

Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII EXAMINATION – SUMMER 2025

Subject Code:3170510

Date:16-05-2025

Subject Name:Process Intensification

Time:02:30 PM TO 05:00 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: process intensification. Also, explain the main benefits of process intensification.	03
	(b) Explain the fundamental principles of process intensification.	04
	(c) Draw and discuss schematic of toolbox for Process intensification.	07
Q.2	(a) Explain the concept of membrane distillation.	03
	(b) Discuss various techniques of Process Intensification (PI) Applications.	04
	(c) Explain the working principle of spinning disc reactor. Discuss the Nusselt flow model for this reactor.	07
	OR	
	(c) Discuss working of Catalytic plate reactor with neat sketch, merits and demerits.	07
Q.3	(a) Explain the concept in Reactive absorption.	03
	(b) What is catalyst? Discuss overview of structured reactors.	04
	(c) Explain the principle and working of Micro-channel heat exchangers. Also justify that which parameters are intensified?	07
	OR	
Q.3	(a) Explain the role of Environmental Catalysis in designing of reactors.	03
	(b) Write the significance of Gauzes, Structured Packings and Foams in field of reactors.	04
	(c) Describe the principle and working of Flat tube-and-fin heat exchangers with necessary diagram.	07
Q.4	(a) Enlist and explain the applications of Monolith reactors with necessary example.	03
	(b) Enlist and elaborate the selection criteria of heat exchangers.	04
	(c) Discuss and elaborate the case study of Methyl Acetate Synthesis as PI.	07
	OR	
Q.4	(a) Write a short note on Ultrasound Atomization.	03
	(b) Explain dividing wall columns of distillation with neat sketch.	04
	(c) Discuss and elaborate the case study of Synthesis of Methyl Tertiary Butyl Ether.	07
Q.5	(a) Describe briefly about Rotor stator mixers.	03
	(b) Discuss Barriers and future prospects associated with Hybrid Separation.	04
	(c) Discuss Membrane absorption and Membrane stripping.	07

OR

- Q.5** (a) State the name of various novel reactors used in process industry. **03**
(b) Describe the Mixing in intensified equipment. **04**
(c) Discuss working of Extractive distillation operation with necessary diagram, merits and demerits. **07**
