Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V- EXAMINATION – SUMMER 2016

Subject Code: 153502 **Date: 21/05/2016**

Subject Name: Basics of Mass Transfer

Time: 02:30 PM to 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	State dimensions and SI units of diffusivity, concentration gradient, and molar flux. Convert 1 cm^2/s, 1 (mol/l)/ (cm), and 1 mol/cm^2 s to corresponding SI units.	**07**
	(b)	Define the following terms : (1) Relative volatility (2) critical moisture content (3) nucleation (4) wet-bulb temperature (5) vapor pressure (6) absolute humidity (7) partial pressure	**07**
Q.2	**(a)**	Starting from Fick's law of diffusion, derive an integrated equation to compute the molar flux of gas A diffusing through non-diffusing gas B. A and B are ideal gases.	**07**
	(b)	Describe the process of binary distillation with the help of a T-xy diagram.	**07**
		OR	
	(b)	What are various factors influencing the rate of leaching? Describe their effect on leaching process. Explain the terms overflow and underflow.	**07**
Q.3	**(a)**	Derive a relation between individual and overall mass transfer coefficients according to two film theory.	**07**
	(b)	Write principle of membrane separation. Explain in brief electro dialysis with neat sketch.	**07**
		OR	
	(a)	What are various factors influencing the rate of leaching? Describe their effect on leaching process. Explain the terms overflow and underflow.	**07**
	(b)	Draw a neat schematic diagram of forward feed triple effect evaporator?	**07**
Q.4	**(a)**	Describe with a schematic diagram Induced draft cooling tower.	**07**

	(b)	Derive Rayleigh equation for batch distillation.	**07**

OR

Q.4	**(a)**	Show on a drying curve free, critical, and equilibrium moisture contents of a solid?	**07**
	(b)	Draw a schematic diagram of tray type gas absorption column and describe the process.	**07**

OR

Q.5	**(a)**	Describe with a schematic diagram circulating-magma vacuum crystallizer.	**07**
	(b)	Describe with a schematic diagram circulating-liquid evaporator crystallizer.	**07**

OR

Q.5	**(a)**	Draw a schematic diagram of packed bed gas absorption column and described the process.	**07**
	(b)	Define liquid-liquid extraction. Explain choice of solvent for extraction.	**07**

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