Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

CM-7005(3)-CBGS

B.E. VII Semester

Examination, June 2020

Choice Based Grading System (CBGS)

Novel Separation Techniques

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. Explain solution diffusion model for reverse osmosis process.

2. a) What is Freeze Drying? How does it work?
   b) What is pressure swing adsorption process? What effect does the PSA unit have on the outlet air quality?

3. a) Derive the model equation for complete mixing model for gas separation by membranes.
   b) Discuss the strategy for the solution of model equations.

4. Give a schematic illustration of osmotic processes. Derive Van't Hoff equation for osmosis process. What modifications are required in this equation if dissociation occurs?

5. a) Explain how to design an Ion Exchange Resin System.
   b) Calculate the amount of resin required for the following information.
   Cation Load: 80 ppm as $CaCO_3$
   Capacity: 45 kg/m^3
   Correction factor: 0.9
   Flow rate: 135 m^3/hr
   Operation hours: 20 hrs

6. a) Discuss the working principle of micellar separation. Also discuss various factors affecting the process.

   b) Discuss cloud point and surfactant partition coefficient.

7. Explain any one method for preparation of asymmetric membrane.

8. Explain any two :

   a) Mechanism of separation on the basis of ion exchange.

   b) Use and regeneration of ion exchange resins

   c) Kinetic of ion exchange.

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