



Hambald

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 Examination – May 2025
IV Semester

Class : II UG

Major : Biochemistry and Biotechnology

Time: 3 Hours

Max. Marks: 100

23BBTC04 Microbiology and Industrial Fermentation

Course Outcomes :

At the end of the course students will be able to

1. Appreciate the principle of various microscopes and their utility in microbiology
2. Gain an insight in to the classification of microorganisms and their ultra-structure
3. Acquire the theoretical knowledge for the various methods used in microbiology
4. Understand the methods used in the control of microorganisms and various pathogenic diseases
5. Acquire knowledge of food microbiology, packaging and fermentation industry

Part A

10 x 1 = 10

Choose the Correct Answer

1. The theory of spontaneous generation proposed that life could arise spontaneously from _____
a. Air
b. Non-living matter
c. Water
d. Germs
CO1K1
2. Who invented the first compound microscope ?
a. Antonie van Leeuwenhoek
b. Louis Pasteur
c. Robert Hooke
d. Zacharias Janssen
CO1K1
3. The outer most layer of the bacterial cell that provides protection and rigidity is called the _____
a. Cell membrane
b. Peptidoglycan layer
c. Capsule
d. Flagella
CO2K1
4. The primary purpose of microbial staining is to _____ micro organisms for easier observation under a microscope.
a. isolate
b. Visualize
c. identify
d. Culture
CO2K1
5. What is the causative agent of diphtheria ?
a. *Corynebacterium diphtheriae*
b. *Streptococcus pyogenes*
c. *Escherichia coli*
d. *Staphylococcus aureus*
CO3K1
6. Who discovered the first antibiotic, penicillin?
a. Louis Pasteur
b. Robert Koch
c. Edward Jenner
d. Alexander Fleming
CO3K1
7. The _____ bioreactor, is characterized by a continuous flow of medium through the vessel and is widely used for industrial fermentation processes.
a. Batch
b. Fed-batch
c. Continuous
d. Air-lift
CO4K1
8. How is protein typically recovered from a fermentation broth in downstream processing?
a. Ion exchange chromatography
b. Filtration
c. Freeze-drying
d. Distillation
CO4K1
9. What is the primary microorganism used in the fermentation of kefir ?
a. *Streptococcus thermophilus*
b. Lacticacidbacteria
c. Mixedcultureofbacteria and yeast
d. *Saccharomyces cerevisiae*
CO5K1
10. Biogas is produced through a process called _____.
a. Photosynthesis
b. Fermentation
c. Combustion
d. Anaerobicdigestion
CO5K1

Part B

5 x 6 = 30

Answer ALL questions

Each answer should not exceed 400 words or two pages

- 11.a. Explain the contributions of Louis Pasteur in disproving spontaneous generation. CO1K2
(or)
- 11.b. What is a light microscope ? Draw and label its parts. CO1K2
- 12.a. Write the differences between Gram-positive and Gram-negative bacteria. CO2K2
(or)
- 12.b. List and explain the four phases of the microbial growth curve. CO2K3
- 13.a. Describe the symptoms, transmission, and prevention methods for tuberculosis. CO3K2
(or)
- 13.b. Describe the symptoms, transmission, and prevention methods for SARS-COVID. CO3K2
- 14.a. List the main differences between batch and continuous fermentation. CO4K3
(or)
- 14.b. Describe the role of chromatography in the isolation and purification of bioproducts. CO4K3
- 15.a. List the microorganisms involved in cheese production and illustrate the steps involved. CO5K2
(or)
- 15.b. Discuss the applications of metabolic engineering in the production of secondary metabolites. CO5K3

Part C

5 x 12 = 60

Answer ALL questions

Each answer should not exceed 800 words or four pages

- 16.a. Explain the germ theory of disease and discuss how Koch's Postulates provide evidence for this theory. CO1K4
(or)
- 16.b. Explain the working principle, advantages, and limitations of Scanning Electron Microscopy. CO1K3
- 17.a. Describe the various classifications of protozoa with examples. CO2K3
(or)
- 17.b. List and explain the different methods of sterilization in microbiology. CO2K2
- 18.a. Explain the causes, types, and treatments of fungal infection (Mycosis). CO3K3
(or)
- 18.b. What are antibiotics? Describe the major causes of antimicrobial resistance (AMR) and its impact on public health. CO3K2
- 19.a. Explain the design and different types of fermenters used in industrial microbiology. CO4K3
(or)
- 19.b. List and explain any four downstream processing techniques used in biotechnology. CO4K3
- 20.a. Explain the main steps involved in the beer production. List out the key ingredients used in it. CO5K2
(or)
- 20.b. Explain the process of enzyme production (amylase) in microorganism. CO5K4
