Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI EXAMINATION – SUMMER 2025

Subject Code: 3160501 Date: 20-05-2025

Subject Name: Mass Transfer Operations II

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
Q.1	**(a)**	Describe the concept of Flash Distillation.	**03**
	(b)	Discuss importance of vacuum distillation.	**04**
	(c)	Discuss positive deviations from ideality with neat sketch.	**07**
		OR	
Q.2	**(a)**	Define Reflux Ratio.	**03**
	(b)	List assumptions of McCabe-Thiele method and its limitations.	**04**
	(c)	Write a short note on Azeotrope.	**07**
		OR	
	(c)	Explain Adsorption hysteresis with figure.	**07**
Q.3	**(a)**	Explain Extractive distillation.	**03**
	(b)	Describe Azeotropic distillation briefly.	**04**
	(c)	A gas (B)–benzene (A) mixture is saturated at 1 std atm, 50° C. Calculate the absolute humidity if B is (a) nitrogen and (b) carbon dioxide. Vapor pressure of nitrogen at 50°C is given as 0.362 std atm.	**07**
		OR	
Q.3	**(a)**	Explain physical adsorption.	**03**
	(b)	Classify rotary dryer and explain any one in brief.	**04**
	(c)	Define: (1) Absolute humidity (2) Relative humidity (3) Dry-bulb temperature (4) Wet-bulb temperature (5) Humid volume (6) Humid Heat (7) Lewis relation	**07**

Q.4	**(a)**	Define Moisture content on wet basis and dry basis.	**03**
	(b)	With neat sketch, explain drum dryer.	**04**
	(c)	Why cooling towers are used in chemical process industries, give the classification and explain in detailed about cooling tower used in power plants.	**07**

OR

Q.4	**(a)**	Explain Freeze Drying with application.	**03**
	(b)	Explain: i) Bound moisture ii) Free moisture iii) Equilibrium moisture iv) Critical moisture	**04**
	(c)	Write Freundlich equation. How is it applied to two-stage cross current adsorption?	**07**
Q.5	**(a)**	Explain nature of adsorbents.	**03**
	(b)	Explain rate of drying curve with neat diagram.	**04**
	(c)	Write brief note on Pressure Swing Adsorption (PSA).	**07**

OR

Q.5	**(a)**	Explain Vacuum drying with example.	**03**
	(b)	Explain cross current adsorption.	**04**
	(c)	What do you mean by Ion Exchange? Describe techniques and application of ion exchange and list out the factors on which rate of ion exchange is dependent.	**07**

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