

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

- 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**

\*\*\*\*\*

[www.FirstRanker.com](http://www.FirstRanker.com)