Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV EXAMINATION – WINTER 2015

Subject Code: 143502 Date:01/01/2016

Subject Name: Chemical Engineering Operations

Time: 02:30pm to 05:00pm 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)** Write a short note on ribbon blender. **07**

(b) Define: 'Cake Filtration' and derive equation for constant pressure cake filtration. **07**

Q.2 **(a)** Size analysis of finely divided catalyst particles is represented as: **07**

Average Diameter of Particles, (Cm)	0.0250	0.0180	0.0126	0.0089	0.0038
Weight fraction (x_i)	0.096	0.170	0.294	0.190	0.250

If density and sphericity of these particles are 1.2 gm/Cm^3 and 0.5 respectively, calculate mass mean diameter and specific surface area of particles.

(b) Draw a neat diagram and explain construction, working and applications of a tunnel drier. **07**

OR

(b) Write a short note on flash distillation. **07**

Q.3 **(a)** Derive material balance equation for an evaporator. **07**

(b) Explain step-wise procedure to calculate number of theoretical plates in a binary distillation using McCabe-Thiele method. **07**

OR

Q.3 **(a)** State seven differences between liquid liquid extraction and distillation. **07**

(b) Answer the following: **07**

(1) Define: (i) magma (ii) super saturation **02**

(2) Explain solubility curves. **05**

Q.4 **(a)** Draw a neat diagram and explain construction, working and applications of an 'Oslo Crystallizer'. **07**

(b) Write a short note on reverse osmosis. **07**

OR

Q.4 **(a)** What is the role of solvent in absorption? Explain important criteria for solvent selection in absorption operation. **07**

(b) List out different isotherms in adsorption and explain any one in detail. **07**

Q.5 **(a)** Derive an equation for total drying time in a batch dryer. **07**

(b) Answer the following: **07**

(1) Define: (i) absorption (ii) adsorption. **02**

(2) State five applications of ultra filtration. **05**

OR

Q.5 **(a)** Enlist various industrial screens and with neat diagram explain construction, working and applications of any one in detail. **07**

(b) Write a short note on cooling towers. **07**

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