

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V • EXAMINATION – SUMMER 2013****Subject Code: 150505****Date: 23-05-2013****Subject Name: Fundamentals of Chemical Engineering Unit Operations****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) Define the terms: Unit Operations, Unit Processes, Equation of State, Ideal Gas Law, Partial Pressure, Material Balance and Energy Balance. **07**

(b) Draw a neat and labeled sketch of different parts in shell and tube heat exchanger and explain the function of any two parts. **07**

Q.2 (a) Enlist different types of pump. Discuss about NPSH, cavitation and priming. **07**

(b) Write in brief on rheological characteristics of fluid with diagram for newtonian and non-newtonian fluid. **07**

OR

(b) With a neat sketch explain different types of valve and their application. **07**

Q.3 (a) According to the industrial application classify different types of size reduction equipment. Describe any one of them. **07**

(b) Explain the process for removing solid particles from gas stream containing no moving parts. **07**

OR

Q.3 (a) State and discuss any one main type of steam-heated tubular evaporators in current use. **07**

(b) Depending upon the behavior of condensate on the cooled surface explain the distinct modes of condensation process. **07**

Q.4 (a) What do you understand about conduction, convection, radiation, subcooled boiling, nucleate boiling, LMTD and blackbody? **07**

(b) List out various types of measurement of flowing fluids. Briefly discuss the construction, working principle and industrial application of any one. **07**

OR

Q.4 (a) With a neat sketch of continuous fractionating distillation column explain relative volatility, reflux and q-line. **07**

Q.4 (b) Write a brief note on types of packing used in packed tower. **07**

Q.5 (a) Define liquid-liquid extraction. Explain choice of solvent for extraction. **07**

(b) Explain the mechanism of crystallization process. **07**

OR

Q.5 (a) Classify dryers based on the method of supplying heat to material. Write a short note on tray dryer. **07**

(b) State and discuss types of water cooling tower. Draw a neat sketch of cooling tower arrangements. **07**
