R1989	Sub. Code
	530101

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024.

First Semester

Microbiology

GENERAL MICROBIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objectives type questions by choosing the correct option.

1. Who proposed the germ theory of disease? (CO1, K2)
   (a) Louis Pasteur (b) Edward Jenner
   (c) Robert Koch (d) Joseph Lister

2. Which scientist is credited with disproving the theory of spontaneous generation through his experiments with swan-necked flasks? (CO1, K2)
   (a) Antonie van Leeuwenhoek
   (b) Louis Pasteur
   (c) Joseph Lister
   (d) John Tyndall

3. What is the primary function of bacterial endospores? (CO2, K2)
   (a) Reproduction
   (b) Energy storage
   (c) Survival under adverse conditions
   (d) Cellular communication

4. Which structure of bacteria is primarily responsible for motility? (CO2, K2)

(a) Capsule (b) Periplasmic space
(c) Flagella (d) Cell membrane

5. Which phylum do diatoms belong to? (CO3, K2)

(a) Chlorophyta (b) Rhodophyta
(c) Diatophyta (d) Bacillariophyta

6. What is the primary mode of reproduction in protozoa? (CO3, K2)

(a) Binary fission (b) Conjugation
(c) Spore formation (d) Fragmentation

7. What is the distinctive property of viruses? (CO4, K4)

(a) They are cellular organisms
(b) They can reproduce outside of a host cell
(c) They contain both DNA and RNA
(d) They require a host cell for replication

8. Which of the following is not a viral-related agent? (CO4, K2)

(a) Viroid (b) Prion
(c) Bacteriophage (d) Mycoplasma

9. Which method is commonly used for the preservation of microbial cultures for long-term storage at ultra-low temperatures? (CO5, K4)

(a) Liquid nitrogen preservation
(b) Freeze-drying (lyophilization)
(c) Refrigeration at 4°C
(d) Preservation in agar slants

10. Which type of media encourages the growth of certain microorganisms while inhibiting the growth of others? (CO5, K2)

(a) Natural media (b) Synthetic media
(c) Enriched media (d) Selective media

Part B (5 × 5 = 25)

Answer **all** questions not more than 500 words each.

11. (a) Give a brief account of the historical significance of the spontaneous generation theory. (CO1, K2)

Or

(b) Highlight the contributions of scientists Antonie van Leeuwenhoek and Louis Pasteur in the field of Microbiology. (CO1, K2)

12. (a) Briefly describe the various morphological types exhibited by bacteria. (CO2, K2)

Or

(b) Compare and contrast the cell wall structures of Gram-negative and Gram- positive bacteria. (CO2, K4)

13. (a) Give a brief account of the structure and reproduction of Rhodophyta. (CO3, K2)

Or

(b) Write a short note on the chemical composition and functions of the fungal cell wall. (CO3, K4)

14. (a) Describe the morphology of a typical virus.(CO4, K2)

Or

(b) Briefly explain the classification of bacteriophages based on their structural organization. (CO4, K5)

15. (a) Write a brief note on natural and enriched media. (CO5, K4)

Or

(b) Briefly explain the principle behind freeze-drying as a method of microbial culture preservation. (CO5, K5)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1000 words each.

16. (a) Give a detailed account of bacterial classification with emphasis on Bergey's Manual of Systematic Bacteriology. (CO1, K2)

Or

(b) Discuss the physiological, morphological, and genetic characteristics utilized in microbial taxonomy. (CO1, K4)

17. (a) Give a detailed account of the structure and composition of bacterial endospores, highlighting their unique features that contribute to extreme resistance. (CO2, K4)

Or

(b) Discuss the type and functions of reserve food materials stored by bacteria. (CO2, K2)

18. (a) Write a detailed account of the general characteristics, structure and reproduction of Chlorophyta. (CO3, K4)

Or

(b) Give an elaborate account of the structure and life cycle of Ascomycetes. (CO3, K4)

19. (a) Discuss the discovery of viruses and how our understanding of them has evolved overtime.

(CO4, K6)

Or

(b) Compare and contrast the lytic and lysogenic life cycles of bacteriophages, highlighting their key stages and outcomes. (CO4, K5)

20. (a) Discuss the significance of selective media in microbiology. Provide examples of selective media and explain their applications in microbial culture.

(CO5, K4)

Or

(b) Describe the principles and applications of anaerobic culture techniques, including the use of anaerobic chambers and thioglycolate media.

(CO5, K4)

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R1990

Sub. Code
530102

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024.

First Semester

Microbiology

MICROBIAL BIOCHEMISTRY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Which is the most abundant biomolecules in earth? (CO1, K3)

   (a) Lipid (b) Carbohydrate

   (c) Protein (d) Nucleic acid

2. What is the function of saliva in digestion? (CO3, K4)

   (a) Starch (b) Fiber

   (c) Proteins (d) Fats

3. Which one of bone presents between amino acid? (CO3, K4)

   (a) Conic bond (b) Acidic bond

   (c) Hydrogen bond (d) Peptide bond

4. Amino acids are mostly synthesised from (CO2, K3)

   (a) Fatty acid (b) Mineral salt

   (c) α-ketoglutaric acid (d) None of the above

5. Which of the following is undergoes β-oxidation?(CO3, K4)
   (a) Polyunsaturated fatty acid
   (b) Saturated fatty acid
   (c) Monounsaturated fatty acid
   (d) All the above

6. β-oxidation of fatty acid mostly occur in (CO3, K4)
   (a) Brain (b) Adipose tissue
   (c) Liver (d) Muscles

7. Which of the following is not co-enzyme? (CO4, K2)
   (a) NAD (b) NADP
   (c) FAD (d) MN^{2+}

8. What are ribozyme? (CO4, K2)
   (a) RNA acting as enzyme
   (b) Protein acting as enzyme
   (c) Robose sugar acting as enzyme
   (d) Antibodies acting as enzyme

9. Which species used for producing Streptomycin?(CO4, K2)
   (a) *Streptomyces rimoses*
   (b) *Streptomyces griseus*
   (c) *Streptomyces aureofaeciens*
   (d) *Streptomyces griseaflavus*

10. Fermentation process used for the production of Penicillin (CO5, K1)
   (a) Aerobic fermentation followed by anaerobic fermentation
   (b) Anaerobic fermentation
   (c) Aerobic fermentation
   (d) Anaerobic fermentation followed by erobic fermentation

Part B (5 × 5 = 25)

Answer **all** the question not more than 500 words each.

11. (a) Illustrate the Enter Doudroff pathway. (CO1, K3)

Or

(b) Interpret the Krebs cycle. (CO1, K3)

12. (a) Outline the biological importance and reactivity of amino acids. (CO2, K3)

Or

(b) Classify the of amino acids based structure. (CO2, K3)

13. (a) Summarize the cholesterol synthesis in *E. coli*. (CO3, K4)

Or

(b) Interpret the classification of lipid. (CO3, K4)

14. (a) Differentiate the cofactors and co-enzymes. (CO4, K2)

Or

(b) Demonstrate the reversible and irreversible enzyme inhibition. (CO4, K2)

15. (a) Classify the antibiotics based on mode of action. (CO4, K1)

Or

(b) Summarize the biosynthesis of chlorophyll. (CO4, K1)

Part C (5 × 8 = 40)

Answer **all** the question not more than 1000 words each.

16. (a) Explain the classification, structure, properties of polysaccharides. (CO1, K3)

Or

(b) Outline the pentose phosphate pathway with neat diagram. (CO1, K3)

17. (a) Discuss the degradation of amino acids. (CO2, K3)

Or

(b) Explain the tertiary and quaternary structure of protein. (CO2, K3)

18. (a) Discuss the double helix model of DNA. (CO3, K4)

Or

(b) Elaborate the structure of mRNA. tRNA. (CO3, K4)

19. (a) Interpret the mechanism of enzyme action. (CO4, K2)

Or

(b) Explain the properties water soluble vitamins. (CO4, K2)

20. (a) Discuss the biosynthesis of Penicillin. (CO5, K1)

Or

(b) Explain the structure and mode of action of Cholera toxin and aflatoxin. (CO5, K1)

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R1991	Sub. Code
	530103

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Microbiology

MICROBIAL PHYSIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct options.

1. What is the term for bacteria that grow optimally at low temperatures? (CO1, K2)

   (a) Psychrophiles

   (b) Mesophiles

   (c) Thermophiles

   (d) Hyperthermophiles

2. Which phase of bacterial growth is characterized by a balance between cell division and cell death? (CO1, K2)

   (a) Lag phase (b) Log phase

   (c) Stationary phase (d) Death phase

3. Which pigment is commonly found in cyanobacteria and red algae? (CO2, K2)

   (a) Chlorophyll a (b) Chlorophyll b

   (c) Carotenoids (d) Phycobilins

4. Where does photophosphorylation occur in photosynthetic organisms? (CO2, K4)

(a) Thylakoid membrane

(b) Stroma

(c) Mitochondrial matrix

(d) Cytoplasm

5. Which process converts atmospheric nitrogen (N_2) into a form that plants can use? (CO3, K4)

(a) Denitrification

(b) Ammonification

(c) Nitrogen fixation

(d) Nitrification

6. Which organisms are primarily responsible for denitrification? (CO3, K4)

(a) Nitrogen-fixing bacteria

(b) Ammonifying bacteria

(c) Nitrifying bacteria

(d) Denitrifying bacteria

7. Which of the following is a common response of microbial cells to osmotic stress? (CO4, K2)

(a) Decreased membrane stability

(b) Decreased intracellular water content

(c) Increased cell volume

(d) Increased membrane stability

8. What are the end products of butanol fermentation? (CO4, K2)

(a) Butanol and carbon dioxide

(b) Butanol and acetone

(c) Butanol and ethanol

(d) Butanol and hydrogen gas

9. Which law of thermodynamics is related to the concept of conservation of energy? (CO5, K6)

(a) First Law of Thermodynamics

(b) Second Law of Thermodynamics

(c) Third Law of Thermodynamics

(d) Zeroth Law of Thermodynamics

10. According to the fluid mosaic model, what is the primary component of the cell membrane? (CO5, K6)

(a) Phospholipids

(b) Proteins

(c) Carbohydrates

(d) Cholesterol

Part B ($5 \times 5 = 25$)

Answer **all** questions not more than 500 words each.

11. (a) Write short notes on growth phase of microorganisms. (CO1, K2)

Or

(b) Define synchronous culture in microbial growth and explain the methods used to synchronize microbial populations. (CO1, K2)

12. (a) Compare and contrast the oxygenic and anoxygenic photosynthesis in microbial organisms. (CO2, K2)

Or

(b) Explain the structure of phycobilin pigments found in red and blue-green algae. (CO2, K4)

13. (a) Write a note on structure and composition of the nitrogenase enzyme. (CO3, K4)

Or

(b) Describe the significance of transamination and deamination. (CO3, K4)

14. (a) Outline an overview of the lactic acid fermentative pathway. (CO4, K2)

Or

(b) Describe the propionic acid fermentation pathway in bacteria. (CO4, K6)

15. (a) Examine the principles and applications of group translocation as a nutrient transport mechanism in bacteria. (CO5, K6)

Or

(b) Compare and contrast the advantages and disadvantages of passive diffusion and facilitated diffusion in bacterial nutrient uptake. (CO5, K6)

Part C (5 × 8 = 40)

Answer **all** questions not more than 1,000 words each.

16. (a) Discuss in detail on the impact of environmental factors affecting microbial growth. (CO1, K2)

Or

(b) Explain in detail on the nutritional classification of microorganisms based on carbon and energy sources. (CO1, K2)

17. (a) Outline the importance of the Calvin Cycle in the overall process of photosynthesis. (CO2, K2)

Or

(b) Elaborate in detail on the cyclic and non-cyclic electron transport. (CO2, K4)

18. (a) Give a detailed account on Nitrogen cycle. (CO3, K4)

Or

(b) Explain the genetic regulation of nitrogen fixation in diazotrophic bacteria. (CO3, K4)

19. (a) Explain the process of butanol fermentation, emphasizing the microorganisms involved in key metabolic pathways. (CO4, K2)

Or

(b) Write an essay on factors influencing microbial stress responses. (CO4, K2)

20. (a) Elaborate the role of the TCA cycle in cellular respiration and its significance in energy production. (CO5, K6)

Or

(b) Explain in detail on the principles and laws of thermodynamics. (CO5, K6)

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R1992	Sub. Code
	530501

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

First Semester

Microbiology

Elective — BIOLOGICAL TECHNIQUES

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Which of the following is used in electron microscope? (CO1, K3)

   (a) Electron beams

   (b) Magnetic fields

   (c) Light waves

   (d) Electron beams and magnetic fields

2. Which among the following helps us in getting a three-dimensional picture of the specimen? (CO3, K4)

   (a) Transmission Electron Microscope

   (b) Scanning Electron Microscope

   (c) Compound Microscope

   (d) Simple Microscope

3. The region of electromagnetic spectrum for NMR is (CO2, K3)

(a) Microwave

(b) Infrared

(c) Radio frequency

(d) UV rays

4. In FTIR, initially spectra is recorded as (CO3, K4)

(a) Volts Vs time

(b) Percentage Transmittance vs concentration

(c) Absorbance vs Concentration

(d) Absorbance vs time

5. Centrifugation is based on (CO3, K4)

(a) Pascal law

(b) Stain law

(c) Strokes law

(d) Patricks law

6. Which of the following use of density gradient centrifugation? (CO4, K2)

(a) Purification of virus

(b) To remove the small particles

(c) To remove dirt

(d) To get rid of big particles

7. Which of the following cannot be used as an adsorbent in Column adsorption chromatography? (CO4, K2)

(a) Magnesium oxide

(b) Silica gel

(c) Activated alumina

(d) Potassium permanganate

8. In Gas-liquid phase chromatography, the stationary phase is composed of ———— and the mobile phase is made of ———— (CO4, K2)

(a) Solid, liquid

(b) Liquid, liquid

(c) Liquid, gas

(d) Solid, gas

9. The polymerization of the gel used in PAGE occurs between polyacrylamide and ———— (CO4, K2)

(a) N, N – acrylamide

(b) Bisacrylamide

(c) N – methyleneacrylamide

(d) N, N – methylene bisacrylamide

10. Which type of agreement royalty is paid on the basis of sale? (CO5, K1)

(a) Patent

(b) Copy right

(c) Licensing

(d) None of the above

Part B (5 × 5 = 25)

Answer **all** the questions not more than 500 words each.

11. (a) Illustrate the Confocal laser scanning microscopy. (CO1, K3)

Or

(b) Interpret the sample preparation methods for Transmission Electron microscope. (CO1, K3)

12. (a) Construct the beer Lambert's law. (CO2, K3)

Or

(b) Describe the principle of UV/VIS spectrophotometer. (CO2, K3)

13. (a) Summarize the factors affecting the sedimentation rate. (CO3, K4)

Or

(b) Interpret the principle and uses of density gradient centrifuge. (CO3, K4)

14. (a) Describe the principle and uses ion exchange chromatography. (CO4, K2)

Or

(b) Demonstrate the agarose gel electrophoresis. (CO4, K2)

15. (a) Describe the ethical guidelines for research involving animals. (CO4, K1)

Or

(b) Summarize the national and international agencies involved in IPR and patenting. (CO4, K1)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 1000 words each.

16. (a) Explain the principle and applications of Scanning Electron Microscope. (CO1, K3)

Or

(b) Outline the principle and applications of Fluorescent Microscope. (CO1, K3)

17. (a) Discuss the principle and uses of MALDI ToF Spectroscopy. (CO2, K3)

Or

(b) Explain the working mechanism of NMR Spectroscopy. (CO2, K3)

18. (a) Discuss the molecular weight determination by centrifugation. (CO3, K4)

Or

(b) Elaborate the mechanism of Gas Chromatography. (CO3, K4)

19. (a) Interpret the principle of SDS-PAGE. (CO4, K2)

Or

(b) Explain the Isoelectric focussing and 2-dimentional gel electrophoresis. (CO4, K2)

20. (a) Discuss the trade mark, trade secret and copy right. (CO5, K1)

Or

(b) Explain the ethical committee guidelines for research involving genetically engineered microorganisms. (CO5, K1)

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R1993	Sub. Code
	530301

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024

Third Semester

Microbiology

MEDICAL MICROBIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. Which of the following is NOT a factor to consider when collecting clinical samples? (CO1, K2)

   (a) Proper labeling

   (b) Use of sterile containers

   (c) Transporting samples at room temperature

   (d) Timing of sample collection

2. The most common mode of transmission for nosocomial infections is (CO1, K2)

   (a) Airborne transmission

   (b) Vector-borne transmission

   (c) Contact transmission

   (d) Vehicle transmission

3. Actinomyces is often treated with (CO2, K2)

(a) Antifungal medications

(b) Antibiotics

(c) Antiviral medications

(d) Immunomodulators

4. *Bacillus anthracis* is the causative agent of (CO2, K4)

(a) Tetanus (b) Anthrax

(c) Tuberculosis (d) Botulism

5. Mycoplasma species are often difficult to culture using traditional methods because they (CO3, K4)

(a) Require anaerobic conditions

(b) Grow very slowly

(c) Are resistant to antibiotics

(d) Form spores

6. *Salmonella* infections are often associated with the consumption of (CO3, K4)

(a) Raw seafood

(b) Unpasteurized dairy products

(c) Undercooked poultry and eggs

(d) Fresh fruits and vegetables

7. Candida infections of the skin and mucous membranes are collectively known as (CO4, K2)

(a) Thrush

(b) Oral candidiasis

(c) Cutaneous candidiasis

(d) Vaginal candidiasis

8. *Ascaris lumbricoides* primarily infects the (CO4, K2)

(a) Lungs (b) Liver

(c) Intestines (d) Bloodstream

9. Ebola virus primarily targets which organ system in the body? (CO5, K6)

(a) Cardiovascular system

(b) Nervous system

(c) Respiratory system

(d) Immune system

10. The causative agent of rabies belongs to the genus within the family Rhabdoviridae is (CO5, K6)

(a) Lyssa virus

(b) Orthorhabdo virus

(c) Vesiculo virus

(d) Novirhabdo virus

Part B ($5 \times 5 = 25$)

Answer **all** the questions not more than 500 words each.

11. (a) Give short notes on types of medium used for collection and transport of clinical samples. (CO1, K2)

Or

(b) Outline the different categories of laboratory waste and the recommended disposal methods for each. (CO1, K2)

12. (a) Brief out the pathogenicity and laboratory diagnosis of *Neisseria*. (CO2, K2)

Or

(b) Outline the cultural characteristics of the organism *Corynebacterium*. (CO2, K4)

13. (a) Give notes on pathogenesis of the disease Yersiniosis. (CO3, K4)

Or

(b) Write notes on Pertussis in context to its pathogenesis. (CO3, K4)

14. (a) Outline the primary habitat and the key clinical manifestations associated with cryptococcal infections. (CO4, K2)

Or

(b) Describe the general characteristics of dimorphic fungi. (CO4, K6)

15. (a) Write notes on the mechanism of action and consideration of any two antiparasitic drugs against various parasitic infections. (CO5, K6)

Or

(b) Explain the transmission, clinical manifestations, laboratory diagnosis of Ebola virus. (CO5, K6)

Part C (5 × 8 = 40)

Answer **all** the questions not more than 100 words each.

16. (a) Explain in detail on the microbiological examination of cerebrospinal fluid (CSF) for the diagnosis of central nervous system infections. (CO1, K2)

Or

(b) Define Nosocomial Infections and discuss the significant aspects of nosocomial infections in healthcare settings. (CO1, K2)

17. (a) Give a detailed account on morphology, characteristics, pathogenesis and diagnosis of *Clostridium*. (CO2, K2)

Or

(b) Discuss in detail note on cultural characteristics, pathogenesis and diagnosis of *Streptococci*. (CO2, K4)

18. (a) Narrate an essay on the organism vibrio with it properties, pathogenesis, diagnosis and control measures. (CO3, K4)

Or

(b) Elaborate the general properties, pathogenesis and diagnosis of *Leptospira*. (CO3, K4)

19. (a) Narrate the different stages of the life cycle, clinical manifestations, complications and the challenges associated with malaria control and prevention. (CO4, K2)

Or

(b) Write a detailed essay on life cycle, pathogenesis, clinical manifestations, laboratory diagnosis and management of infections caused by *Entamoeba histolytica*. (CO4, K2)

20. (a) Discuss the properties, transmission, clinical manifestations, laboratory diagnosis, prevention of the Rhabdo virus. (CO5, K6)

Or

(b) Enumerate the pathology, diagnosis and treatment of Hepatitis B. (CO5, K6)

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R1994

Sub. Code
530302

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024.

Third Semester

Microbiology

IMMUNOBIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct options.

1. Antibodies transferred from mother to fetus through the placenta or breast milk represent (CO1, K2)
   (a) Active immunity (b) Passive immunity
   (c) Innate immunity (d) Adaptive immunity

2. Which organ is considered the primary site for T cell maturation? (CO1, K2)
   (a) Spleen (b) Thymus
   (c) Bone marrow (d) Lymph nodes

3. The region of an antigen that is recognized by antibodies or T cells is called the (CO2, K2)
   (a) Epitope (b) Antigenic determinant
   (c) Paratope (d) Immunoglobulin domain

4. Immunoglobulin responsible for mucosal immunity found in tears, saliva and breast milk is (CO2, K4)
   (a) IgA (b) IgD
   (c) IgG (d) IgM

5. Which pathway of complement activation is initiated by antigen-antibody complexes? (CO3, K4)

(a) Classical pathway (b) Alternative pathway

(c) Lectin pathway (d) Innate pathway

6. Graves' disease is an autoimmune disorder affecting which gland? (CO3, K4)

(a) Thyroid gland (b) Pituitary gland

(c) Adrenal gland (d) Pancreas

7. Live attenuated vaccines are contraindicated in individuals who are (CO4, K2)

(a) Pregnant (b) Immunocompromised

(c) Allergic to eggs (d) Over 65 years old

8. Which of the following vaccines is an example of a subunit vaccine? (CO4, K2)

(a) Influenza vaccine

(b) Oral polio vaccine (OPV)

(c) Yellow fever vaccine

(d) Bacillus Calmette-Guérin (BCG) vaccine

9. The two main classes of MHC molecules in humans are (CO5, K6)

(a) Class I and Class II

(b) Class II and Class III

(c) Class I and Class III

(d) Class II and Class IV

10. The technique of immunoelectrophoresis is particularly useful for detecting and quantifying. (CO5, K6)

(a) Lipids (b) Carbohydrates

(c) Nucleic acids (d) Proteins

Part B (5 × 5 = 25)

Answer **all** the questions, not more than 500 words each.

11. (a) Explain the key components and mechanisms of innate immunity. (CO1, K2)

Or

(b) Describe briefly on cells of immune system.(CO1, K2)

12. (a) Write notes on Monoclonal antibody production by Hybridoma technology. (CO2, K2)

Or

(b) Outline briefly on the properties and types of Antigens. (CO2, K4)

13. (a) Explain briefly on the Systemic lupus erythematosus. (CO3, K4)

Or

(b) Describe the causes, mechanism and symptoms of anaphylaxis. (CO3, K4)

14. (a) Outline briefly on the subunit vaccine. (CO4, K2)

Or

(b) Write notes on immunomodulation in infection. (CO4, K6)

15. (a) Describe briefly on the types of precipitation reactions. (CO5, K6)

Or

(b) Explain the procedure and applications of radio immunoassay. (CO5, K6)

Part C (5 × 8 = 40)

Answer **all** the questions, not more than 1000 words each.

16. (a) Explain in detail on the primary and secondary lymphoid organs. (CO1, K2)

Or

(b) Give a detailed account on acquired immunity. (CO1, K2)

17. (a) Discuss a step-by-step diagram illustrating the mechanism of antigen processing and presentation by APCs from antigen uptake to T cell activation. (CO2, K2)

Or

(b) Give a detailed account on the basic structure, types and functions of Immunoglobulins. (CO2, K4)

18. (a) Write an essay on the classical and alternative pathway of complement system. (CO3, K4)

Or

(b) Explain in detail on the organ specific autoimmune diseases. (CO3, K4)

19. (a) Discuss in detail on the live attenuated vaccines. (CO4, K2)

Or

(b) Give a detailed account on the immunity to viral disease. (CO4, K2)

20. (a) Discuss in detail on Major Histocompatibility complex and its role in antigen presentation. (CO5, K6)

Or

(b) Explain in detail on the principles of tumor immunology. (CO5, K6)

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R1995	Sub. Code
	530303

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024.

Third Semester

Microbiology

INDUSTRIAL MICROBIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct options.

1. A commonly used method for preserving bacteria in a laboratory is (CO1, K2)
   (a) Freezing at –20°C
   (b) Lyophilization
   (c) Exposure to ultraviolet (UV) light
   (d) Boiling at 100°C

2. Which of the following is a commonly screened trait in industrial microbes? (CO1, K2)
   (a) Pathogenicity (b) Biofilm formation
   (c) Quorum sensing (d) Antibiotic production

3. Packed bed bioreactors are typically operated in(CO2, K2)
   (a) Batch mode (b) Fed-batch mode
   (c) Continuous mode (d) Semi-batch mode

4. What is the main advantage of using advanced control algorithms in fermentation? (CO2, K4)
   (a) Decreased automation
   (b) Improved process efficiency and productivity
   (c) Increased risk of errors
   (d) Higher operational costs

5. What is the primary advantage of using batch culture over fed-batch culture? (CO3, K4)
   (a) Higher cell densities and productivity
   (b) Simplicity and ease of operation
   (c) Longer fermentation times
   (d) Lower risk of contamination

6. Which of the following methods is commonly used for enzyme encapsulation? (CO3, K4)
   (a) Adsorption
   (b) Covalent bonding
   (c) Entrapment within a polymer matrix
   (d) Precipitation

7. What is the process by which biogas is produced? (CO4, K2)
   (a) Aerobic digestion (b) Anaerobic digestion
   (c) Fermentation (d) Photosynthesis

8. What is the term for the process of separating solid particles from beer or wine to clarify the liquid? (CO4, K2)
   (a) Filtration (b) Decantation
   (c) Distillation (d) Carbonation

9. Which technique is used for the separation of proteins based on their size and charge? (CO5, K6)
   (a) Affinity chromatography
   (b) Gel electrophoresis
   (c) Ion exchange chromatography
   (d) Size exclusion chromatography

10. Which of the following is a primary concern in downstream processing? (CO5, K6)
   (a) Cell culture optimization
   (b) Protein expression
   (c) Product stability
   (d) DNA sequencing

Part B (5 × 5 = 25)

Answer **all** questions, not more than 500 words each.

11. (a) Brief out the importance of strain improvement in the context of industrial microorganism screening. (CO1, K2)

Or

(b) Describe the steps involved in the isolation and identification of potential industrial microorganisms. (CO1, K2)

12. (a) Write notes on packed bed bioreactor and its applications. (CO2, K2)

Or

(b) Describe the principle of fed-batch bioreactor operation modes. (CO2, K4)

13. (a) Brief out the key factors influencing the kinetics of microbial growth in a chemostat culture system. (CO3, K4)

Or

(b) Explain the importance of media sterilization in microbial fermentation processes. (CO3, K4)

14. (a) Give note on concept of single cell protein in context to food and feed production. (CO4, K2)

Or

(b) Outline the production on riboflavin. (CO4, K6)

15. (a) List out the chemical methods of cell disruption. (CO5, K6)

Or

(b) Explain the principle of liquid-liquid extraction and its applications in pharmaceutical industries. (CO5, K6)

Part C ($5 \times 8 = 40$)

Answer **all** questions, not more than 1000 words each.

16. (a) Explain in detail the different types of fermentation process. (CO1, K2)

Or

(b) Outline the challenges associated with preservation of microbial strains used in large-scale industrial processes. (CO1, K2)

17. (a) Narrate the role of instrumentation and computer applications in the optimization and control of fermentation processes. (CO2, K2)

Or

(b) Compare and contrast Newtonian and non-Newtonian behavior of fluids. (CO2, K4)

18. (a) Discuss the growth parameters that influence the overall performance of the fermentation process. (CO3, K4)

Or

(b) Narrate an essay on immobilization with its types in context to industrial applications. (CO3, K4)

19. (a) Give a detailed account on industrial production of Penicillin. (CO4, K2)

Or

(b) Discuss in detail on the production of biogas. (CO4, K2)

20. (a) Elaborate the different types of centrifugation employed in downstream processing. (CO5, K6)

Or

(b) Discuss the significance of market potential analysis and recovery cost in the fermentation industry. (CO5, K6)

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R1996

Sub. Code
530506

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2024.

Third Semester

Microbiology

Elective – APPLIED MICROBIOLOGY – I

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** the following objective type questions by choosing the correct option.

1. What is the primary purpose of ISO/IEC 17025? (CO1, K2)
   (a) Ensure the safety of medical devices
   (b) Establish requirements for clinical trials
   (c) Ensure the competence of testing and calibration laboratories
   (d) Standardize marketing practices

2. What does ISO 13485 focus on in terms of medical devices? (CO1, K2)
   (a) Product safety and effectiveness
   (b) Regulatory compliance
   (c) Marketing strategies
   (d) Post-market surveillance

3. Which ISO standard focuses on the sterilization of medical devices? (CO2, K2)
   (a) BS EN ISO 11737-1:2018
   (b) BS EN ISO 11737-2:2009
   (c) ISO 10993-5
   (d) ISO 13485:2016

4. Which ISO standard specifies tests for in vitro cytotoxicity? (CO2, K2)

(a) BS EN ISO 11737-1:2018

(b) BS EN ISO 11737-2:2009

(c) ISO 10993-5

(d) ISO 13485:2016

5. Bio safety concepts in handling dairy/food pathogens primarily focus on: (CO3, K2)

(a) Decreasing the effectiveness of sanitation measures

(b) Containing and preventing the spread of pathogens

(c) Increasing exposure to pathogens

(d) Enhancing the growth of pathogens

6. Which pathogen is commonly associated with food borne illness outbreaks due to contaminated poultry and eggs? (CO3, K2)

(a) *E. coil* (b) *Salmonella*

(c) *Shigella* (d) *Staphylococcus aureus*

7. What is the purpose of the personal qualification procedure for clean area entry? (CO4, K4)

(a) To Improve communication skills

(b) To enhance employee morale

(c) To prevent contamination of clean areas

(d) To increase production output

8. What is a crucial aspect of clean room design? (CO4, K2)

(a) Color scheme

(b) Employee attire

(c) Air filtration system

(d) Noise level

9. Which technique is commonly used for imaging nanomaterials? (CO5, K4)

(a) Scanning Electron Microscopy (SEM)

(b) Polymerase Chain Reaction (PCR)

(c) Western blotting

(d) Gel Electrophoresis

10. What is a disadvantage of using nanomaterials in therapeutics? (CO5, K2)

(a) Enhanced drug efficacy

(b) Limited targeting capabilities

(c) Reduced side effects

(d) Difficulty in large-scale production

Part B ($5 \times 5 = 25$)

Answer **all** the question not more than 500 words each.

11. (a) Write a short note on microbiological standards.

(CO1, K2)

Or

(b) Give a brief account of International Standard on Medical Devices. (CO1, K2)

12. (a) What is the purpose of BS EN ISO 11737-1:2018 in relation to the sterilization of healthcare products? (CO2, K2)

Or

(b) Give a short note on the significance of the biological evaluation of medical devices. (CO2, K4)

13. (a) Define risk assessment, risk management, and risk communication in the context of microbiological risk analysis. (CO3, K5)

Or

(b) Briefly describe the biosafety concept relevant to handling dairy/food pathogens in a microbiological lab. (CO3, K4)

14. (a) Describe the role of the Qualified Person in ensuring microbiological quality assurance in pharmaceutical manufacturing. (CO4, K3)

Or

(b) Briefly explain the international disinfectant testing protocols commonly used in pharmaceutical settings. (CO4, K6)

15. (a) Define microbial nanotechnology and briefly explain its significance in the field of nanomedicine. (CO5, K4)

Or

(b) Give a brief account of nanowires and quantum dots in the context of microbial nanotechnology.(CO5, K6)

Part C (5 × 8 = 40)

Answer **all** the question not more than 1000 words each.

16. (a) Give a detailed account of ISO/IEC 17025 for testing and calibration laboratories. (CO1, K2)

Or

(b) Distinguish between ISO/IEC 17025 and ISO 13485 in terms of their scope, objectives and application in laboratory and medical device settings, respectively. (CO1, K4)

17. (a) Compare and contrast the microbiological methods outlined in BS EN ISO 11737.1:2018 and BS EN ISO 11737-2:2009 for the sterilization of healthcare products and medical devices, respectively.(CO2, K4)

Or

(b) Discuss the role of ISO 10993-5 in assessing the biocompatibility of medical devices through in vitro cytotoxicity testing. (CO2, K2)

18. (a) Explore the principles and procedures involved in rapid enumeration techniques for the detection of predominant hygiene indicator organisms such as E. coil and Salmonella. (CO3, K4)

Or

(b) Write an essay on the significance of microbiological risk analysis in food technology. (CO3, K4)

19. (a) Give a detailed account of the methods and procedures for measuring the effectiveness of biocides in pharmaceutical manufacturing.(CO4, K6)

Or

(b) Elaborately discuss the personal qualification procedures for clean area entry, clean-in-place and clean room design in pharmaceutical manufacturing. (CO4, K5)

20. (a) Write a detailed account of the role of nanomaterials in diagnostics, drug delivery, and therapeutics. (CO5, K4)

Or

(b) Explain the working mechanism of microbial biosensors and discuss their applications in various fields. (CO5, K6)

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