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## GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-V • EXAMINATION – SUMMER • 2015

Subject Code: 150505 Date: 15-05-2015 Subject Name: Fundamentals of Chemical Engineering Unit Operations

Time: 02.30 pm - 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) How would you define unit operations & unit processes? State and explain 07 any four types mass transfer operations with suitable examples.
  - (b) With a neat sketch explain the construction, working principle and industrial **07** application of Roll crusher.
- Q.2 (a) What do you mean by compressible and incompressible fluid? Discuss the 07 detail classification of fluid.
  - (b) Distinguish between head meter and area meter. Describe the construction 07 and working principle of Rotameter.

## OR

- (b) Distinguish between pump and compressor. Explain the construction and **07** working of reciprocating pump.
- Q.3 (a) Write a short note on "Gravity thickener". (A note preferably should include 07 working principle, brief about construction, applications and related issues)
  - (b) State and explain the Fourier's law of heat conduction and discuss about the various types of heat flow processes.

## OR

- Q.3 (a) Write a short note on "Rotary drum filter". (A note preferably should include 07 working principle, brief about construction, applications and related issues)
  - (b) Distinguish between boiling & condensation. Briefly describe the concept of film wise and drop wise condensation phenomena.
- Q.4 (a) What is heat exchanger? Draw the neat sketch of 1-2 shell & tube heat 07 exchanger and explain the function of its various parts.
  - (b) Define the following terms. (i) Entrainment (ii) Priming (iii) Coning (iv) 07 Weeping (v) Dumping (vi) Flooding (vii) Loading.

| Q.4   | (a) | Differentiate between evaporation and drying. Discuss about the working | 07 |
|---|-----|---|----|
| principle & industrial application falling film evaporator. |     |   |    |

- (b) Define the following terms. (i) Absolute humidity (ii) Relative humidity (iii) 07

  Percentage saturation (iv) Humid volume (v) Dew point (vi) Dry bulb temperature (vii) Wet bulb temperature.
- Q.5 (a) Define relative volatility. Explain the working principle of steam distillation.O7State the advantages & disadvantages of steam distillation.
  - (b) Explain the concept of minimum liquid to gas ratio for absorption. 07

## OR

- Q.5 (a) Classify the industrial dryers. Describe the working principle and industrial 07 application of spray dryer.
  - **(b)** Define liquid-liquid extraction & distribution coefficient. Briefly discuss **07** about the crosscurrent, countercurrent and fractional extraction.

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