

Total No. of Questions : 12]

SEAT No. :

P2128

[Total No. of Pages : 3

[4659] - 299

**B.E. (Chemical) (Semester - I)**

**E : ADVANCED SEPARATION PROCESSES**

**(2008 Pattern) (Elective - II)**

*Time : 3 Hours]*

*[Max. Marks : 100*

*Instructions to the candidates:*

- 1) *Answer three questions from Section - I and three questions from Section - II.*
- 2) *Answers to the two sections should be written in separate books.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
- 6) *Assume suitable data, if necessary.*

**SECTION - I**

- Q1)** a) Explain the details of chromatography column design and fiddling. [6]  
b) Explain in detail 'Adsorption Cycle' with neat sketches. [12]

OR

- Q2)** a) Explain the basic concept of chromatography process. [6]  
b) Give the application of chromatography in separation of enzymes and proteins. [6]  
c) Explain adsorption mechanism in separation of fluid-solid system. [6]
- Q3)** a) Give the advantages of membrane separation process over other separation technique. [8]  
b) Describe four basic types of Reverse Osmosis module currently manufactured. [8]

**P.T.O.**

OR

- Q4)** a) Calculate the osmotic pressure of a solution containing 0.10 gmol NaCl/ 1000 g H<sub>2</sub>O at 250 C. Density of water = 997.0 kg/m<sup>3</sup> [6]  
b) Write down the classification of the membrane process. [6]  
c) Explain the following terms : [4]  
i) Rejection  
ii) Permeate

**Q5)** Discuss the following in detail :

- a) Characteristics of the complexing agent used in chemical - complexation. [8]  
b) Reactive distillation process. [8]

OR

- Q6)** a) Give the solution characteristics of chemical complexation process. [8]  
b) Write short note on 'Reactive crystallization' process. [8]

### SECTION - II

- Q7)** a) Give the flotation techniques classification on the basis of mechanism of separation and size of material separated. [9]  
b) Explain 'Collapse and drainage phenomena'. [9]

OR

**Q8)** Discuss the following :

- a) Design and development of flotation equipment. [9]  
b) Application of flotation technique. [9]

- Q9)** a) Explain the adsorption properties and applications of molecular sieve. [8]  
b) Explain Zone refining process in detail. [8]

OR

**Q10)** Write short notes on : **[16]**

- a) Zone Electrophoresis
- b) Adductive Crystallization

**Q11)** Explain the classification of unit operations based on the property difference. **[16]**

OR

**Q12)** Write short notes on : **[16]**

- a) Exchange Reaction
- b) Ring oven technology application

