

B.Sc. BIOTECHNOLOGY
FIFTH SEMESTER (SPECIAL REPEAT)
Industrial Fermentation
BBT – 501

(Use Separate Answer Scripts for Objective & Descriptive)

Duration : 3 hrs.

Full Marks : 70

[PART-A: Objective]

Time : 20 min.

Marks : 20

Choose the correct answer from the following:

1X20=20

- Citric acid found in citrus fruit is
 - Inorganic acid
 - Organic acid
 - Both a & b
 - Very strong acid
- What is the pore size of the filtration membrane to remove bacteria?
 - 0.25 μm
 - 0.22 μm
 - 0.27 μm
 - 0.26 μm
- The levels of primary metabolites are regulated by _____
 - Feedback mechanism
 - rDNA technology
 - Incubating the microorganism in dark
 - Adding the inhibitors
- Which among the following is used in wine production
 - E.coli*
 - Saccharomyces cerevisiae*
 - Aspergillus niger*
 - Thiomargarita*
- Hydroxylation reaction involves
 - Removal of Hydrogen (H) from the substrate
 - Removal of Hydroxyl group (OH) from the substrate
 - Addition of Hydrogen (H) to the substrate
 - Addition of Hydroxyl group (OH) to the substrate
- Which of the following is NOT the technique of preservation?
 - Storage on agar slant
 - Storage under liquid nitrogen
 - Dried cultures
 - Storage in water
- Which of the following is not a method of immobilization?
 - Entrapment
 - Ionic bonding
 - Adsorption
 - Encapsulation
- The partial fermentation of green tea results in the formation of _____
 - Yoghurt
 - Sauerkraut
 - Kombucha
 - Kefir
- The purpose of aeration is to provide _____
 - The medium to organisms
 - The carbon dioxide to organisms
 - The oxygen to organisms
 - The water to organisms

10. Which of the following is absent in fermentation media?
 - a. Carbon
 - b. Nitrogen
 - c. Agar
 - d. Water
11. Steroids are found in
 - a. Plants
 - b. Animals
 - c. Fungi
 - d. All of these
12. While constructing the fermenter, which of the following is not required?
 - a. High-speed Agitation and Aeration system
 - b. Temperature control system
 - c. pH control system
 - d. Sample facilities
13. Amino acids are metabolites of pharmacological interest and it is produced industrially from microbes. It is the product of ____
 - a. Primary metabolism
 - b. Secondary metabolism
 - c. Both a & b
 - d. None of these
14. Which of the following is NOT a criterion for the choice of an organism?
 - a. The organism must be genetically stable
 - b. The organism must be able to produce a high yield of product
 - c. The optimum temperature for the growth of an organism must be above 50°C
 - d. The organism must be able to grow in an easily available nutrient medium
15. Bacteria secrete or produce secondary metabolites in _____ of growth curve.
 - a. Lag phase
 - b. Log Phase
 - c. Stationary phase
 - d. Death phase
16. Four phase bacterial growth curve is applicable only for
 - a. Batch culture
 - b. Continuous culture
 - c. Fed-Batch culture
 - d. All of these
17. Which of the following procedure has a great application in strain improvement?
 - a. rDNA technology
 - b. conjugation
 - c. Transformation
 - d. Transduction
18. From the following, which bacteria is not used in pharmaceutical industry
 - a. *E.coli*
 - b. *Staphylococcus aureus*
 - c. *Rhizobium*
 - d. *Actinomyces*
19. Full-form of ATCC is _____
 - a. American type culture collection
 - b. Automatic type counter & classifier
 - c. American type counter collection
 - d. American type classifier & collection
20. During the Lag phase of growth curve the size of a bacterial cell is ____
 - a. Minimum
 - b. Maximum
 - c. Moderate
 - d. No change

(PART-B : Descriptive)

Time : 2 hrs. 40 min.

Marks : 50

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

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| 1. Discuss the different methods employed for immobilization of enzymes in industrial processing. | 10 |
| 2. What is proteolytic enzymes? List atleast five (5) proteolytic enzymes and their applications respectively. | 10 |
| 3. Define fermentation. Explain the isolation, screening and strain improvement of microorganism in fermentation process. | 10 |
| 4. Explain the methods involved in the engineering of metabolic pathways for the over-production of primary metabolites in industrial fermentation. | 10 |
| 5. Discuss the methods used for the separation and purification of proteins in the industrial fermentation. | 10 |
| 6. a. Explain the biosynthetic path and mode of action of penicillin.
b. Explain the production of penicillin with a neat diagram. | 5+5=10 |
| 7. a. Explain the bacterial growth curve with a neat diagram.
b. Describe the mechanism of continuous culture with a neat diagram. | 5+5=10 |
| 8. a. Describe the biosynthetic pathway of citric acid production.
b. Explain the production of citric acid with a neat diagram. | 5+5=10 |

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