Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - VI EXAMINATION - SUMMER 2025

Subject Code: 3160511 **Date: 28-05-2025**

Subject Name: Polymer Science and Technology

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.

			Marks
Q.1	**(a)**	Define: (i) Monomer (ii) Polymer (iii) Kinetic chain length of polymer	**03**
	(b)	State examples and explain applications of polymers in chemical industries	**04**
	(c)	Compare step growth and chain growth polymerization reactions.	**07**
Q.2	**(a)**	Enlist important steps involved in blow molding	**03**
	(b)	Differentiate amorphous and crystalline polymers	**04**
	(c)	Construct a neat labelled diagram and explain working of injection molding machine.	**07**
		OR	
	(c)	Justify why compounding and additives are used in polymer processing?	**07**
Q.3	**(a)**	What are different mechanisms of addition polymerization ?	**03**
	(b)	Classify polymers based on source and their end use applications.	**04**
	(c)	Derive equation for rate of polymerization of free radical polymerization.	**07**
		OR	
	(a)	What are the block and graft co-polymers?	**03**
	(b)	Outline advantages and disadvantages of emulsion polymerization.	**04**
	(c)	Illustrate solution polymerization in detail.	**07**
Q.4	**(a)**	List unit operations involved in polymer industries.	**03**
	(b)	Summarize different types of polymers based on their thermal behavior.	**04**
	(c)	Describe steps involved in polymer synthesis via condensation polymerization reaction.	**07**
		OR	
	(a)	What is degree of polymerization and functionality?	**03**
	(b)	What is the chemical formula of following polymers? (i) Nylon 6,6 (ii) Polystyrene (iii) Polyvinyl chloride (iv) Polyethylene	**04**
	(c)	Describe steps involved in polymer synthesis via anionic polymerization reaction.	**07**

Q.5	**(a)**	Identify important features of suspension polymerization.	**03**
	(b)	Explain number average and weight average molecular weight of polymers.	**04**
	(c)	Appraise viscometery method to determine average molecular weight of polymers.	**07**

OR

	(a)	Outline applications of polymer processing method 'calendaring'.	**03**
	(b)	Classify polymer degradation methods.	**04**
	(c)	Illustrate the environmental impact of polymer degradation.	**07**

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