Seat No.: _____

Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER- V • EXAMINATION - WINTER 2016

	Subject Code: 153502 Date: 24/11/2 Subject Name: Basics of Mass Transfer)16	
	Tir Inst	ne: 10:30AM – 01:00PM ructions: 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks.	0	
Q.1	(a)	Define relative percentage humidity, humidity, and humid heat.	07	
	(b)	State dimensions and SI units of enthalpy, pressure, molar flux. Convert 1 atm., 1 cal/hr, and 1 gm/cm ³ to corresponding SI units.	07	
Q.2	(a)	Derive a relation between individual and overall mass transfer coefficients according to two film theory.	07	
	(b)	With a neat sketch of continuous fractionating distillation column explain relative volatility, reflux and q-line.	07	
	(b)	OR Explain the construction and working of a tray drier with a neat diagram.	07	
Q.3	(a)	Write principle of membrane separation. Explain the types of membrane in Detail.	07	
	(b)	What are the different types of packing material used in packed tower? Differentiate between random and regular packing arrangement.	07	
	(a)	OR With neat sketch explain construction and working of Oslo cooling crystallizer.	07	
	(b)	Draw a neat schematic diagram of forward feed triple effect evaporator?	07	
Q.4	(a)	Write in brief construction and working of drum dryer.	07	
	(b)	Derive Rayleigh equation for batch distillation.	07	
Q.4	(a)	OR Show on a drying curve free, critical, and equilibrium moisture contents of a solid?	07	
	(b)	When is the operation liquid extraction used in chemical process industry? Explain binodal solubility curve taking suitable example of a ternary system.	07	

OR

07

Q.5 (a) Define the term relative volatility (α) and hence derive the following equation for a binary system

$$y = \frac{\alpha x_A}{1 + (\alpha - 1)x_A}$$

(b) Describe with a schematic diagram circulating-liquid evaporator crystallizer. 07

OR

- Q.5 (a) What are the advantages of membrane separation processes? Give any three 07 membrane separation processes and mention their driving forces.
 - (b) Define liquid-liquid extraction. Explain choice of solvent for extraction. 07
