

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- 2025

B.Tech.- VI Semester (Biotechnology)

COURSE CODE (CREDITS): 18B11BT611 (04)

MAX. MARKS: 25

COURSE NAME: Downstream Processing

COURSE INSTRUCTORS: Dr. Saurabh Bansal

MAX. TIME: 1 Hour 30 Min

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q. No	Question	CO	Marks
Q1	What are the advantages and limitations of organic solvent precipitation compared to salt-induced precipitation?	CO-3	3
Q2	What is the principle behind electrodialysis, and how does it differ from traditional dialysis?	CO-3	3
Q3	Differentiate between Microfiltration and Nanofiltration	CO-3	2
Q4	Which is more efficient: Counter-current multistage or Co-current multistage liquid-liquid extraction. Give the justification of your answer.	CO-3	2
Q5	What factors influence the choice of solvent in liquid-liquid extraction, and how does the partition coefficient play a role?	CO-3	3
Q6 a.	Leucine dehydrogenase is recovered from a homogenate of disrupted <i>Bacillus cereus</i> cells using an aqueous two-phase polyethylene glycol-salt system. 200 L of homogenate initially containing 3.5 units enzyme ml ⁻¹ are processed; a polyethylene glycol-salt mixture is added and two phases form. The enzyme partition coefficient is 4. What volume ratio of upper and lower phases must be chosen to achieve 80% recovery of enzyme in a single extraction step?	CO-4	2
Q6 b.	If the volume of the lower phase is 100 L, what is the concentration factor for 80% recovery?	CO-4	2
Q7	A filter operates to process 5000 L of slurry in 8 hours with a filtration rate of 625 L/h. The filtration system uses a pressure drop of 200 kPa and has an efficiency of 80%. Calculate the total time required to filter the slurry. Also, calculate the filter area required if the filtration rate per unit area is 10 L/h per m ² .	CO-4	2
Q8	If a mixture contains multiple proteins with different isoelectric points (pI), how can selective precipitation be achieved by adjusting the pH?	CO-5	2
Q9	What is concentration polarization, and how does concentration polarization contribute to membrane fouling, and what strategies can be used to minimize its impact?	CO-5	4