BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER: VIth**
BRANCH: BIOTECH **SESSION: SP/2025**

SUBJECT: BE308 BIOSEPARATION ENGINEERING

TIME: 2 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

				CO	BL	Module
Q1	(a)	Write the Langmuir and Freundlich adsorption isotherm equations.	[2]	CO2	BL1	2
Q1	(b)	With a flow diagram describe the overall protein purification technique.	[3]	CO1	BL2	1
Q2	(a)	Justify how increase in column length increase resolution in column chromatography.	[2]	CO3	BL3	3
Q2	(b)	With schematic diagram, describe the principle of gel filtration chromatography.	[3]	CO3	BL2	3
Q3		100 L of solution contains 10 g/L BSA and some contaminant of 5 g/L. Calculate the salt required to recover 90% of BSA if the value of β and k for BSA are 21.6 and 7.65 respectively and that of contaminant are 20 and 7 respectively. What will be the purity of the lipase at 90% recovery?	[5]	CO2	BL5	2
Q4		Two analytes A and B are separated on a 25 cm column. The observed retention times were 7 min 20 sec and 8 min 20 sec respectively. A reference compound completely exhausted by stationary phase is eluted out at 1 min 20 sec. considering number of theoretical plates are 1764, what is the resolution of these two peaks?	[5]	CO3	BL5	3
Q5	(a)	Adsorption of an enzyme on cellulose follows Langmuir model. The maximum uptake is 70 mg/g adsorbent. Half of this maximum at the solution concentration of 50 mg/L of enzyme. We have 1.5 L of feed containing 220 mg/L of enzyme. How much cellulose do we need to add to obtain 90% recovery of the enzyme?	[5]	CO2	BL5	2

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