

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS-2022

B.Tech-VI Semester (BT)

COURSE CODE (CREDITS): 18B11BT611(4)

MAX. MARKS: 35

COURSE NAME: Downstream Processing

COURSE INSTRUCTORS: Dr. Saurabh Bansal

MAX. TIME: 2 Hours

Note: All questions are compulsory. Marks are indicated against each question in square brackets. Do all set of a question at a single place.

[CO1]

1. Which enzyme will have a higher cost, the enzyme used in detergent or the enzyme used as therapeutic? Why? [2]
2. List the names of two organisms for the production of each: [2]
 - a) Penicillin
 - b) Lactic Acid

[CO2]

3. a) Which precursor is used for the production of Penicillin V? [1]
- b) Which enzyme is used to lyse the fungal cells? [1]
- c) Whether nucleic acid removal is required in an extracellular product recovery? Justify your answer. [2]

[CO3]

4. Why salt-induced precipitation of the protein is carried out at low temperature? [2]
5. a) How filter aid affects the filtration? [1]
- b) How the concentration polarization affects the membrane-based filtration? How will you deal with the issue? [3]

[CO4, 5]

6. a) How the 'Height Equivalent to a Theoretical Plate (HETP)' affect the resolution of the peaks in a chromatogram? [2]
 - b) If you wish to purify two different proteins A and B having pI 5.0 and 7.0 respectively and the protein A is found to be unstable at alkaline conditions. Design an experiment (flow chart) for the purification of both the proteins using ion exchange chromatography. [3]
7. A Sephacryl gel filtration chromatography is used to separate two hormones A and B. The gel filtration column is 5 cm in diameter and 0.3 m high; the void volume is $1.9 \times 10^{-4} \text{ m}^3$.

The water regain value of the gel is $3 \times 10^{-3} \text{ m}^3 \text{ kg}^{-1}$ dry Sephacryl; the density of wet gel is $1.25 \times 10^3 \text{ kg m}^{-3}$. The partition coefficient for hormone A is 0.4; the partition coefficient for hormone B is 0.2 and the eluant flow rate is 0.8 l h^{-1} .

- a) What is the retention time for each hormone? [2]
- b) Which Hormone has the higher molecular weight and why? [2]

[CO6]

- 8. a) Why the formulation of a bioproduct is required? [2]
- b) How the iron limitation in media enhances the Citric acid excretion? [2]
- 9. Why *Zymomonas mobilis* seems to be more promising over the yeast for the alcohol production? [3]
- 10. Draw the flow chart for representing the downstream processing of following: [5]
 - a) Citric Acid
 - b) Gluconic Acid