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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Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3160511 Date:22-05-2024

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	Explain monomer and it's functionality.	**03**
	(b)	Describe conformation and configuration of polymer.	**04**
	(c)	Discuss classification of polymer in detail.	**07**
Q.2	**(a)**	Explain polymer dispersity and molecular weight distribution..	**03**
	(b)	Explain the Concept of Number average molecular weight, weight average molecular weight, viscosity average molecular weight and Z average molecular weight,	**04**
	(c)	Explain effect of molecular weight on polymer and their measurement techniques.	**07**
		OR	
	(c)	Compare bulk, solution, and emulsion and suspension polymerization.	**07**
Q.3	**(a)**	Explain calendaring in polymer industry.	**03**
	(b)	Explain thermoforming and rubber processing in two-roll mill.	**04**
	(c)	Explain the methods of degradation of polymers such as mechanical, thermal, photo, oxidative and bio degradation.	**07**
		OR	
Q.3	**(a)**	Define: (i)Monomer (ii)Polymerization (iii)Number average molecular weight.	**03**
	(b)	Discuss the theory of polymer solutions.	**04**
	(c)	Discuss polymerization reactions in details.	**07**
Q.4	**(a)**	What unit operations are being used in polymer Industries.	**03**
	(b)	Explain the concepts of tacticity and crystallinity in polymer	**04**
	(c)	State Mark-Houwink Sakurda equation with its significance.	**07**
		OR	
Q.4	**(a)**	Explain Stereo Polymerization in brief.	**03**
	(b)	Explain chain and random degradation of polymers with examples?	**04**
	(c)	List different techniques of polymerization and explain any one in detail.	**07**
Q.5	**(a)**	Explain processing of polymer by extrusion in brief.	**03**
	(b)	Explain Injection molding.	**04**
	(c)	Discuss applications of polymers in Chemical industries.	**07**
		OR	
Q.5	**(a)**	Explain block and graft polymers.	**03**
	(b)	Explain Blow molding.	**04**
	(c)	Explain Co-ordination polymerization and condensation Polymerization.	**07**

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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2023

Subject Code:3160511 Date:12-07-2023

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	Define: (i)Weight average molecular weight (ii)Viscosity average molecular weight (iii) Z average molecular weight.	**03**
	(b)	Explain effect of molecular weight on polymer.	**04**
	(c)	List different techniques of polymerization and explain any one. .in	**07**
Q.2	**(a)**	What unit operations are being used in polymer Industries?	**03**
	(b)	Explain the concepts of tacticity and crystallinity in polymer.	**04**
	(c)	State Mark-Houwink Sakurda equation with its significance.	**07**
		OR	
	(c)	Discuss classification of polymer in detail.	**07**
Q.3	**(a)**	What is degree of polymerization and functionality?	**03**
	(b)	Compare emulsion and suspension polymerization.	**04**
	(c)	Write a short note on Co-Polymerization.	**07**
		OR	
Q.3	**(a)**	Define: (i)Monomer (ii)Polymerization (iii)Number average molecular weight.	**03**
	(b)	Differentiate Chain and random polymerization.	**04**
	(c)	Explain addition polymerization with its classifications.	**07**
Q.4	**(a)**	Explain different types of monomer.	**03**
	(b)	Describe rearrangements and stereo Polymerization.	**04**
	(c)	Describe thermal degradation and mention the factors affecting the thermal stability of polymers?	**07**
		OR	
Q.4	**(a)**	Explain polymer dispersity and molecular weight distribution.	**03**
	(b)	Explain Pultrusion in polymer industry.	**04**
	(c)	Explain Compression molding with neat diagram.	**07**
Q.5	**(a)**	Explain block and graft polymers.	**03**
	(b)	Discuss the theory of polymer solutions	**04**
	(c)	Explain Co-ordination polymerization and condensation Polymerization.	**07**
		OR	
Q.5	**(a)**	Explain processing of polymer by extrusion in brief.	**03**
	(b)	Explain thermoforming and rubber processing in two-roll mill.	**04**
	(c)	Explain chain and random degradation of polymers with examples.	**07**

Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2022

Subject Code:3160511 Date:08/06/2022

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain monomer and it's functionality.	**03**
	(b)	Describe conformation and configuration of polymer.	**04**
	(c)	Discuss classification of polymer in detail.	**07**
Q.2	**(a)**	Explain polymer dispersity and molecular weight distribution.	**03**
	(b)	Explain the Concept of Number average molecular weight, weight average molecular weight, viscosity average molecular weight and Z average molecular weight.	**04**
	(c)	Explain effect of molecular weight on polymer and their measurement techniques.	**07**
		OR	
	(c)	Discuss the theory of polymer solutions, solubility parameter and Mark-HouwinkSakurda equation.	**07**
Q.3	**(a)**	Explain addition polymerization.	**03**
	(b)	Describe rearrangements and stereo Polymerization.	**04**
	(c)	Discuss polymerization reactions in details.	**07**
		OR	
Q.3	**(a)**	Explain emulsion and suspension polymerization techniques.	**03**
	(b)	Compare bulk, solution, and emulsion and suspension polymerization.	**04**
	(c)	Discuss different polymerization techniques.	**07**
Q.4	**(a)**	Explain polymer degradation.	**03**
	(b)	Differentiate Chain and random polymerization.	**04**
	(c)	Explain the methods of degradation of polymers such as mechanical, thermal, photo, oxidative and bio degradation.	**07**
		OR	
Q.4	**(a)**	What is Bio degradation? Explain with example.	**03**
	(b)	Discuss emulsion and solution polymerization with examples.	**04**
	(c)	Explain polymerization techniques with any two case studies.	**07**
Q.5	**(a)**	What unit operations are being used in polymer Industries?	**03**
	(b)	Explain different molding techniques.	**04**
	(c)	Discuss any polymer processing unit with examples.	**07**
		OR	
Q.5	**(a)**	Explain thermoforming and rubber processing in two-roll mill.	**03**
	(b)	Explain application of injection and transfer molding.	**04**
	(c)	Explain Co-ordination polymerization and condensation Polymerization	**07**

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