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**WT—260—2024**

**FACULTY OF SCIENCE**

**M.Sc. (Second Year) (Third Semester) EXAMINATION**

**NOVEMBER/DECEMBER, 2024**

**(CBCS/New Pattern)**

**ORGANIC CHEMISTRY**

**Paper CH-53G/2B**

**(Polymer Chemistry-I)**

**(Tuesday, 17-12-2024)**

**Time : 2.00 p.m. to 5.00 p.m.**

*Time—Three Hours*

*Maximum Marks—75*

*Note :— (i) Attempt all questions.*

*(ii) Figures to the right indicate full marks.*

1. Answer any *three* of the following : 15
- (a) How are polymers classified ?
- (b) Explain why nylon-6 is soluble in some solvents at room temperature whereas linear polyethylene is not.
- (c) Equal number of polymer molecules with  $m_1 = 10,00,000$  and  $m_2 = 1,00,00,000$  are mixed. Calculate  $\bar{M}_n$  and  $\bar{M}_w$
- (d) Comment in detail on film casting.
- (e) What is glass transition temperature ?
- (f) Explain Z-average molecular weight of polymer.

P.T.O.

2 Attempt any *three* from the following : 15

- (a) Explain with mechanism condensation polymerisation of ethylene glycol and adipic acid.
- (b) What are elastomers ? Explain the properties of elastomers.
- (c) Draw structural formulas indicating the stereoregular chain configuration in :
  - (i) Atactic polystyrene
  - (ii) Isotactic polypropylene.
- (d) Sketch typical stress-strain curves for wool-like fibres.
- (e) Describe the process of extrusion moulding.
- (f) Comment in detail on calendering process.

3. (a) Describe the emulsion polymerisation with mechanism. 8

*Or*

Describe the process of determination of molecular weight of polymer by ultra-centrifugation method.

- (b) Explain how infra-red spectroscopy can be used to determine copolymer reactivity ratio. 7

*Or*

Describe the process of foaming for producing spongy materials.

4. (a) Explain the method of solution polymerisation in the formation of polymer. 8

Or

Describe the process of determination of molecular weight by viscosity measurement method.

- (b) Comment in detail on compression moulding process. 7

Or

What is strain induced morphology of polymer ? Explain.

5. Write short notes on any *three* of the following : 15

- (a) Fibres
- (b) Crystalline melting point ( $T_m$ )
- (c) Polydispersity
- (d) Co-polymers.