

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: 07
(i) Dry Bulb Temperature (ii) Wet Bulb Temperature (iii) Relative humidity
(iv) Saturation humidity (v) Humid heat (vi) Humid volume (vii) Critical moisture content.
- (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
