Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV • EXAMINATION – WINTER 2013

Subject Code: 143502 **Date: 23-12-2013**

Subject Name: Chemical Engineering Operation

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)**	Define following terms: (i) Dry Bulb Temperature (ii) Wet Bulb Temperature (iii) Relative humidity (iv) Saturation humidity (v) Humid heat (vi) Humid volume (vii) Critical moisture content.	**07**
	(b)	List methods of feeding in a multiple effect evaporators. Explain any one in detail with schematic diagram for triple effect evaporator.	**07**
Q.2	**(a)**	What are the advantages and limitations of membrane separation processes over conventional separation processes?	**07**
	(b)	Give and discuss the factors to be considered for choice of solvent for liquid-liquid extraction.	**07**
		OR	
	(b)	Derive and explain Rayleigh equation for the differential distillation of binary mixture.	**07**
Q.3	**(a)**	Explain the principle and working of fluidized bed drier with suitable diagram.	**07**
	(b)	Explain differential and cumulative methods for size analysis of mixture of solid particles.	**07**
		OR	
Q.3	**(a)**	Explain in detail plate and frame filter press with its neat diagram. Also give its advantages and disadvantages.	**07**
	(b)	Explain the terms minimum reflux ratio, total reflux ratio and optimum reflux ratio in the distillation.	**07**
Q.4	**(a)**	Give the types of evaporator? And discuss at least five factors affecting evaporation process.	**07**
	(b)	Write various types of tray (plate) towers used for absorption? And explain any one with neat diagram.	**07**
		OR	
Q.4	**(a)**	Discuss in detail the types of adsorption and nature of adsorbents. Also list out principal adsorbents generally used.	**07**
	(b)	Give the classification of crystallizer? Explain any one crystallizer with neat diagram?	**07**
Q.5	**(a)**	Explain the principle of separation for membrane based gas separation processes? Give pore size ranges for different membrane filtration processes.	**07**
	(b)	Explain the mechanism of filtration in detail? And differentiate between constant pressure filtration and constant rate filtration.	**07**

OR

Q.5	**(a)**	Explain industrial applications of gas absorption? Also give factors that should be considered while selecting a solvent for gas absorption.	**07**
	(b)	What is boiling point elevation in evaporation? Write a note on capacity and economy of evaporator.	**07**

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