Register No : _____

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Sixth Semester

Chemical Engineering

CH3014 - Bioseperation 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.	What are the characteristics of fermentation broths?	UN	1	2
2.	What are the different stages in Bio separations	UN	1	2
3.	What are the filters used in bioprocess?	UN	2	2
4.	What are filter aids? Give examples.	UN	2	2
5.	Give two examples for gas absorption?	RE	3	2
6.	What is meant by channeling?	RE	3	2
7.	State four metals separated from its ore by leaching operations.	UN	4	2
8.	Write the properties of a good solvent for extraction?	UN	4	2
9.	What are the types of chromatographic method?	UN	5	2
10.	List out the factors affecting retention time.	UN	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)*

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Write the principles of downstream processing and briefly describe the characteristics of any one Biomolecule.	UN	1	7
		ii	What are the factors affecting the downstream processing? Explain.	UN	1	6
			Or			
	b	i	Describe the role and importance of downstream processing in bioprocess.	UN	1	7
		ii	Explain the various stages and unit operations involved in the downstream processing operations	UN	1	6
12.	a	i	Give a brief account on (i) Sedimentation (ii) Filtration	UN	2	7
		ii	Explain about settling of solids in centrifuge.	UN	2	6
			Or			
	b	i	Explain with neat sketch the working principle of continuous filtration equipment.	UN	2	7
		ii	Explain the concept of precoating in filtration operations.	UN	2	6

13.	a	i	Explain with a neat figure the construction and working of a packed tower.	UN	3	7
		ii	Give a brief account on different types of packing and packing materials used in an absorber.	AN	3	6
			Or			
	b	i	Explain the concept of NTU and HTU.	UN	3	7
		ii	Compare plate and packed columns for merits and demerits.	AN	3	6
14.	a	i	Explain the working of centrifugal extractors.	UN	4	7
		ii	Explain Bollman Extractor with a neat sketch.	UN	4	6
			Or			
	b	i	Explain the method of aqueous two-phase extraction in detail.	UN	4	7
		ii	Explain the principle of steam distillation.	UN	4	6
15.	a	i	Outline the solid phases used for elution chromatography of different scales and types.	UN	5	7
		ii	Describe the scaling up chromatography and scaling the separation.	UN	5	6
			Or			
	b	i	Write an essay on (i) Microfiltration (ii) Ultrafiltration	UN	5	7
		ii	Explain in detail on column chromatographic separation process.	UN	5	6

*PART – C (Marks 1*15 = 15)*

Q.No			*Questions*	*BLT*	*CO*	*Marks*
16.	a	i	Write short notes on i) Molecular distillation ii) Extractive distillation.	UN	4	8
		ii	Derive Rayleigh's equation.	AP	4	7
			Or			
	b	i	Explain the principle of ion exchange and reverse osmosis process in detail.	UN	5	8
		ii	Explain in detail pseudo affinity chromatographic separation process with application in bio separation.	AP	5	7