Code No: 07A70808 **R07** **Set No. 2**

**IV B.Tech I Semester Examinations,NOVEMBER 2010**
**MEMBRANE TECHNOLOGY**
**Chemical Engineering**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. (a) Write the different applicating of pervaporation.
   (b) Write the different applicating of gas separation in membranes. [8+8]
2. Discuss in detail about hallo fiber module. [16]
3. Why is the by product in the cheese production? It contains about 6% total dissolved solids and the three main components are lactose, proteins and salts. Combine various membrane processes to separate these main components from each other. [16]
4. Compare the different membranes for basic parameters. [16]
5. (a) Calculate the porosity of membrane with a pore diameter of 0.2 $\mu$m and a number of pores of 109 pores /$cm^2$.
   (b) Discuss Permporometry. [10+6]
6. Discuss clustering and solubility of liquid mixture. [16]
7. Discuss the important features in the solution coating process? [16]
8. The hydraulic or water permeability coefficient (Lp)can be determined from a simple permeation experiment. Assume for a given membrane a Lp value of 5 * $10^{-4}$ m/hr.bar. The membrane has the rejection coefficient of 95% for Nacl and 99.8% for $Na_2SO_4$. At 40 bar and 10,000 salt. Calculate the solute permeability coefficient for both salts ppm. [16]

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Code No: 07A70808 **R07** **Set No. 4**

**IV B.Tech I Semester Examinations,NOVEMBER 2010**
**MEMBRANE TECHNOLOGY**
**Chemical Engineering**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. Write the membranes for electro dialysis and its applications [16]
2. (a) Write the uses of plates and frames in plate and frame module.
   (b) Explain spiral wound module with diagram. [6+10]
3. (a) Discuss about different membrane process and give the applications of that process.
   (b) Write theoretical considerations of membrane process. [8+8]
4. Explain:
   (a) gel layer model.
   (b) osmotic pressure model. [8+8]
5. What is the transportation through non porous membrane and draw sorption isotherms for ideal and non ideal systems. [16]
6. Explain and justify:
   (a) Importance of membrane structure.
   (b) Importance of materials used to prepare synthetic membrane. [16]
7. The density of homogeneous film of nylon 6.6 is 1.14 g/$cm^3$. The density of the crystalline fraction is 1.22 g/$cm^3$ and of the amorphous phase is 1.07 g/$cm^3$. Calculate the amount of crystallinity in weight fraction and in volume fraction. [16]
8. (a) Write the concepts of pervaporation.
   (b) Short note on supported liquid membranes.
   (c) draw and explain schematic drawing of the pervaporation process with a downstream vacuum.
   (d) Write a short note on porous membrane. [16]

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Code No: 07A70808 **R07** **Set No. 1**

**IV B.Tech I Semester Examinations,NOVEMBER 2010**
**MEMBRANE TECHNOLOGY**
**Chemical Engineering**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. Write short note on modules:
   (a) Plate and frame.
   (b) Capillary.
   (c) Spiral wound.
   (d) Tubular. [4+4+4+4]
2. (a) Write the applications of gas separation membranes.
   (b) Write brief note on concentration membrane process. [8+8]
3. (a) Discuss about osmotic pressure and derive the Vont hoff equation relative to osmotic pressure .
   (b) Mention the various separation ranges in m to nm involved in various membrane process. [10+6]
4. Explain in detail characterizing pore size by:
   (a) Atomic force micro scope.
   (b) Bubble point measurement. [6+10]
5. (a) What is fouling.
   (b) what are the turbulent promoters and why are they used.
   (c) explain concentration polarization with respect to electro dialysis. [4+6+4]
6. Discuss in detail about transportation in ideal membrane by taking necessary examples. [16]
7. Discuss the history of membrane technology. [16]
8. Explain with schematic diagram for preparation of synthetic membrane by track-etching, vapor deposition and solution coating. [16]

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Code No: 07A70808 **R07** **Set No. 3**

**IV B.Tech I Semester Examinations,NOVEMBER 2010**
**MEMBRANE TECHNOLOGY**
**Chemical Engineering**

**Time: 3 hours** **Max Marks: 80**

**Answer any FIVE Questions**
**All Questions carry equal marks**

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1. Explain how to determine diffusion coefficient by time lag method. [16]
2. Write short notes on:
   (a) Carrier membranes.
   (b) Phase inversion.
   (c) Immersion precipitation.
   (d) Template leaching. [16]
3. Discuss about tabular and capillary module with diagrams. [16]
4. Explain membrane process for two phase system with neat schematic diagram and explain how to calculate the retention and separation factor. [16]
5. (a) Write the important parameters of electro dialysis
   (b) Explain separation of amino acids through electro dialysis [8+8]
6. (a) Write a note on membrane reactors.
   (b) Discuss the fouling test in reverse osmosis. [8+8]
7. (a) Discuss about basic requirements regarding choice of organic solvent in liquid membrane.
   (b) Discuss about basic requirements regarding choice of carriers in liquid membrane. [8+8]
8. The pore size distribution of an ultra filtration membrane can be determined by liquid displacement. If the set up has pressure range of 0.1 to 5 bar and if a water/ isobutanol ($\gamma$=1.85 mN/m) is used as a liquid mixture what will be the pore range which can b determined. [16]

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