

Subject Code: 2160507

Date: 29/01/2021

Subject Name: Advance Separation Techniques

Time: 02:00 PM TO 04:00 PM

Total Marks: 56

Instructions:

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 Answer the followings.

- (a) Enlist application of RO in non-aqueous system. [3]
- (b) State advantages of ceramic membrane over polymeric membranes. [4]
- (c) List out common reasons for flux decline in ultrafiltration. Discuss concentration polarization phenomena in ultrafiltration. [7]

- Q.2
- (a) Differentiate between short path distillation and molecular distillation. [3]
 - (b) Write short note on properties of supercritical solvent. [4]
 - (c) With the help of a detailed flow diagram explain the ROSE process for deasphalting by propane using supercritical extraction [7]

- Q.3
- (a) Discuss membrane characteristics for the membrane distillation process. [3]
 - (b) Write short note on contact devices used in reactive and catalytic distillation. [4]
 - (c) With neat sketch explain construction and working of short path distillation [7]

- Q.4
- (a) Discuss Mechanism of transport in nanofiltration. [3]
 - (b) Explain zone refining technique for melt crystallization. [4]
 - (c) Discuss conventional distillation process for production of ETBE with flow diagram [7]

- Q.5
- (a) Differentiate between rate governed and equilibrium separation processes. [3]
 - (b) Explain four steps of Pressure Swing Adsorption process. [4]
 - (c) Discuss basic principle of pressure swing distillation and its advantages and disadvantages over azeotropic distillation. [7]

- Q.6
- (a) Enlist major drawback and advantages of PSA over cryogenic separation process. [3]
 - (b) Explain progressive freezing technique for melt crystallization. [4]
 - (c) Discuss various types of membrane modules used for membrane separation processes. [7]

- Q.7
- (a) Discuss in brief various types of configuration used in membrane distillation. [3]
 - (b) List out industrial application of ultrafiltration. [4]
 - (c) Explain the working principle of pervaporation and describe hybrid process for the production of absolute alcohol. [7]

- Q.8
- (a) State industrial application of membrane distillation. [3]
 - (b) Write advantages and limitations of membrane separation processes over conventional separation processes. [4]
 - (c) Explain with neat sketch general types of membrane reactors. [7]