Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 7 – EXAMINATION – SUMMER 2026

Subject Code: 3170510 **Date: 29/05/2026**

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.**

Q.1	**(a)**	Define Process Intensification and state its objectives.	**03**
	(b)	Discuss the benefits of Process Intensification in chemical industries.	**04**
	(c)	Describe the concept of the PI toolbox and discuss its functions in process industries.	**07**
Q.2	**(a)**	Define Spinning Disc Reactor.	**03**
	(b)	Outline the philosophy of process intensification and explain it with relevant examples.	**04**
	(c)	Explain Rotating Packed Bed (Higee) with advantages and applications.	**07**
		OR	
Q.2	**(c)**	Explain Oscillatory Baffled Reactor (OBR) with mixing characteristics	**07**
Q.3	**(a)**	State limitations of Process Intensification techniques.	**03**
	(b)	Describe micro-reactors and discuss their significance in industrial applications.	**04**
	(c)	Discuss various intensive mixers and explain their working principles.	**07**
		OR	
Q.3	**(a)**	Outline supercritical separation process	**03**
	(b)	Compare intensified reactors with conventional reactors.	**04**
	(c)	Outline reactive distillation and discuss its benefits and applications in industry.	**07**
Q.4	**(a)**	Define Hybrid Separation with examples and benefits.	**03**
	(b)	Summarize the scale-up limitations in process intensification	**04**
	(c)	Analyze mass and heat transfer in intensified reactors.	**07**
		OR	
Q.4	**(a)**	Define Reactive Distillation.	**03**
	(b)	Analyze challenges in scaling micro-reactors	**04**
	(c)	Evaluate performance of Rotating Packed Bed in industrial applications.	**07**
Q.5	**(a)**	Investigate the factors affecting mass transfer in structured reactors.	**03**
	(b)	Discuss hybrid separation methods along with relevant examples.	**04**
	(c)	Analyze Dividing Wall Column (DWC) and its energy advantages	**07**
		OR	
Q.5			

(a)	List compact heat exchangers.	**03**
(b)	Describe Membrane Distillation with advantages.	**04**
(c)	Design an integrated reaction–separation system (e.g., MTBE / Methyl Acetate).	**07**

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