

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: M. Sc.
BRANCH: BIOTECH**

**SEMESTER: IIIrd
SESSION: MO/2025**

SUBJECT: BT509 DOWNSTREAM PROCESSING

TIME: 3 HOURS

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q1	(a)	Schematically represent the overall Bioseparation process for any intracellular protein.	[5]	CO1	BL3
Q1	(b)	Describe Rate zonal and Isopycnic centrifugation. Write down the formula for terminal settling velocity.	[5]	CO1	BL3
Q2	(a)	Justify the use of ammonium sulphate for salt precipitation.	[5]	CO2	BL3
Q2	(b)	Describe aqueous two phase extraction.	[5]	CO2	BL3
Q3	(a)	Two proteins of MW 2.5×10^5 and 1×10^4 were eluted out of a gel in gel filtration column at 220 mL and 300 mL respectively. Determine the molecular weight of a protein that elutes out at 270 mL under the same condition?	[5]	CO3	BL5
Q3	(b)	With schematic diagram, briefly explain the basic principle and applications of Ion exchange chromatography.	[5]	CO3	BL4
Q4	(a)	Explain the mechanism of transport in MF system.	[5]	CO4	BL3
Q4	(b)	Write short note on: Electro-dialysis Pervaporation	[5]	CO4	BL3
Q5	(a)	Define nucleation in crystallization. Draw the temperature vs. product-concentration graph to indicate different state of material during crystallization.	[5]	CO5	BL4
Q5	(b)	Describe any two driers used in industry.	[5]	CO5	BL3

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