

GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER-VI (NEW) EXAMINATION – WINTER 2020

Subject Code: 2160503**Date: 22/01/2021****Subject Name: Process Equipment Design -I****Time: 02:00 PM TO 04:00 PM****Total Marks: 47****Instructions:**

1. Attempt any **THREE** questions from Q.1 to Q.6.
2. **Q.7 is compulsory.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**

			MARKS
Q.1	(a)	Explain various locations of pressure taps with neat sketch in orifice meter.	03
	(b)	Write a brief note on NPSH for centrifugal pumps.	04
	(c)	Give the functions of various parts of shell and tube heat exchanger.	07
Q.2	(a)	Write a brief note on Fluid allocation in shell and tube heat exchanger.	03
	(b)	Explain Tinker's flow model with a neat diagram.	04
	(c)	Discuss in detail about criteria of selection between kettle type and thermosyphon reboiler.	07
Q.3	(a)	Define: Weeping, Entrainment, Coning in distillation column	03
	(b)	Explain the method for determining minimum reflux ratio for binary distillation	04
	(c)	Discuss the criteria of selection among the different types of trays used in tray tower.	07
Q.4	(a)	Explain in short –Jet flooding and Downcomer Flooding.	03
	(b)	Write short note on selection of key components in multicomponent distillation.	04
	(c)	Explain McCabe Thiele Method and FUG method in detail	07
Q.5	(a)	Explain the functions of liquid redistributor and hold down plate in absorber.	03
	(b)	With neat sketch explain the various types of packing support used in packed column	04
	(c)	Discuss the criteria for selection of various absorption equipments.	07
Q.6	(a)	State and discuss in short the various types of Liquid Distributors	03
	(b)	Discuss in brief Random and Regular packing.	04
	(c)	Design a scrubber for absorbing acetone vapor from air acetone vapor mixture by using water as a pure solvent. The temperature in scrubber is 25 ⁰ C and scrubbing is isothermal. Operating pressure of scrubber is near atmospheric. A mixture of air with acetone vapor containing 6% by volume of acetone is passed through the scrubber. The mixture contains 1400 m ³ /hr of air. The scrubber is required to absorb 98% of the acetone. At 25 ⁰ C vapor pressure of acetone = 228.416 torr	07

- Q.7** Discuss the industrial applications of Liquid Liquid Extraction. **05**
- OR**
- Discuss in brief the design steps for the process design of horizontal settler **05**
