

GUJARAT TECHNOLOGICAL UNIVERSITY**BE – SEMESTER- VII EXAMINATION-SUMMER 2023****Subject Code: 3170510****Date: 26/06/2023****Subject Name: Process Intensification****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

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|------------|---|-----------|
| Q.1 | (a) Explain the numerous Barriers for Process Intensification. | 03 |
| | (b) Discuss the fundamental principles of Process Intensification. | 04 |
| | (c) Draw and explain the schematic of toolbox for Process intensification. | 07 |
| Q.2 | (a) Explain the concept in Reactive absorption. | 03 |
| | (b) Write a brief note on several techniques of Process Intensification (PI) Applications. | 04 |
| | (c) Explain the working principle of spinning disc reactor with necessary diagram and also discuss the Nusselt flow model for this reactor. | 07 |
| | OR | |
| | (c) Write a short note on printed circuit board heat exchangers. | 07 |
| Q.3 | (a) Explain the concept of supercritical extraction. | 03 |
| | (b) Discuss the selection criteria of heat exchanger technology. | 04 |
| | (c) Explain the principle and working of Flat tube-and-fin heat exchangers with necessary diagram. | 07 |
| | OR | |
| Q.3 | (a) Discuss Mass Transfer in Monoliths structures. | 03 |
| | (b) Write a short note on static mixers. | 04 |
| | (c) Discuss the process intensification in process of Absorption of NO _x . | 07 |
| Q.4 | (a) Write a brief note on the Environmental Catalysis. | 03 |
| | (b) Enlist and describe the different Barriers and future prospects of Hybrid Separation. | 04 |
| | (c) Explain the principle and working of Micro-channel heat exchangers. Which parameters are intensified? | 07 |
| | OR | |
| Q.4 | (a) List out the existing and potential applications of extractive distillation. | 03 |
| | (b) What are structure reactors? Give classification of structure reactors with typical example. | 04 |
| | (c) Discuss and explain case study of Synthesis of Methyl Tertiary Butyl Ether. | 07 |
| Q.5 | (a) Explain the Heat Integrated Distillation Trains. | 03 |
| | (b) Explain the Gauzes, Structured Packings, and Foams in field of reactors. | 04 |
| | (c) Discuss in brief Catalytic Plate Reactor (CPR) with example of various reactions. | 07 |
| | OR | |
| Q.5 | (a) Write a short note on Ultrasound Atomization. | 03 |
| | (b) Explain dividing wall columns of distillation with neat sketch. | 04 |
| | (c) Describe Membrane-Enclosed catalytic reactor in detail. | 07 |
