2024/05

SET B

B.Sc. BIOTECHNOLOGY
SECOND SEMESTER
BASICS OF MICROBIOLOGY AND FERMENTATION TECHNOLOGY
BBT-201

[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. What is the main feature of aerobic fermentation?
   a. Agitation b. Aeration
   c. rpm d. All of the above
2. What is the substrate used for mushroom?
   a. Wheat b. Cane sugar
   c. Straw manure d. All of the above
3. The Continuous culture is a/an..... culture system.
   a. Open b. Closed
   c. Isolated d. Semi closed
4. Which growth phase is usually longer in continuous culture?
   a. Log b. Exponential
   c. Stationary d. Death
5. Which of the following fermenters are characterized by height to diameter ratio?
   a. Tower fermenter b. Airlift fermenter
   c. Continuous fermenter d. All of the above
6. Single cell protein is the production of:
   a. Extracellular proteins b. Fermentation waste products
   c. Intracellular protein extraction d. Metabolites
7. Which of the following is a downstream process?
   a. Screening b. Strain improvement
   c. Media formulation d. Product recovery
8. What are primary metabolites?
   a. Synthesized during primary phase of cell growth b. Synthesized during secondary phase of cell growth
   c. Synthesized during death phase of cell growth d. None of the above
9. Liquid liquid extraction involves the separation of molecules based on:
   a. Differential solubility b. Charge
   c. Affinity d. All of the above

10. Ammonium sulfate salts is most commonly used in down steam processing for:
    a. Centrifugation
    b. Precipitation
    c. Evaporation
    d. Chromatography

11. Flavanoids is a:
    a. Primary metabolites secreted from plant
    b. Primary metabolites secreted from microorganism
    c. Secondary metabolites secreted from plant
    d. Secondary metabolites secreted from microorganism

12. Secondary metabolite is produced in which phase?
    a. Early Log Phase
    b. Late Stationary Phase
    c. Late Lag Phase
    d. Late Log Phase

13. What is the relationship with generation time and growth in bacteria?
    a. K∞1/g
    b. K=g
    c. K∞g
    d. None

14. Rhodamine is a dye used in which type of microscope?
    a. Brightfield microscope
    b. Fluorescent microscope
    c. Phase Contrast
    d. Electron

15. Conventional method of bacterial identification is done by:
    a. 16-S rRNA
    b. 18-SrRNA
    c. Bergeys Manual of Determinative Bacteriology
    d. 23-srRNA

16. Name the scientist who proposed the phylogenetic tree for living things.
    a. Carlo Urbani
    b. Louis Pasteur
    c. Robert Koch
    d. Carl Woese

17. Suppose a bacterial population increases from 10^3cells to 10^9 cells in 10 hrs, find the growth of the bacteria.
    a. 5.0gen/h
    b. 2.0 gen/h
    c. 1.0 gen/h
    d. 3.0 gen/h

18. Nodule formation in plant is done by which gene?
    a. Nif
    b. Rhicadhesin
    c. Flavanoids
    d. Nod

19. Who discovered the concept of pure culture?
    a. Louis Pasteur
    b. Robert Koch
    c. Anton Von Leewenhoek
    d. Joseph Lister

20. Which of the following bacteria is pleomorphic?
    a. Streptococcus
    b. Mycobacteria
    c. Corynebacterium
    d. Pseudomonas

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Descriptive

Time : 2 hr. 30 mins. **Marks : 50**

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

1. Which are the enzymes responsible for the production of Citric acid? Explain the Biosynthetic pathway and production of Citric acid? Plot a graph if glucose supplemented:150g/L ,biomass yield:5g/L, Citric acid production 100g/L — 2+6+2=10

2. Write some properties of drug. Explain the biosynthetic pathway and production of Penicillin with a neat diagram. — 5+5=10

3. a) Write the principle and working principle of fluorescent microscope with a schematic diagram.
   b) What is Rhicadhesin? Explain symbiotic relationship of Rhizobium and leguminous plants with a neat diagram. — 10

4. Explain diauxic growth curve. Define bacterial growth curve with a neat diagram. Describe the kinetics of continuous culture. — 2+8=10

5. Describe the bacterial cell wall with a neat diagram. Explain the principle of Gram staining. — 5+5=10

6. What do you mean by fermentation and what is the relationship between fermentation and yeast? Justify your answer. Explain the design of a continuous stirred tank bioreactor with the help of a suitable diagram. Explain the importance of each part. Do you think there is any importance of improving the strain of microbe used for fermentation? Justify your answer. — 2+7+1=10

7. Differentiate between batch fermentation and continuous fermentation. What will be the outcome of growth curve if the media contains a complex compound mixture of lactose and glucose? Explain solid substrate fermentation. What is the difference between a fluidised and packed bed bioreactor? Write a note on airlift bioreactors. — 2+1+2+2+3=10

8. What are the different media components used during fermentation? Mention their importance. Define downstream processing. What are the steps involved? Mention their importance and method used for each stage. — 3+7=10

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