GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER – VI (OLD).EXAMINATION – WINTER 2016

Subject Code: 160501   **Date: 26/10/2016**
Subject Name: Mass Transfer Operation –II
Time: 10:30 AM to 01:00 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)** Explain the McCabe Thiele method to calculate the number of stages for given feed mixture.   **07**

(b) An Equimolar feed mixture of n-heptane (A) and n-octane (B) were subjected to a differential distillation at atmospherics pressure, with 60 mol% of the liquid distilled. Compute the composition of the composited distillate and residue. Use following equilibrium data.   **07**

X	0.5	0.46	0.42	0.38	0.34	0.32
Y*	0.689	0.648	0.608	0.567	0.523	0.497

Q.2 **(a)** Explain : Early feed entry, Delayed feed entry, Optimum feed entry, Pinch   **07**
(b) Discuss briefly on Steam distillation.   **07**
OR
(b) Discuss briefly on extractive distillation.   **07**

Q.3 **(a)** Explain the working of Higgins contactor.   **07**
(b) Write briefly on chromatographic separation of two solutes.   **07**
OR
Q.3 **(a)** Discuss principle of ion exchange.   **07**
(b) State Freundlich equation and explain it applications in adsorption.   **07**

Q.4 **(a)** Compare various types of cooling tower.   **07**
(b) Discuss the concept of wet bulb temperature.   **07**
OR
Q.4 **(a)** An air-water vapor sample has a dry bulb temperature 55 ^{0}C and an absolute humidity 0.03 kg water/ kg dry air at 1 std atm pressure. Calculate percentage humidity, molal absolute humidity, partial pressure of water vapor, dew point and humid volume.   **07**
(b) Derive the equation of adiabatic saturation curve.   **07**

Q.5 **(a)** Define: Equilibrium moisture, bound moisture, unbound moisture, free moisture, deliquesce, critical moisture, moisture content on wet basis.   **07**
(b) Write shortly on rotary dryer.   **07**
OR
Q.5 **(a)** Explain the movement of moisture within the solid by liquid diffusion.   **07**
(b) Discuss tray dryer and truck dryer with neat diagram.   **07**

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Psychrometric chart showing absolute humidity, enthalpy, and humid volume as functions of temperature. Axes: Temperature, °C (horizontal); Y' = absolute humidity, kg water vapor/kg dry air; H' = enthalpy, kJ/kg dry air; V_H = humid volume, m³/kg dry air. Curves shown include the adiabatic saturation curve, enthalpy of dry air, enthalpy of saturated air (H', saturated air), specific volume dry air, saturated humid volume, and percent humidity lines (2%, 5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% humidity).