



17970



BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – B.Sc.(BT)-Hons-2024

Course Name – Bioprocess Technology

Course Code - BBT30204

(Semester III)

LIBRARY
Brainware University
Barasat, Kolkata -700125

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Select an example of a primary metabolite produced during microbial growth
 - a) Antibodies
 - b) Antibiotics
 - c) Ethanol
 - d) Recombinant Proteins
- (ii) What is the primary advantage of using microbial enzymes in bioprocess technology?
 - a) They can be produced in large quantities by established fermentation techniques
 - b) They do not require fermentation vessels for production
 - c) They are more stable compared to enzymes from plant and animal sources
 - d) They have higher substrate specificity than chemical reagents.
- (iii) In fermentation technology, identify the primary role of a bioreactor
 - a) To separate the end products from the fermentation broth
 - b) To provide a controlled environment for microbial growth and product formation
 - c) To sterilize the medium before inoculation
 - d) To measure the pH and temperature of the culture
- (iv) Identify the main advantage of continuous fermentation over batch fermentation
 - a) Simpler equipment requirements
 - b) Higher product consistency and productivity
 - c) Lower risk of contamination
 - d) Easier downstream processing
- (v) In a fed-batch culture select the method of substrate addition to the system
 - a) All at once at the beginning
 - b) Continuously without removing culture fluid
 - c) Intermittently or continuously without removing culture fluid
 - d) Not added at all after initial inoculation
- (vi) Select among the following bioreactors commonly used for continuous culture.
 - a) Stirred-tank reactor
 - b) Airlift reactor
 - c) Chemostat
 - d) Packed-bed reactor

- (vii) In continuous culture, identify what will happen if the dilution rate exceeds the maximum specific growth rate of the organism
- a) The culture reaches a new steady state b) The cells are washed out of the system
c) The cell density increases d) The product formation rate increases
- (viii) Select the combination of two process of which Fed-batch culture is a hybrid of.
- a) Aerobic and Anaerobic b) Batch and Continuous
c) Solid-state and Submerged d) Chemostat and Turbidostat
- (ix) Indicate the standard number of baffles typically used in a cylindrical bioreactor.
- a) 2 b) 4
c) 6 d) 8
- (x) Identify the primary characteristic of an airlift bioreactor.
- a) It uses mechanical stirring for mixing b) It relies on gas flow for circulation and mixing
c) It operates without aeration d) It has a rotating impeller for agitation
- (xi) Select a common application of cyclone column bioreactors in the industry.
- a) Pharmaceutical production b) Biofuel production
c) Dairy product fermentation d) Wastewater treatment
- (xii) Explain the consequences of increasing the surface area of gas-liquid contact in a bioreactor.
- a) Decrease in mass transfer coefficient b) Increase in mass transfer coefficient
c) No effect on mass transfer coefficient d) Increase in mass transfer resistance
- (xiii) Explain the process of Foam control in bioprocessing.
- a) A dissolved oxygen probe b) An antifoam sensor and mechanical control system
c) A thermocouple d) A chromatography column
- (xiv) Determine the technique used to separate biomolecules based on their size and charge.
- a) Ion-exchange chromatography b) Gel filtration chromatography
c) Affinity chromatography d) Reverse-phase chromatography
- (xv) Determine that type of microorganisms that are commonly used in aerobic biological treatment of effluents.
- a) Anaerobic bacteria b) Fungi
c) Nitrifying bacteria d) Cyanobacteria

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Describe two major applications of bioprocess technology in the pharmaceutical industry. (3)
3. Discuss the role of microbial fermentation in bioprocessing. (3)
4. Explain the importance of oxygen transfer in aerobic bioprocesses. (3)
5. Determine the importance of antifoam addition on oxygen transfer. (3)
6. Estimate how is downstream processing optimized for large-scale production? (3)

OR

- Evaluate the purpose of crystallization in product purification. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. How can batch fermentation be optimized for higher productivity? (5)
8. Analyze different feeding strategies used in fed-batch fermentation. (5)
9. Explain the process of pasteurization and its significance in bioprocessing. (5)
10. Explain the role of microorganisms in effluent treatment and their significance in wastewater management. (5)

- 11. Discuss the advantages and disadvantages of batch fermentation. (5)
- 12. Explain the production process of Single Cell Proteins. (5)

OR

Compare the different substrates used in SCP production and their advantages. (5)

LIBRARY
Brainware University
Barasat, Kolkata -700125