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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.

UNIT - I			CO	PO	Marks
1	a)	Discuss the concept of 'Separation Factor' and its importance in designing a separation process.	<i>CO1</i>	<i>PO1</i>	10
	b)	Compare and contrast the different external field-driven separation techniques.	<i>CO 1</i>	<i>PO1</i>	10
OR					
2	a)	Discuss with suitable examples how phase changes facilitate the separation of components in a mixture.	<i>CO 1</i>	<i>PO1</i>	10
	b)	Explain how gradients or external fields are used to achieve separation.	<i>CO 1</i>	<i>PO1</i>	10
UNIT - II					
3	a)	Describe the different membrane materials used in membrane separation processes.	<i>CO 2</i>	<i>PO2</i>	08
	b)	Explain the different module flow patterns used in membrane separation.	<i>CO 2</i>	<i>PO2</i>	12
OR					
4	a)	Explain the working principle of dialysis in membrane separation with a neat schematic diagram.	<i>CO 2</i>	<i>PO2</i>	10
	b)	Explain the principle, process configuration, and applications of reverse osmosis.	<i>CO 2</i>	<i>PO2</i>	10
UNIT - III					
5	a)	Explain the industrial applications of adsorption processes.	<i>CO 3</i>	<i>PO6</i>	10
	b)	Illustrate how mass transfer and transport mechanisms influence adsorption performance.	<i>CO 3</i>	<i>PO6</i>	10
OR					

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.

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
