BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – M.Sc.(BT)-2022/M.Sc.(BT)-2023
Course Name – Bioprocessing and Fermentation Technology
Course Code - MBTC302
(Semester III)

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) Describe the primary function of a dissolved oxygen probe in a bioreactor.
   a) To measure the concentration of oxygen in the liquid medium
   b) To control the nutrient concentration
   c) To maintain a constant temperature
   d) To monitor the pH of the culture

(ii) Explain the bioconversion process involves the breakdown of organic matter by microorganisms in the absence of oxygen.
   a) Fermentation
   b) Photosynthesis
   c) Combustion
   d) Respiration

(iii) Which of the following microorganisms is commonly used in the production of antibiotics?
   a) Saccharomyces cerevisiae
   b) Escherichia coli
   c) Penicillium notatum
   d) Streptomyces griseus

(iv) Choose the primary goal of metabolic engineering in microbial biotechnology.
   a) To create new microbial species
   b) To enhance the growth rate of microorganisms
   c) To modify the metabolic pathways of microorganisms for specific product formation
   d) To eliminate microbial competition in bioprocessing

(v) Explain the purpose of aseptic techniques in microbial biotechnology
   a) To increase the oxygen supply to microorganisms
   b) To promote the growth of pathogenic microorganisms
   c) To prevent contamination of microbial cultures
   d) To improve the taste of fermented foods

(vi) Name the preservation method that removes moisture from food.
   a) Canning
   b) Freezing
   c) Dehydration
   d) Fermentation

(vii) Name the gas commonly used in food packaging to extend shelf life.

a) Oxygen b) Carbon dioxide
c) Nitrogen d) Hydrogen

(viii) Explain the function of monosodium glutamate (MSG) in food preparation.

a) To add a sour flavor b) To enhance the umami taste
c) To increase sweetness d) To preserve food products

(ix) Identify natural flavor enhancer extracted from seaweed.

a) Monosodium glutamate (MSG) b) Xanthan gum
c) Carrageenan d) Sodium benzoate

(x) Describe the process in which microorganisms are used to extract valuable metals from ores through chemical reactions.

a) Biomineralization b) Bioleaching
c) Biomining d) Biodissolution

(xi) Identify the microorganisms that are commonly used for the production of single-cell lipids.

a) Yeast and bacteria b) Algae and fungi
c) Archaea and viruses d) Protozoa and plants

(xii) Justify the significance of controlling fermentation conditions such as temperature and pH in antibiotics production.

a) To improve the taste of the antibiotic b) To ensure safety for workers
c) To maximize antibiotic yield and quality d) To reduce production time

(xiii) Choose the class of antibiotic, derived from Streptomyces, known for its effectiveness against tuberculosis and other gram-positive bacteria.

a) Aminoglycosides b) Tetracyclines
c) Isoniazid d) Sulfonamides

(xiv) Decide the primary raw material for bioconversion of biodiesel.

a) Corn starch b) Algal biomass
c) Natural gas d) Coal

(xv) Predict the major product of Phase II reactions in drug metabolism.

a) A prodrug b) A metabolite that can be excreted in urine or bile
c) A lipid-soluble compound d) A neurotransmitter

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Justify the use of amylase and protease in baked food products. (3)
3. Describe the process of lipase production briefly. (3)
4. Differentiate between BOD and COD. (3)
5. Discuss the factors which can influence the process of solid state fermentation. (3)
6. Explain potential drawbacks of heat treatment in food sterilization. (3)

OR

Explain optimization of fermentation process. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Evaluate Phase I biotransformation in detail. (5)
8. Summarize the working process of stirred tank bioreactor. (5)
9. List advantages of enzyme immobilization. (5)
10. Assess the production of industrial enzymes. (5)
11. Examine in detail, principle and working of anaerobic effluent treatment. (5)

12. Differentiate Phase I and Phase II biotransformation. (5)

OR

Analyze the use of single cell lipids. (5)

****