



Hambal

Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD (now MoE)
Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC
Coimbatore - 641 043, Tamil Nadu, India

Bachelor's Degree Arrear Examination – November 2025 IV Semester

Batch : 2023
Major : BCBT

Time: 3 Hrs
Max. Marks: 100

23BBTC04 Microbiology and Industrial Fermentation

Course Outcomes :

- CO1: Appreciate the principle of various microscopes and their utility in microbiology.
- CO2: Gain an insight in to the classification of microorganisms and their ultra-structure.
- CO3: Acquire the theoretical knowledge for the various methods used in microbiology.
- CO4: Understand the methods used in the control of microorganisms and various pathogenic diseases.
- CO5: Acquire knowledge of food microbiology, packaging and fermentation industry.

Part A

Choose the Correct Answer

10 X 1 = 10

1. Consider the following statements CO1K3
 - I. Gem theory was proposed by Louis Pasteur
 - II. He is considered as a father of Microbiology

a. I is correct b. II is correct c. Both I and II are correct d. Both are wrong
2. Which of the following best describes the principle of fluorescence microscopy? CO1K1
 - a. It uses differences in refractive index to enhance contrast in unstained specimens.
 - b. It detects electrons scattered by the specimen to form an image.
 - c. It visualizes structures by detecting emitted light from fluorophores after excitation with specific wavelengths.
 - d. It relies on interference of light waves to produce a 3D-like image.
3. Bacterial cells are mainly composed of different macromolecules. Which statement correctly explains the predominant component found in the dry weight of bacterial cells? CO2K2
 - a. Carbohydrates form the bulk as they serve as storage molecules.
 - b. Proteins are the major component, as they are required for enzymes, structural elements, and cell functions.
 - c. Lipids dominate because they are essential for the cell membrane.
 - d. Nucleic acids are the main part since they carry genetic information.
4. From the following options, identify the medium that would best support the survival and growth of most microorganisms present in a mixed sample CO2K3
 - a. Selective medium b. Differential medium
 - c. Nutrient medium d. Enriched medium
5. Cholera is caused by which organism? CO3K1

a. Salmonella typhi b. Vibrio cholerae c. Escherichia coli d. Shigella dysenteriae
6. Why does repeated and improper use of antibiotics contribute to antibiotic resistance in bacteria? CO3K2
 - a. Antibiotics lose their chemical structure after repeated use.
 - b. Bacteria adapt by developing mechanisms to survive antibiotic exposure.
 - c. The human immune system becomes resistant to antibiotics.
 - d. Antibiotics get converted into inactive forms inside the stomach.
7. A bioreactor is primarily used for CO4K1
 - a. Food preservation b. Large-scale growth of microorganisms or cells
 - c. Wastewater chlorination d. DNA sequencing
8. During crystallization, product purity is achieved because CO4K2
 - a. Impurities are incorporated into the crystal lattice
 - b. Only the desired compound forms a regular crystal structure
 - c. Impurities dissolve at the same rate as the product
 - d. The process increases the temperature of the solution

Part B

5 x 6 = 30

Answer the following

Each answer should not exceed 400 words or two pages

- 11.a. Discuss the spontaneous generation theory and its controversy. CO1K1
(or)
- 11.b. Compare and contrast the dark field and light field microscope. CO1K3
- 12.a. Summarize the characteristics of gram- positive and gram-negative bacteria. CO2K1
(or)
- 12.b. Review the Grams staining method for phenotypic characterization of bacteria. CO2K1
- 13.a. Explain how poor sanitation contributes to the spread of two bacterial diseases. Give suitable examples and briefly describe their modes of transmission and symptoms. CO3K2
(or)
- 13.b. Describe the fungaldiseases with suitable examples. CO3K2
- 14.a. List and briefly describe any three types of bioreactors used in industrial Microbiology. CO4K1
(or)
- 14.b. Explain the role of chromatography in downstream processing of fermentation product. CO4K2
- 15.a. Review the different types of non-alcoholic beverages. CO5K1
(or)
- 15.b. Describe the process of industrial production of the antibiotic penicillin, highlighting the role of the microorganism and the major steps involved. CO5K2

Part C

5 x 12 = 60

Answer ALL questions

Each answer should not exceed 800 words or four pages

- 16.a. Explain the fundamental principles and operational procedure of a phase contrast Microscope. CO1K2
(or)
- 16.b. Describe the core principles and working methodology of an electron microscope. CO1K1
- 17.a. Elaborate various sterilization techniques, and their role in eliminating microorganisms. CO2K2
(or)
- 17.b. What are the different nutritional categories of microorganisms? Explain the various types of media used for their growth. CO2K2
- 18.a. Describe any two viral diseases affecting humans. For each disease, including the causative virus, mode of transmission, key symptoms and prevention or control measures. CO3K2
(or)
- 18.b. Give a detailed summary of antibiotics and antibiotic resistance. CO3K2
- 19.a. Explain the design of a fermenter used in industrial microbiology with illustration. CO4K2
(or)
- 19.b. Illustrate the downstream processing of fermentation products. CO4K1
- 20.a. Review the production and applications of Single Cell Protein (SCP) and mushroom cultivation. CO5K1
(or)
- 20.b. Explain the production of important dairy products including kefir, Butter milk and cheese CO5K2