

U.S.N.

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

May / June 2025 Semester End Main Examinations**Programme: B.E.****Semester: VIII****Branch: Chemical Engineering****Duration: 3 hrs.****Course Code: 22CH8PELD1****Max Marks: 100****Course: Advanced Separation Techniques**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.			UNIT - I	CO	PO	Marks
	1	a)	Discuss the concept of 'Separation Factor' and its importance in designing a separation process.	CO1	PO1	10
		b)	Compare and contrast the different external field-driven separation techniques.	CO 1	PO1	10
			OR			
	2	a)	Discuss with suitable examples how phase changes facilitate the separation of components in a mixture.	CO 1	PO1	10
		b)	Explain how gradients or external fields are used to achieve separation.	CO 1	PO1	10
			UNIT - II			
	3	a)	Describe the different membrane materials used in membrane separation processes.	CO 2	PO2	08
		b)	Explain the different module flow patterns used in membrane separation.	CO 2	PO2	12
			OR			
	4	a)	Explain the working principle of dialysis in membrane separation with a neat schematic diagram.	CO 2	PO2	10
		b)	Explain the principle, process configuration, and applications of reverse osmosis.	CO 2	PO2	10
			UNIT - III			
	5	a)	Explain the industrial applications of adsorption processes.	CO 3	PO6	10
		b)	Illustrate how mass transfer and transport mechanisms influence adsorption performance.	CO 3	PO6	10
			OR			

6	a)	Explain the principle of chromatography and its industrial significance.	CO 3	PO6	10
	b)	Describe the factors affecting separation efficiency in chromatography.	CO 3	PO6	10
		UNIT - IV			
7	a)	Differentiate between molecular separations and ionic separations.	CO 6	PO12	05
	b)	Enlist the different types of electrophoresis techniques.	CO 4	PO7	05
	c)	Discuss the key factors affecting the performance of electrodialysis and enlist its industrial applications.	CO 4	PO7	10
		OR			
8	a)	Explain the fundamental physicochemical principles of ionic separations.	CO 4	PO7	08
	b)	Explain ion exchange chromatography and list its industrial applications.	CO 4	PO7	12
		UNIT - V			
9	a)	Evaluate the performance of gas permeation compared to pressure swing adsorption for gas separations.	CO 6	PO12	10
	b)	Analyze and explain in detail the principle of zone refining and its dependence on impurity distribution coefficients.	CO 5	PO6	10
		OR			
10	a)	Discuss the principles of supercritical fluid extraction with an example.	CO 5	PO6	10
	b)	Critically assess the advantages and limitations of gas permeation in industrial hydrogen recovery applications.	CO 6	PO12	10
