# **GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-VI (NEW) - EXAMINATION - SUMMER 2016** 

Subject Code:2160507

Date:17/05/2016

Subject Name: Advance Separation Techniques 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 Residuum Oil Supercritical Extraction (ROSE) process with a neat flowsheet. Describe the advantages of this process over conventional propane deasphalting process
  - (b) Explain the concept of Reactive Distillation and with a neat flowsheet .Describe 07 the manufacturing of ETBE by Reactive Distillation process
- Q.2 (a) Explain working of Short Path Distillation unit in detail with a neat sketch 07 indicating all the components of the unit.
  - (b) Explain concept of Pressure Swing Distillation(PSD). Also describe the working of 07 PSD for the separation of the Acetonitrile-Water system.

#### OR

- (b) Discuss in detail the various contact devices used for catalytic distillation 07
- Q.3 (a) Describe different types of membrane modules with neat sketch used in membrane 07 separation process.
  - (b) Explain in detail the purification of hydrogen using six bed Pressure Swing 07 Adsorption (PSA) technique.

### OR

- **Q.3** (a) Explain Ultrafiltration. List down its applications.
  - (b) Explain the concept of Melt Crystallization and explain its applications. 07
- Q.4 (a) Explain the concept of Reverse Osmosis (RO) and discuss in detail the use of RO 07 in various water purification and desalination process.
  - (b) List down the various applications of Short Path Distillation and give a detailed 07 description of any one application

OR

- Q.4 (a) Explain the concept of Pervaporation and describe in detail the manufacturing of 07 absolute alcohol by using pervaporation.
  - (b) Explain the working principle of osmotic distillation and describe its various 07 applications.
- Q.5 (a) Discuss the concept and working of membrane reactors and their applications. 07
  - (b) List the Supercritical Solvents. Discuss importance of supercritical solvents and the principle of Supercritical Extraction

### OR

- Q.5 (a) Explain the advantages and limitations of the various new separation techniques 07 used in the chemical industries over conventional methods.
  - (b) Discuss in detail various engineering problems associated with usage of membranes 07

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