



GIET UNIVERSITY, GUNUPUR - 765022
M. Tech (First Semester) Examinations, January- 2024
MPCCH1050 - Advanced Separation Processes
(Chemical Engineering)

Time: 3Hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

PART – A**(2 x 10 = 20 Marks)**

Q.1. Answer all questions

	CO#	Blooms Level
a. What is Osmotic Pressure? How osmotic pressure is related to concentration?	CO2	K2
b. Differentiate between Observed retention and Real retention.	CO1	K1
c. Draw a typical molecular cut off curve of a membrane.	CO3	K1
d. Draw the Sharp and diffused molecular cut off curves of a membrane.	CO2	K2
e. Define Membrane Permeability.	CO3	K2
f. What is Membrane Casting? What are the Common polymeric membrane materials is used for the casting process?	CO2	K1
g. Differentiate between Homogeneous barrier and Micro porous Barrier.	CO4	K1
h. What are the different types of motion of molecules through barrier?	CO3	K2
i. What is the transport mechanism, Pressure, Pore size, Molecular weight is maintained for Small solute particles to be separated by Reverse Osmosis.	CO2	K2
j. What is the transport mechanism, Pressure, Pore size, Molecular weight is maintained for Red blood cells to be separated by Ultrafiltration?	CO2	K1

PART – B**(10 x 5=50 Marks)**Answer **ANY FIVE** questions

	Marks	CO#	Blooms Level
2. a. Discuss about the Membranes for Gas and Vapor Separation.	4	CO1	K1
b. How Pervaporation and membrane distillation (MD) are distinguished from the other synthetic membrane separation processes with respect to phase change, from liquid to vapor?	6	CO2	K2
3.a. Design the solution diffusion model for RO/NF where the solute flux through the membrane is considered in realistic situation.	4	CO2	K2
b. Demonstrate the Modified solution diffusion model for RO/NF.	6	CO1	K1
4. a. Design the Kedem-Katchalsky equation for Ultrafiltration in case of imperfect retention of the solutes by the membrane by a reflection coefficient.	4	CO4	K1

b.	Demonstrate the Modified solution diffusion model for Ultra Filtration.	6	CO2	K2
5.a.	List out the different driving force of transport of species.	5	CO4	K2
b.	Enumerate the description of transport process by phenomenological equation.	5	CO2	K3
6. a.	Discuss the two main geometries by which Synthetic membranes are fabricated.	4	CO4	K2
b.	Enumerate about the detail steps for Phase Inversion Technique for Preparation of Integrally Skinned Asymmetric Membranes.	6	CO3	K2
7.a.	What is the importance of Membrane modules in advance separation process?	4	CO4	K2
b.	Describe the working mechanism, design and characteristics of (i) plate and frame module, (ii) hollow fiber module, (iii) spiral wound and (iv) tubular Modules in order to provide maximum membrane area in relatively smaller volume to get maximum permeate flux.	6	CO4	K1
8. a.	What are the different steps for Preparation of Composite Membranes?	4	CO2	K2
b.	How to modify the membrane surface, aimed at prevention of contaminant deposition and maintenance of high flux.	6	CO2	K1

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