2024/05

SET A

B.Sc. MICROBIOLOGY
SIXTH SEMESTER
INDUSTRIAL MICROBIOLOGY
BMB-601

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs. **Full Marks: 70**

Objective

Time: 30 mins. **Marks: 20**

Choose the correct answer from the following: ***1×20=20***

1. Substrates used as carbon source in industrial fermentation includes:
   a. Glucose b. Sucrose
   c. Molasses d. Urea
2. Corn steep liquor is rich in:
   a. C b. N
   c. S d. P
3. Which was one of the first applications of fermentation?
   a. Acetone b. Brewing beer
   c. Antibiotics d. Cheese making
4. Who was the Father of Industrial Fermentation?
   a. Chaim Weizmann b. Leuwenhoek
   c. Robert Koch d. Alexandar Fleming
5. Whey is obtained from:
   a. Sugarcane industry b. Malt and barley industry
   c. Baker's yeast d. Dairy industry
6. An example of an emulsifying agent is:
   a. Urea b. NaCl
   c. Tween d. NaOH
7. Freezing in liquid N2 is done in:
   a. Lyophilisation b. Refrigeration
   c. Freeze drying d. Cryopreservation
8. Example of a recombinant protein is:
   a. Insulin b. PHB
   c. Glutamate synthase d. None of the above
9. .....fermentation is an open system.
   a. Batch b. Feed batch
   c. Continuous d. All of the above
10. Active growth and multiplication of microorganisms occur during:
    a. Lag phase b. Log phase
    c. Deceleration phase d. Stationary phase

11. Which of the following is not a component of down streaming process?
    a. Preservation
    b. Separation
    c. Expression
    d. Purification

12. Which of the following is not a product of fermentation?
    a. Carbon dioxide
    b. Oxygen
    c. Ethanol
    d. Lactic acid

13. Which factor greatly influences fermentation process?
    a. pH
    b. Oxygen composition
    c. Soil composition
    d. Light intensity

14. What is the ideal temperature range of Fermentation?
    a. 60-70°C
    b. 40-50°C
    c. 0-5°C
    d. 15-25°C

15. What is the primary purpose of sterilization in fermentation process?
    a. Promoting enzyme activity
    b. Preventing contamination
    c. Controlling temperature
    d. Enhancing fermentation speed

16. Which process involves the conversion of pyruvate to ethanol or lactic acid in fermentation?
    a. Glycolysis
    b. Fermentation cycle
    c. Citric acid cycle
    d. Krebs cycle

17. What is the importance of aeration in fermentation?
    a. To reduce the microbial growth
    b. To enhance the oxygen availability
    c. To increase the acidity
    d. To accelerate fermentation

18. Which method involves continuous removal of product while adding fresh substrate during fermentation?
    a. Feed batch fermentation
    b. Batch fermentation
    c. Continuous fermentation
    d. Solid state fermentation

19. What role do microorganisms play in fermentation?
    a. Consume nutrients
    b. Produce enzymes
    c. Convert substrates
    d. All

20. Which of the following is not the physical method for the cells rupturing?
    a. Milling
    b. Homogenization
    c. Ultrasonication
    d. Enzymatic digestion

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Descriptive

Time : 2 hr. 30 mins. Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. Define batch fermentation. Describe the growth phases in a typical batch fermentation system with suitable diagrams. 2+8=10

2. Define strain improvement. Write the characteristics of an improved strain. Discuss how mutation can help in the strain improvement programme. 2+3+5=10

3. Write short notes on: 5+5=10
   a) Lyophilisation
   b) Protoplast fusion

4. Discuss briefly the substrates used as Carbon sources in industrial fermentation. Draw a neat labelled diagram of a conventional bioreactor. 7+3=10

5. Explain the usage of centrifugation and spray drying in detail. 5+5=10

6. What are the methods used in enzyme immobilization? Explain any two of them. 5+5=10

7. Explain the preparation of: 5+5=10
   a) Ethanol
   b) Citric acid

8. Write a note on the sources and ways of isolation of industrially important microbial strains. 10

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