

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2024

B.Tech-VI Semester (BT)

COURSE CODE(CREDITS): 18B11BT611 (04)

MAX. MARKS: 35

COURSE NAME: Downstream Processing

COURSE INSTRUCTORS: Dr. Saurabh Bansal

MAX. TIME: 2 Hours

---

*Note: (a) All questions are compulsory.*

*(b) Marks are indicated against each question in square brackets.*

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

---

[CO1]

1. a) How the downstream processing of any product affect its cost? Explain your answer in terms of no. of steps involved, intended use, and purity level. [2]
- b) What will be the overall yield of the product if you recover by following two steps. In each step the recovery of products was 90% and 99% respectively. [1]

[CO2]

2. a) Why does the industry prefer the strains which produce the products extracellularly? [1]
- b) Whether the effluent treatment is the part of upstream processing? Justify your answer. [1]
- c) What are inclusion bodies? How will you solubilize them for their recovery? [2]

[CO3]

3. Differentiate between following: [4]
- a) FPLC and HPLC
- b) Reverse Phase and Normal Phase Chromatography

[CO4]

4. a) What is the principle of cell disruption using sonication? [1]
- b) It is the fact that the density of nucleic acids (DNA and RNA) are higher than the cells. So whether nucleic acids would settle faster than cells and organelles? Justify your answer. [2]
- c) Why the use of hydrophobic interaction chromatography before the Gel Filtration Chromatography is beneficial? [2]
- d) Why we cannot increase the size of centrifuge beyond a limit for increasing the its capacity? [1]

[CO5]

5. a) Why citric acid production should not be done in an iron vessel? [1]
- b) To obtain 200 °Proof alcohol, which type of Distillation is used? [1]
- c) List the name of two cultures which are used for industrial production of alcohol. [2]

- d) Why the industrial production of lactic acid through fermentation is desirable? [1]  
e) Why lactic acid production using *Rhizopus oryzae* is beneficial over the bacterial fermentation? [2]
6. a) How does the penicillin inhibit the bacterial growth? [1]  
b) Which precursors are used for the production of Penicillin G and Penicillin V? [2]  
c) What are the limitations of a natural penicillin? [1]

[CO6]

7. What are the major formulation issues with the bioproducts? How can you avoid/remove the contamination of pyrogens from any bioproducts? [3]
8. How can you deal with the following problems associated with the bioproducts during downstream processing: [2]  
a) Proteolytic degradation                      b) Aggregation of proteins
9. Draw a self-explanatory flow chart for the downstream processing of Citric acid. [2]