Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2020

Subject Code: 2170403 **Date:21/01/2021**

Subject Name: Bioprocess Plant Design

Time:10:30 AM TO 12:30 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Notations used, have conventional meaning.**
5. **Assume suitable data wherever necessary.**

Q.1	**(a)**	Give the full form of HTRI, ASTM & TEMA.	**03**
	(b)	Write a short note on various types of Nozzle used in industry.	**04**
	(c)	Discuss various types of feed arrangement used in multiple effect evaporators.	**07**
Q.2	**(a)**	Write in brief about Process Flow diagram.	**03**
	(b)	Define the term: Stress, Strain, Modulus of elasticity, Resilience	**04**
	(c)	With the help of neat sketch, discuss the construction and working of forced circulation evaporator.	**07**
Q.3	**(a)**	Define: LMTD with equation for counter current heat exchange process.	**03**
	(b)	Discuss the concept of Boiling Point Elevation in Evaporator.	**04**
	(c)	With the help of neat sketch of shell and tube heat exchanger, discuss the importance of tube pitch, baffles and various types of pitch arrangement.	**07**
Q.4	**(a)**	Draw the neat sketch for saddle support with its notations.	**03**
	(b)	Describe the factor used for the selection of distillation tower.	**04**
	(c)	Write the steps for the designing of fixed conical roof storage tanks.	**07**
Q.5	**(a)**	Define the term optimum reflux ratio with its importance in design of distillation column.	**03**
	(b)	Draw the neat sketches for various types coils used in industries.	**04**
	(c)	Discuss different types of heads used in the industry with neat sketch.	**07**
Q.6	**(a)**	What do you mean by the term capacity and economy of an evaporator?	**03**
	(b)	Discuss the advantages and disadvantages of vacuum distillation.	**04**
	(c)	Discuss in detail about Weld joint efficiency factor and Corrosion Allowance.	**07**
Q.7	**(a)**	Explain the term: Design pressure, Design temperature & Design Stress.	**03**
	(b)	Briefly explain the importance of Process & Instrumentation diagram (PID) in industries.	**04**
	(c)	Discuss the factors affecting the fluid allocation in Shell and Tube heat exchanger in brief.	**07**
Q.8		Starting with all assumptions and limitations, discuss Mc-Cabe Thiele method for finding number of theoretical stages in plate type distillation column.	**14**

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