

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. Sem. - V - Examination – June- 2011

Subject code: 150505

Subject Name: Fundamentals of Chemical Engineering Unit Operations

Date: 30/06/2011

Time: 10:30 am – 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) Distinguish between Unit operations and Unit processes. List out the various types of unit operations by giving their brief introduction. **07**
- (b) Classify the size reduction equipments and briefly explain the construction, working principle and industrial application of any one of them. **07**

- Q.2** (a) Differentiate between Newtonian and Non-Newtonian fluid. Discuss & illustrate with diagram some possible characteristics of Non-Newtonian fluid. **07**
- (b) What are the assumptions necessary to derive the Bernoulli's theorem? Derive the Bernoulli's equation for the flow of an incompressible fluid flowing through a pipeline. **07**

OR

- (b) Name the various types of pumps used for the fluid transportation. Briefly explain the construction and working of any one of them. **07**
- Q.3** (a) Write a short note on "Cyclone separator". (A note preferably should include working principle, brief about construction, applications and related issues) **07**
- (b) What are the various modes of heat transfer operations? Explain each of them with suitable examples. **07**

OR

- Q.3** (a) Write a short note on "Plate and frame filter press". (A note preferably should include working principle, brief about construction, applications and related issues) **07**
- (b) Discuss about pool boiling and briefly explain the various regimes of pool boiling for saturated liquid. **07**
- Q.4** (a) Explain with a neat sketch the construction and working of a shell & tube heat exchanger. **07**
- (b) With a neat sketch explain the construction, working and industrial application of the tray column. **07**

OR

- Q.4** (a) Discuss the principle of evaporators. List out various types of evaporators and briefly explain the working of any one of them. **07**
- (b) With a neat sketch explain the construction, working and industrial application of the cooling tower. **07**
- Q.5** (a) Define distillation & relative volatility. Explain schematically the working of a simple distillation showing all the important details. **07**

- (b) State and discuss the different criteria for solvent selection in the gas absorption. **07**

OR

- Q.5** (a) With a neat sketch explain the working of a tray drier. Also cite any two industrial application of tray drier. **07**
- (b) State and discuss the different criteria for solvent selection in the liquid – liquid extraction. **07**
