

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY
2025****Sixth Semester****Chemical Engineering****CH3014 – Bioseparation and Downstream Processing****Regulations - 2021****Duration : 3 Hrs****Maximum : 100 Marks****PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

Q.No	Questions	BLT	CO	Marks
1.	List any two common by-products obtained from microbial fermentation processes.	L1	1	2
2.	Define biomolecules and give one example.	L2	1	2
3.	State the principle of sedimentation.	L1	2	2
4.	Why dewatering of filter cakes is important in downstream processing?	L2	2	2
5.	Infer the role of a packed column in the gas absorption process.	L1	3	2
6.	Mention any two advantages of multistage counter-current operation over single-stage operation.	L2	3	2
7.	Give two differences between reactive extraction and conventional solvent extraction.	L1	4	2
8.	Interpret the purpose of fractionation in the purification of biological products.	L2	4	2
9.	Define the term chromatographic peak and peak yield.	L1	5	2
10.	State the principle behind electrophoresis.	L2	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BLT	CO	Marks
11.	a i Explain the range and characteristics of bioproducts generated during fermentation.	L2	1	10
	ii How do the characteristics of bioproducts influence the choice of bioseparation technique?	L2	1	6
	Or			
	b i With a neat flow diagram, describe the stages of downstream processing with example of each stage.	L2	1	10
	ii Give any two characteristics in each of physical, chemical, and biochemical aspects of biomolecules.	L2	1	6
12.	a Discuss the variation in centrifugal force and time affect the separation efficiency of cellular components during centrifugation.	L3	2	16

Or

	b	Compare the conventional and cross flow filtration. Infer how cake resistance and medium resistance influence the filtration process.	L3	2	16
13.	a	Illustrate the effects of temperature and pressure on solubility of gases in liquid along with choice of solvent for the process.	L2	3	16
		Or			
	b	With a neat sketch, explain the co-current and counter current operation of absorption.	L2	3	16
14.	a i	Using the principles of liquid-liquid extraction, describe how you would separate a water-soluble acid from an organic solvent.	L3	4	12
	ii	What factors should be considered to optimize the extraction efficiency?	L3	4	4
		Or			
	b i	Discuss the principles of different types of distillation process with advantages and disadvantages.	L3	4	12
	ii	Give the importance of Maccabe Thiele method.	L3	4	4
15.	a	Assess the principles of chromatography to separate a mixture of two closely related amino acids. Describe the steps involved and the factors that would influence the separation.	L4	5	16
		Or			
	b	How fouling affects the performance of membranes in bioseparation processes and suggest strategies to minimize its impact?	L4	5	16