

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VI • EXAMINATION – WINTER 2013

Subject Code: 160501**Date: 27-11-2013****Subject Name: Mass Transfer Operations -II****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: **07**
 (1) Distillation (2) Adsorption (3) Ion Exchange (4) Drying (5) Humidification (6) Relative volatility (7) Azeotrope.
- (b) Write a short note on extractive distillation. **07**
- Q.2** (a) Explain with suitable examples the difference in physical adsorption and chemisorption. **07**
- (b) List out various types of cooling towers and discuss their selection criteria in detail. **07**
- OR**
- (b) Explain with the sketch, the principle and working of spray drier. **07**
- Q.3** (a) Explain positive deviation from ideality and minimum boiling azeotrope. **07**
- (b) What is reflux ratio? Derive Fenske's equation for the minimum number of theoretical stages. **07**
- OR**
- Q.3** (a) Derive q-line equation for introduction of feed in the distillation column. **07**
- (b) A liquid mixture containing 50 mol% n-heptane (A), 50 mol% n-octane (B), at 30°C, is continuously flash-vaporized at 1 std atm pressure to vaporize 60 mol% of the feed. Determine the composition of the vapor and liquid in the separator for an equilibrium stage. Average relative volatility = 2.17 **07**
- Q.4** (a) Discuss in detail about Steam Distillation with example and compare it with vacuum distillation. **07**
- (b) Explain differential distillation and derive Rayleigh equation. **07**
- OR**
- Q.4** (a) Explain rate of drying curve. **07**
- Q.4** (b) Explain Adsorption isotherm and hysteresis. **07**
- Q.5** (a) Explain with the sketch, the principle and working of rotary drier. **07**
- (b) Derive the equation of adiabatic saturation curve. **07**
- OR**
- Q.5** (a) Discuss the principles of ion exchange with example. **07**
- (b) Define: (1) Absolute humidity (2) Relative humidity (3) Dry-bulb temperature (4) Wet-bulb temperature (5) Humid volume (6) Humid volume (7) Lewis relation **07**
