JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech-V Semester (BT)

COURSE CODE (CREDITS): 18B11BT611 (04) MAX. MARKS: 15

COURSE NAME: Downstream Processing

COURSE INSTRUCTOR: Dr. Saurabh Bansal MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory. Use of calculators is allowed*

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

Q. No.	Question	CO	Marks
Q1	How the number of steps involved in downstream processing affect the yield and purity of the product?	CO- I	2
Q2	A fermentation broth contains 20 wt% dead mass and the rest of the liquid; the latter needs to be recovered fully. The annual production of the broth is 10000 kg. The pure liquid product can be sold at a profit of Rs. 100 /kg. If a simple filter is used, the solids retain 10 wt% of the liquid, while if a centrifuge is used, the solids retain only 2 wt% of the liquid. The cost of the filter is Rs. 1,00,000, while the cost of a centrifuge is Rs. 1,50,000. The annual maintenance plus operating costs of the filter is Rs. 50,000 and that of the centrifuge is Rs. 80,000 per annum. If you assume that the life of both equipment is 4 years and there is no resale value for them. Based on the given data, suggest the correct equipment (filter or centrifuge) with reason. Assume all other factors are the same. The discount factor for the money is 10%. Assume that the equipment will be purchased at the beginning of year 0, and the profit of sales will be received at the beginning of years 1, 2, 3, and 4. Also, assume that all the operating costs will be accrued at the beginning of years 1, 2, 3, and 4.	CO-I	3
Q3	Justify why downstream processing of intracellular products is generally expensive and labor-intensive than that of extracellular products.	CO-II	2
Q4	a) How the downstream processing of intracellular product is different from that of extracellular products?	CO-II	2
	b) Which kind of product (intracellular/extracellular) is preferred at industrial level and why?		1
	c) Why removal of nucleic acid is important before further processing of the cell lysate? How it can be removed?		2

32

Q5	How much a centrifugal force will be applied if a sample is centrifuged at a 10,000 RPM in a centrifuge with a diameter of 20 cm?	CO-III	1
Q6	Why is centrifugation considered a primary separation technique in downstream processing?	CO-III	2