

OR

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| c) | What are the applications of conducting polymers? | 2 |
| d) | What is a polymer produced by the reaction of formaldehyde with urea. Explain the synthesis. | 2 |
| e) | Give preparation and uses of Nylon-6. | 2 |
| f) | Write a note on epoxy resin. | 2 |
| 5. | There are ten short-answer questions, and each question carries 1 mark. Out of ten solve any eight questions. | |
| a) | What are isotactic polymers. | 1 |
| b) | What is crystallinity. | 1 |
| c) | What are fibers? | 1 |
| d) | Write a formula for the mass average method for the determination of the molecular mass of the polymer. | 1 |
| e) | State the mathematical expression for M_n and M_w | 1 |
| f) | What is glass transition temperature (T_g)? | 1 |
| g) | Explain the effect of diluents on T_g | 1 |
| h) | Draw the structure of Zeigler-Natta Catalyst. | 1 |
| i) | Give two examples of phenolic resin. | 1 |
| j) | What are biomedical polymers? | 1 |
