Enrollment No./Seat No.:

# GUJARAT TECHNOLOGICAL UNIVERSITY

**Bachelor of Engineering - SEMESTER - VII EXAMINATION - WINTER 2025**

**Subject Code: 3174403** **Date: 24-11-2025**

**Subject Name: Sustainable Polymer Engineering**

**Time: 10:30 AM TO 01:00 PM** **Total Marks: 70**

**Instructions**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

| | | | Marks |
|---|---|---|---|
| **Q.1** | **(a)** | Define: Monomer, Polymer and Oligomer. | **03** |
| | **(b)** | What is repeating units, structural units, degree of polymerization and molecular weight? | **04** |
| | **(c)** | Write a note on classification of polymer. | **07** |
| **Q.2** | **(a)** | Define: homopolymer, co-polymer and fiber. | **03** |
| | **(b)** | What are Elastomers? Explain. | **04** |
| | **(c)** | Discuss poly dispersity and molecular weight distribution. | **07** |
| | | **OR** | |
| | **(c)** | Write a note on Mark-Houwink Sakurda equation. | **07** |
| **Q.3** | **(a)** | Define: structures, configuration and polymerization. | **03** |
| | **(b)** | Write about mechanism and kinetics of polymerization. | **04** |
| | **(c)** | Explain effect of molecular weight on polymer end properties functionality principle. | **07** |
| | | **OR** | |
| | **(a)** | What is addition, condensation and co-polymerization? | **03** |
| | **(b)** | Difference between thermoset and thermoplastic. | **04** |
| | **(c)** | Discuss techniques of polymerization. | **07** |
| **Q.4** | **(a)** | Define: Bulk solution and Emulsion polymerization. | **03** |
| | **(b)** | Write a short note on suspension polymerization. | **04** |
| | **(c)** | Write a note on various types of polymerization reactions in detail | **07** |
| | | **OR** | |
| | **(a)** | What is mechanical, thermal and photo degradation? | **03** |
| | **(b)** | Write advantages and disadvantages of polymer degradation. | **04** |
| | **(c)** | Discuss methods of degradation of polymers in detail. | **07** |

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|---|---|---|---|
| **Q.5** | **(a)** | Define: compression molding, transfer molding and injection molding. | **03** |
| | **(b)** | Comparison of bulk solution, emulsion and suspension polymerization techniques. | **04** |
| | **(c)** | Write a short note on rubber processing in two roll mills. | **07** |

**OR**

| | | | |
|---|---|---|---|
| | **(a)** | What is calendaring molding, thermoforming and internal mixer? | **03** |
| | **(b)** | Write a note on unit operations in polymer industries. | **04** |
| | **(c)** | Write various types of molding in polymer processing. | **07** |

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