QPC: RN20BTECH631 AR 20 Reg. No | | | | | | | | | | |

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Seventh Semester – Regular) Examinations, November – 2023

BPECH7010 - Modern Separation Techniques

(Chemical)

Time: 3 hrs Maximum: 70 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) **(1 x 10 = 10 Marks)**

Q.1. Answer ***ALL*** questions	[CO#]	[PO#]
a. Which of the following is not an application of transport in membranes?	CO1	PO1
(i) Microfiltration (ii) Reverse osmosis		
(iii) Dialysis (iv) Fractional distillation		
b. What is the driving force in Dialysis?	CO3	PO2
(i) Pressure difference (ii) Concentration Difference		
(iii) Difference in fugacity (iv) Temperature difference		
c. How the transport does occur in dense membrane?	CO3	PO2
(i) microporous (ii) macroporous		
(iii) solution diffusion (iv) Above all		
d. Which of the following factor is considered in ultrafiltration?	CO1	PO1
(i) Size (ii) Colour		
(iii) taste (iv) smell		
e. Chromatography is a physical method that is used to separate and analyze _____.	CO1	PO2
(i) Simple mixture (ii) Complex mixture		
(iii) Viscous mixtures (iv) metals		
f. Electrodialysis cannot produce water with a _____because of the high electrical resistance of dilute solutions	CO1	PO3
(i) low suspended solid content (ii) high suspended solid content		
(iii) high dissolved solid content (iv) low dissolved solid content		
g. Liquid membranes are much _____than the solid polymeric membranes	CO3	PO3
(i) broader (ii) thicker		
(iii) either thicker or thinner (iv) thinner		
h. Which module has high packing density?	CO1	PO1
(i) Plate and frame (ii) Spiral wound		
(iii) Tubular (iv) Hollow fibre		
i. Ceramic membrane is a type of:	CO1	PO1
(i) Polymeric membrane (ii) Liquid membrane		
(iii) Inorganic membrane (iv) Gas membrane		
j. Separation of azeotropic mixture and heat sensitive products, is widely used application of which the below stated membrane process	CO1	PO1
(i) Ultrafiltration (ii) Reverse Osmosis		
(iii) Membrane bioreactor (iv) Pervaporation		

PART – B: (Short Answer Questions) **(2 x 10 = 20 Marks)**

Q.2. Answer ***ALL*** questions	[CO#]	[PO#]
a. Write the advantages of membrane separation process.	CO2	PO3
b. Define the term fouling in membrane.	CO1	PO1
c. What are the factors affecting the performance of UF?	CO3	PO2
d. What do you mean by Molecular Weight Cut Off? What is its value for UF?	CO1	PO1
e. Write the basic principle of electrophoresis	CO1	PO2
f. Write the application of ion exchange chromatography.	CO3	PO2
g. Write two application of gas separation.	CO3	PO2
h. What is Knudsen diffusion?	CO2	PO2
i. Differentiate equilibrium separation process and rate governed separation process.	CO1	PO1
j. What is the importance of rate governed separation process?	CO1	PO2

PART – C: (Long Answer Questions) **(10 x 4 = 40 Marks)**

Answer ***ALL*** questions	Marks	[CO#]	[PO#]
3. a. Differentiate (i) porous and non-porous membrane and (ii) symmetric and asymmetric membrane	5	CO2	PO2
b. What are the general criteria for selection of a membrane?	5	CO1	PO2
(OR)			
c. Discuss about the different membrane modules with diagram	5	CO2	PO2
d. Discuss about the Track etch method of preparation of membrane with diagram.	5	CO1	PO2
4. a. Explain about the basic principle of Reverse Osmosys.	5	CO1	PO2
b. Discuss the basic principle and industrial application of Nano Filtration	5	CO2	PO2
(OR)			
c. Discuss about the basic principle of microfiltration.	5	CO2	PO2
d. Write the application of dialysis in different area.	5	CO1	PO1
5. a. Write the basic principle of electro dialysis.	2	CO1	PO2
b. Explain its process electro dialysis by drawing a neat diagram.	8	CO3	PO2
(OR)			
c. Write the basic principle of ion exchange membrane process. Explain about the types of ion exchange membrane.	7	CO3	PO2
d. What is zeta potential? Explain.	3	CO1	PO2
6. a. Differentiate thin sheet supported and hollow fibre supported liquid membrane.	5	CO2	PO1
b. Explain about the Bulk liquid membrane with diagram.	5	CO3	PO2
(OR)			
c. Derive the expression of complete mixing model for gas separation.	10	CO2	PO1

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