

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 4 – EXAMINATION – SUMMER 2026

Subject Code: 3142309

Date: 25/05/2026

Subject Name: Thermoplastic Materials

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.**

- Q.1**
- (a) State the names of any three transparent thermoplastic materials. **03**
 - (b) List the basic characteristics of Thermoplastic materials and give their examples. **04**
 - (c) Draw and explain the manufacturing of Polystyrene through Mass Polymerization(Tower Process). **07**
- Q.2**
- (a) State the properties of Polyvinyl Chloride . **03**
 - (b) List the applications of Polymethyl Methacrylate (PMMA) **04**
 - (c) Draw and describe with a labeled flow diagram, the manufacturing process of Low Density Polyethylene (LDPE) by high pressure process. **07**
- OR
- Q.2**
- (c) Explain the Manufacturing of Polypropylene (PP) with a flow diagram. **07**
- Q.3**
- (a) Draw the structures of the following Thermoplastic materials: i) Polystyrene ii) Poly methyl methacrylate iii) Poly Vinyl chloride **03**
 - (b) List the properties & applications of Polystyrene. **04**
 - (c) Compare the properties of HDPE, LDPE & LLDPE. **07**
- OR
- Q.3**
- (a) Differentiate between commodity & engineering thermoplastics and give at least three examples of each. **03**
 - (b) Justify the statement, "Polyacetal is a suitable material to manufacture wrist watch gears". **04**
 - (c) Explain the manufacturing of High Density Polyethylene (HDPE) with a labeled sketch. **07**
- Q.4**
- (a) Write the reactions for the following processes: i) Manufacturing of Styrene monomer ii) Preparation of Ethylene Glycol from Ethylene **03**
 - (b) Discuss the properties & applications of Polyethylene terephthalate (PET). **04**
 - (c) Draw the Isotactic, Syndiotactic and Atactic structures of Polypropylene. List the properties of Polypropylene. **07**
- OR
- Q.4**
- (a) Draw the structure & state the properties and applications of Acrylonitrile Butadiene Styrene (ABS) **03**
 - (b) Draw the structures and describe the properties & applications of i) EVOH ii) EVA **04**

	(c) Explain the UNIPOL process for manufacturing Linear Low Density Polyethylene (LLDPE)	07
Q.5	(a) Explain the preparation of Methyl methacrylate monomer	03
	(b) Compare the properties of thermoplastics with thermosets.	04
	(c) Discuss the properties & applications of Nylon.	07
	OR	
Q.5	(a) Describe the properties and applications of Polyacrylonitrile (PAN)	03
	(b) List the properties & applications of Polycarbonate (PC) & draw its structure.	04
	(c) State the reaction of preparation of Nylon 66 from hexamethylene diamine and adipic acid and explain its manufacturing with a flow diagram.	07
