R0256	Sub. Code
	530101

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Microbiology

GENERAL MICROBIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Section A (10 × 1 = 10)

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

1. The antiseptic method was first demonstrated by (CO1, K1)

   (a) Lord Lister

   (b) Edward Jenner

   (c) Beijerinck

   (d) None of the above

2. Who discovered vaccine for small box (CO1, K2)

   (a) Robert Koch (b) Louis Pasteur

   (c) Lister (d) Edward Jenner

3. Find the bacteria having Psuedomurin (CO2, K2)

   (a) Mycoplasma (b) Ureaplasma

   (c) Archeaacteria (d) Eubacteria

4. Identify the correct statement with respect to mesosomes (CO2, K1)

(a) Found in archeabacteria

(b) In folding of plasma membrane

(c) Aid in breathing

(d) None of the above

5. Which one of the fungi produces aflatoxins (CO3, K2)

(a) *A. fumigatus* (b) *A. flavus*

(c) *A. niger* (d) *A. oryzae*

6. Find the Asexual reproduction in *Rhizopus* is by the formation of ————————. (CO3, K2)

(a) Zygospores (b) Motile zoospores

(c) Sporangiospores (d) Zoogametes

7. Name the protein that enclose the genetic material of viruses (CO4, K2)

(a) Virion (b) Capsid

(c) Peplomers (d) Capsomers

8. Which one of the following is fully formed virus (CO4, K2)

(a) Virion (b) Viriod

(c) Capsid (d) Virusoid

9. What is Lyophilization means (CO5, K1)

(a) Sterilization (b) Freeze-drying

(c) Burning to ashes (d) Exposure to formation

10. Choose the boiling point of liquid nitrogen is (CO5, K1)

(a) –196°C (b) –195°C

(c) –194°C (d) –193°C

Section B (5 × 5 = 25)

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

11. (a) Recollect the history of microbiology. (CO1, K2)

Or

(b) Classify the microorganism according to Whittaker's five kingdom concept. (CO1, K2)

12. (a) Illustrate the cell membrane of archaebacteria. (CO2, K2)

Or

(b) Show the importance of reserve food materials of bacteria. (CO2, K3)

13. (a) Draw the structure and reproduction of Rhodophyta. (CO3, K2)

Or

(b) Outline the cell wall composition and functions of fungi. (CO3, K2)

14. (a) Summarize the life cycle of viruses. (CO4, K2)

Or

(b) Differentiate the virus related agents. (CO4, K4)

15. (a) Formulate the different types of media for the cultivation of bacteria. (CO5, K3)

Or

(b) Identify the growth characteristic of bacteria on various culture media. (CO5, K3)

Section C (5× 8 = 40)

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

16. (a) Explain in detail about Bergey's Manual of systemic bacteriology. (CO1, K5)

Or

(b) Highlight the special characteristic used for microbial taxonomy. (CO1, K4)

17. (a) Distinguish the gram positive and gram negative bacteria. (CO2, K4)

Or

(b) Explore the biochemistry and genetics of sporulation. (CO2, K5)

18. (a) Elaborate the lifecycle of ascomycetes fungi. (CO3, K6)

Or

(b) Evaluate the economic importance of lichens. (CO3, K5)

19. (a) Discuss in detail about Lysogenic lifecycle of bacteriophages. (CO4, K4)

Or

(b) Construct the methodology for purification of viruses. (CO4, K6)

20. (a) Explain in detail about cultivation of anaerobic microorganisms. (CO5, K5)

Or

(b) Elaborate the methods of culture preservation. (CO5, K6)

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R0257	Sub. Code
	530102

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Microbiology

MICROBIAL BIOCHEMISTRY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

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

1. ——————— enzyme catalyses the transfer of a phosphoryl group from ATP to glucose. (CO1, K2)
   (a) Hexokinase (b) Phosphoglucose isomerase
   (c) Aldolase (d) Phosphoglucose mutase
2. In EMP pathway, the process by which ATP is formed from ADP is (CO1, K2)
   (a) reduction
   (b) oxidative phosphorylation
   (c) substrate-level phosphorylation
   (d) photo phosphorylation
3. Which of the following phenomena results in the partial double-bond character of the peptide bond? (CO2, K4)
   (a) Electronegativity
   (b) Both resonance and steric hindrance
   (c) Steric hindrance
   (d) Resonance

4. What is the span of rotation of dihedral angles? (CO2, K4)

(a) 0^o to 90^o (b) 0^o to -180^o

(c) 0^o to 180^o (d) -180^o to 180^o

5. Which of the following serves as the cofactor for the de novo synthesis of purine metabolism? (CO3, K4)

(a) Thiamine (b) Biotin

(c) Folate (d) Flavin

6. In what compartment does the de novo fatty acid synthesis occur? (CO3, K4)

(a) Mitochondria

(b) Peroxisome

(c) Endoplasmic reticulum

(d) Cytosol

7. The study of rates of chemical reactions that are catalyzed by enzymes is referred to as _____ (CO4, K4)

(a) first order reaction kinetics

(b) zero order reaction kinetics

(c) chemical kinetics

(d) enzyme kinetics

8. The target substrate molecules bind to active site of the enzyme transforming into products through a series of steps known as the ———————— (CO4, K4)

(a) enzyme kinetics (b) enzymatic mechanism

(c) chemical kinetics (d) zero order reaction kinetics

9. Which fungus produces the Aflatoxin? (CO5, K5)

(a) *Aspergillus flavus*

(b) *Aspergillus niger*

(c) *Penicillium marneffei*

(d) *Candida albicans*

10. What is the primary target organ affected by aflatoxins in humans? (CO5, K6)

(a) Lungs (b) Liver

(c) Kidneys (d) Skin

Part B (5 × 5 = 25)

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

11. (a) Explain in detail about the shut pathway and its significance. (CO1, K2)

Or

(b) Give a detailed account of the structure and properties of cellulose and its significance. (CO1, K2)

12. (a) Illustrate the structure of the quaternary structure of proteins. (CO2, K6)

Or

(b) Explain in detail the classification of amino acids based on structure, polarity, and biological importance. (CO2, K6)

13. (a) Describe in detail the synthesis of nucleic acid by salvage pathway. (CO3, K4)

Or

(b) Explain the biosynthesis of phospholipids in *E. coil*. (CO3, K4)

14. (a) Briefly explain the types of enzyme inhibition processes. (CO4, K2)

Or

(b) Explain the mechanism of action of enzyme by induced fit theory. (CO4, K2)

15. (a) Explain the classification of antibiotics based on the mode of action. (CO5, K4)

Or

(b) Write a detailed note on the biosynthesis of microbial pigment —chlorophyll. (CO5, K6)

Part C (5 × 8 = 40)

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

16. (a) Discuss the citric acid cycle and its regulation in the prokaryotic system. (CO1, K2)

Or

(b) Explain the classification Structure and properties of monosaccharides. (CO1, K2)

17. (a) Explain the detailed account of the different structure of proteins. (CO2, K6)

Or

(b) Write a detailed account of biosynthesis and degradation of amino acids. (CO2, K6)

18. (a) Explain the structure and synthesis of nucleic acids by novo pathway and degradation of purines and pyrimidines. (CO3, K4)

Or

(b) Write a detailed account on the oxidation of fatty acids and its significance in prokaryotic systems. (CO3, K4)

19. (a) Write an essay on mechanism of enzyme action by lock and key model and its significance. (CO4, K2)

Or

(b) Explain the classification, chemical nature properties of vitamins and vitamins as a co factors, co enzymes. (CO4, K2)

20. (a) Write a detailed account on classification, structure and mode of action of microbial toxins. (CO5, K4)

Or

(b) Explain the biosynthesis and regulation of streptomycin. (CO5, K6)

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R0258	Sub. Code
	530103

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Microbiology

MICROBIAL PHYSIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

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

1. Which phase has the condition of specific growth rate "$\mu = 0$"? (CO1, K2)

   (a) Lag phase

   (b) Log phase

   (c) Stationary phase

   (d) Death phase

2. What is the generation time if 100 bacterial cells growing logarithmically for 5 hours produced 1.7 × 106 cells. (CO1, K2)

   (a) 0.351 generations/hour

   (b) 0.353 generations/hour

   (c) 0.355 generation/hour

   (d) 0.357 generation/hour

3. Methyl group is mainly present in which photosynthetic pigment. (CO2, K4)

(a) Chlorophyll b

(b) Xanthophyll

(c) Carotenoids

(d) Chlorophyll a

4. How many numbers of chlorophyll are present in a photosynthetic unit? (CO2, K4)

(a) 100–150

(b) 90

(c) 200–250

(d) 300–350

5. Which process converts ammonium ions to nitrite and then to nitrate? (CO3, K4)

(a) Nitrification

(b) Nitrogen fixation

(c) Denitrification

(d) Ammonification

6. What is the name of the symbiotic relationship between legume plants and nitrogen-fixing bacteria? (CO3, K4)

(a) Nitrogen cycle

(b) Nitrate relationship

(c) Symbiotic nitrogen fixation

(d) Ammonification partnership

7. Which of the following types of fermentation is observed in yeasts? (CO4, K4)

(a) Acrylic fermentation

(b) Alcoholic fermentation

(c) Lactic acid fermentation

(d) Pyruvic fermentation

8. Which of the following is not a product of fermentation?

(CO4, K4)

(a) Oxygen

(b) Carbon dioxide

(c) Ethanol

(d) Lactate

9. The first law of thermodynamics is based on. (CO5, K5)

(a) Conservation of energy

(b) Conservation of mass

(c) Conservation of momentum

(d) Conservation of work

10. How many reactions that occur in the TCA cycle transfer electrons from a substrate to an electron-accepting enzyme? (CO5, K6)

(a) 1 (b) 2

(c) 3 (d) 4

Part B (5 × 5 = 25)

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

11. (a) Discuss the phases of the bacterial growth curve, Give its significance. (CO1, K2)

Or

(b) Explain the factors affecting the growth of organisms. (CO1, K2)

12. (a) Illustrate the structure of photosynthetic pigments. (CO2, K4)

Or

(b) Explain in detail cyclic and non–cyclic photosynthesis. (CO2, K4)

13. (a) Describe in detail the physiology of nitrogen fixation in symbiotic and free-living bacteria. (CO3, K4)

Or

(b) Explain the transamination and deamination process and support your answer with suitable examples. (CO3, K4)

14. (a) What is known as fermentation? Briefly explain the alcoholic fermentation and lactic acid fermentation. (CO4, K4)

Or

(b) Explain the process of mixed acid fermentation and butyric acid fermentation. (CO4, K4)

15. (a) Give a detailed account of the fluid mosaic model and their significance. (CO5, K5)

Or

(b) Write a detailed note on types of transport across the membrane process. (CO5, K6)

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

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

16. (a) Discuss bacterial growth kinetics studies. (CO1, K2)

Or

(b) Explain the classification of organisms based on carbon, electron and electron sources. (CO1, K2)

17. (a) Elaborate on the Calvin cycle. (CO2, K4)

Or

(b) Explain the general types of microbial photosynthesis. (CO2, K4)

18. (a) Write about the nitrogen cycle and give its signification. (CO3, K4)

Or

(b) Explain the Genetics of nitrogen fixation. (CO3, K4)

19. (a) Give an account of microbial stress responses under the aerobic to anaerobic transitions. (CO4, K4)

Or

(b) Write a detailed account on microbial stress responses under the nutrient stress and starvation stress conditions. (CO4, K4)

20. (a) Write a detailed account on the principles and laws of thermodynamics. (CO5, K5)

Or

(b) Discuss the mechanism and process of the electron transport chain. (CO5, K6)

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R0259	Sub. Code
	530501

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

First Semester

Microbiology

Elective : BIOLOGICAL TECHNIQUES

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

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

1. The resolving power of TEM is derived from _____. (CO1, K2)

   (a) Electrons (b) Specimens

   (c) Power (d) Ocular system

2. Image formation in electron microscope is based on _____. (CO1, K2)

   (a) Column length

   (b) Electron number

   (c) Differential scattering

   (d) Specimen size

3. In NMR spectroscopy, what is the product of Nuclear 'g' factor (gN), the nuclear magneton and the magnetic field strength (B0)? (CO2, K2)

   (a) Energy of transition from alpha to beta state

   (b) Chemical shift

   (c) Steric hindrance

   (d) Magnetogyric ratio

4. Which of the following is the reference that is generally used in FTIR interferometer? (CO2, K4)

(a) Air (b) NaCl solution

(c) Alcohol (d) Base solution

5. What is use of density gradient centrifugation? (CO3, K4)

(a) To purify viruses, ribosomes, membranes

(b) To remove dirt

(c) To remove fine particles

(d) To remove large particles

6. What is the principle of centrifugation? (CO3, K4)

(a) Sedimentation (b) Filtration

(c) Evaporation (d) Size reduction

7. 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

8. Ion-exchange resin is ————————. (CO4, K2)

(a) Linear

(b) Low molecular weight

(c) Organic polymer with porous structure

(d) Soluble

9. Which of the following can you copyright? (CO5, K6)

(a) Ideas

(b) Literary work

(c) Choreographic work

(d) Fashion

10. Which of the following identifies as a trademark? (CO5, K6)

(a) Name, symbol (b) Symbol, logo

(c) Logo, name (d) Name, symbol, logo

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

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

11. (a) Write a principle and applications of compound microscopy. (CO1, K2)

Or

(b) Explain in detail about the bright field microscopy and its applications. (CO1, K2)

12. (a) Give an elaborate account on UV – Visible Spectrophotometry. (CO2, K2)

Or

(b) Describe in detailed account on infrared spectroscopy. (CO2, K4)

13. (a) What is centrifuge? Explain the low speed centrifuge. (CO3, K4)

Or

(b) Write essay mechanism and application of ultracentrifuge. (CO3, K4)

14. (a) Explain mechanism and applications of thin layer chromatography. (CO4, K2)

Or

(b) Describe in detailed account on agarose gel electrophoresis and its applications. (CO4, K6)

15. (a) Write short note on bioethics and IPR. (CO5, K6)

Or

(b) Write a detailed note on the organ transplantation and stem cell. (CO5, K6)

Part C (5 × 8 = 40)

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

16. (a) Give an elaborate account on SEM and mechanism of image formation in SEM. (CO1, K2)

Or

(b) Explain the principles and applications fluorescent microscopes. (CO1, K2)

17. (a) Explain the detailed account of the FTIR. (CO2, K2)

Or

(b) Write a detailed account of ^{H}NMR. (CO2, K4)

18. (a) Give an elaborate account on types of centrifuges. (CO3, K4)

Or

(b) Write essay and applications of density gradient centrifugation. (CO3, K4)

19. (a) Describe in detailed account on Principle and application of SDS - PAGE. (CO4, K2)

Or

(b) Explain in detail about ion – exchange chromatography. (CO4, K2)

20. (a) Define patent. Write a detailed account on tools of IPR. (CO5, K6)

Or

(b) Explain the role of ethical committee in bioscience research and guidelines for research that involve animals, humans and microorganisms. (CO5, K6)

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R0260	Sub. Code
	530301

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Microbiology

MEDICAL MICROBIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

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

1. Which of the following bacteria are found in the nose? (CO1, K1)

   (a) *Haemophilus* sp

   (b) S. *Pneumoniae*

   (c) *Corynebacterium sp*

   (d) S. *Epidermidis*

2. Which of the following fungal infection is commonly associated with contaminated air and ventilation system failure in hospital-acquired infections? (CO1, K4)

   (a) Salmonellosis

   (b) Nocardiosis

   (c) Aspergillosis

   (d) Chromoblastomycosis

3. Which of the following bacteria is the most commonly isolated pathogen from the infection known as pharyngitis? (CO2, K2)

(a) Streptococcus pneumoniae

(b) *Staphylococcus aureus*

(c) Streptococcus pyogenes

(d) Mycoplasma pneumoniae

4. Which of the following bacteria is also called the gamma or non-hemolytic streptococci? (CO2, K4)

(a) *Streptococcus faecalis*

(b) *Streptococcus pyogenes*

(c) *Streptococcus agalactiae*

(d) None of the above

5. Which type of salmonellae is primarily infectious to humans? (CO3, K3)

(a) *Salmonella typhi A*

(b) *Salmonella paratyphi* A, B and C

(c) *Salmonella paratyphi* A and B

(d) *Salmonella paratyphi* A

6. LT or cholera-like toxin activates adenylate cyclase (cAMP) whereas ST activates ———————— that causes travelers' diarrhea (CO3, K4)

(a) Ribosomal dysfunction

(b) Decarboxylase reaction

(c) Guanylate cyclase

(d) Fermentation of sugars

7. What is the most common type of *Aspergillus fumigatus* infection? (CO4, K4)

(a) Sinusitis

(b) Pulmonary aspergillosis

(c) Invasive aspergillosis

(d) Skin infection

8. Which of the following fungi causes vaginal thrush? (CO4, K5)

(a) *Candida albicans*

(b) *Rhizopus oryzae*

(c) *Candida tropicalis*

(d) *Aspergillus fumigatus*

9. Which of the following is an important molecule present in the outer membrane of HIV that helps the virus to enter and infect host cells? (CO5, K3)

(a) Polysaccharides (b) Glycoproteins

(c) Proteins (d) Lipopolysaccharides

10. Which of the following is an important HIV antigen in determining the used as diagnostic marker for the early detection and diagnosis of HIV infection? (CO5, K3)

(a) p24 (b) gp120

(c) Pol gene (d) Gp120

Part B (5 × 5 = 25)

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

11. (a) Explain in detail about the Collection and transport of clinical sample. (CO1, K1)

Or

(b) Write a detailed account on Nosocomial infection. (CO1, K4)

12. (a) Discuss the symptoms, diagnosis and control measures of *Gonococci*. (CO2, K2)

Or

(b) Describe the toxins and enzymes of *Staphylococcus aureus*. (CO2, K4)

13. (a) What is leprosy? Describe in brief about the causal organism, symptoms, type and control measures of leprosy. (CO3, K3)

Or

(b) Discuss briefly the causative agent. pathogenesis. symptoms and prevention of leptospirosis. (CO3, K4)

14. (a) Discuss the symptoms, diagnosis and control measures of *Aspergillus*. (CO4, K4)

Or

(b) Write general characteristics of *Entameoba histolytica*. (CO4, K5)

15. (a) Write short note on anti-parasitic drugs classification based on antibiotics mode of action. (CO5, K5)

Or

(b) Explain the pathogenesis, diagnosis and control measures of Flavi virus. (CO5, K2)

Part C (5 × 8 = 40)

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

16. (a) Write a detailed account on normal flora of human system. (CO1, K1)

Or

(b) Describe in detailed account on microbiological examination of urine, blood, feces and throat swabs. (CO1, K4)

17. (a) Explain in detail the morphology, Pathogenicity and laboratory diagnosis of *Streptococci* sp. (CO2, K2)

Or

(b) Write a dialed account on pathogenesis. clinical features and laboratory diagnosis of Bacillus anthraces. (CO2, K4)

18. (a) Explain about the symptoms, treatment, cause and prevention measures of typhoid. (CO3, K3)

Or

(b) Explain the causative agent. pathogenesis, clinical features, diagnosis and treatment of *E. coil*. (CO3, K4)

19. (a) Give an account on morphology, cultural properties and pathogenesis of *Cryptococcus neoformans*. (CO4, K4)

Or

(b) Explain the general characteristics. pathogenesis and laboratory diagnosis and control measures of *Penicilium* Sp. (CO4, K5)

20. (a) Write a detailed account on pathogenesis. diagnosis and control of Hepatitis B virus. (CO5, K2)

Or

(b) Describe the causative agent. pathogenesis and laboratory diagnosis of rabies. (CO5, K5)

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R0261	Sub. Code
	530302

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Microbiology

IMMUNOBIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

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

1. Which of the following cells is involved in cell-mediated immunity? (CO1, K2)

   (a) T-cells (b) B-cells

   (c) Mast cells (d) Both T and B cells

2. Find out the immunity is obtained during a lifetime?

   (CO1, K1)

   (a) Innate immunity (b) Active immunity

   (c) Passive immunity (d) Both (b) and (c)

3. Name the heavy chain of immunoglobulin G (CO2, K2)

   (a) μ (b) ε

   (c) α (d) γ

4. Find the correct answer with relevant to monoclonal antibodies (CO2, K1)

(a) Hybridomas (b) Lymphocytes

(c) Myeloma cells (d) Plasma cells

5. Which of the following proteins are the component of the alternative pathway, except? (CO3, K2)

(a) C3 (b) Factor B

(c) Factor D (d) Properdin

6. Which of the following is the cause of autoimmune diseases? (CO3, K2)

(a) Immune System begins to attack its cells and tissues

(b) Immune System starts producing cells and tissues

(c) Immune System fails completely

(d) Immune System produces WBCs in a huge number

7. Choose the correct one (CO4, K1)

(a) The immune response to M tuberculosis is T cell dependent

(b) Macrophages and CD4 T cells involve

(c) Innate immunity alone involve

(d) Both (a) and (b) are correct

8. Choose the vaccine Not an example of a live attenuated vaccine? (CO4, K1)

(a) Tetanus vaccine

(b) MMR vaccine

(c) Varicella (chickenpox) vaccine

(d) Influenza vaccine

9. Identify the immune responsible for graft rejection (CO5, K1)

(a) Cell-mediated immune response

(b) Humoral immune response

(c) Innate immune response

(d) Passive response

10. Which of the following test is based on the principle of antigen-antibody interaction? (CO5, K2)

(a) PCR

(b) ELISA

(c) DNA fingerprinting

(d) All of the above

Part B (5 × 5 = 25)

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

11. (a) Classify the types of immune cell. (CO1, K2)

Or

(b) Discuss about the types of immunity. (CO1, K4)

12. (a) Write about various types of antibodies and their functions. (CO2, K4)

Or

(b) How the antigens are processed and presented. (CO2, K3)

13. (a) Show the cytokines properties and functions. (CO3, K3)

Or

(b) Prepare a flow chart for alternate pathway of complement fixation. (CO3, K3)

14. (a) Determine the immunity for HIV. (CO4, K5)

Or

(b) Show the immunity towards Leshmaniasis. (CO4, K3)

15. (a) Classify the MHC molecules. (CO5, K2)

Or

(b) Write the principles of tumor immunology. (CO5, K3)

Part C (5 × 8 = 40)

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

16. (a) Explore Physiology of immune response. (CO1, K5)

Or

(b) Highlight the role of primary lymphoid organs. (CO1, K4)

17. (a) Differentiate the humoral and cell mediated immunity. (CO2, K4)

Or

(b) Elaborate the hybridoma technology and monoclonal antibodies. (CO2, K6)

18. (a) Discuss in detail about auto immune disorder. (CO3, K4)

Or

(b) Elucidate the mechanism of immune tolerance. (CO3, K5)

19. (a) Explain in detail about various types of vaccines. (CO4, K5)

Or

(b) Elaborate the immunomodulation in infection. (CO4, K6)

20. (a) Explore the principles of immunoelectrophoresis. (CO5, K5)

Or

(b) Determine the application of flow cytometry. (CO5, K5)

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R0262	Sub. Code
	530303

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Microbiology

INDUSTRIAL MICROBIOLOGY

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

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

1. Which type of fermentation is not derived from catabolism but from amphibolic pathways? (CO1, K2)

   (a) Type I Fermentation

   (b) Type II Fermentation

   (c) Type III Fermentation

   (d) None of the above

2. The crowded plate technique is a secondary screening method for microbes producing (CO1, K1)

   (a) Antibiotics (b) Amino acids

   (c) Amylase (d) Organic acids

3. What is the size of the production fermenter? (CO2, K2)

   (a) 1000-2000 L

   (b) 5000-10,000 L

   (c) 5000-10,000 gallons

   (d) 1000-2000 gallons

4. Vortex formation in the bioreactor is prevented by (CO2, K1)

(a) Sparger (b) Valves

(c) Baffles (d) Thermistor

5. Corn steep liquor is a nitrogen source for the production of (CO3, K1)

(a) Streptomycin (b) Penicillin

(c) Tetracycline (d) Gentamycin

6. How do you achieve the steady state condition in a continuously stirred tank fermenter? (CO3, K3)

(a) Chemostatic principle

(b) Turbidostatic principle

(c) Both (a) and (b)

(d) Agitation Principle

7. An inducer used for the production of amylase from *Bacillussubtillis* is (CO4, K1)

(a) Pectin (b) Keratin

(c) Starch (d) Casein

8. The precursor for cyanocobalamin production is (CO4, K1)

(a) Phenyl acetic acid

(b) Phenoxy acetic acid

(c) Chloride

(d) Cyanide

9. Which of the following is not the physical method for the cells rupturing? (CO5, K2)

(a) Solid shear

(b) Agitation with abrasives

(c) Ultrasonication

(d) Enzymatic digestion

10. Which chromatography techniques is used in streptomycin recovery? (CO5, K2)

(a) Adsorption chromatography

(b) Ion Exchange chromatography

(c) Gel filtration chromatography

(d) Affinity chromatography

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

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

11. (a) How do you improve the strain by protoplast fusion? (CO1, K3)

Or

(b) Compare the solid state and submerged fermentation. (CO1, K2)

12. (a) Summarize metabolic regulation of L-lysine biosynthetic pathway in *Corynebacteriumglutamicum* (CO2, K4)

Or

(b) Discuss the Newtonian and non -Newtonian behavior of fluid. (CO2, K4)

13. (a) Compare the batch and fed-batch culture. (CO3, K2)

Or

(b) Interpret the carbon, and nitrogen sources used in production media preparation. (CO3, K2)

14. (a) Illustrate the upstream and downstream processes of citric acid production. (CO4, K2)

Or

(b) Describe the large-scale production and commercial uses of biogas. (CO4, K2)

15. (a) How do you recover the intracellular metabolites from microbes? (CO5, K3)

Or

(b) Calculate the market potential. process cost, and recovery cost of *Spirulina* production. (CO5, K3)

Part C (5 × 8 = 40)

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

16. (a) Explain the Preservation of cultures by lyophilization and liquid nitrogen storage. (CO1, K2)

Or

(b) Elaborate the auxonography and enrichment techniques to screen the industrially important microbes. (CO1, K6)

17. (a) Discuss the control and variables devices in bioreactors. (CO2, K4)

Or

(b) Explain the below-mentioned bioreactor (i) Photo bioreactor (ii) Disposable wave bioreactor. (CO2, K2)

18. (a) Analyze the steady state of microbial growth in a continuous stirred tank bioreactor by chemostat. (CO3, K4)

Or

(b) Outline Plackett-Burman design for production media formulation . (CO3, K2)

19. (a) Illustrate cell Immobilization methods. (CO4, K2)

Or

(b) Elaborateon the industrial production of beer. (CO4, K6)

20. (a) Outline the upstream and downstream processes of Penicillin production. (CO5, K2)

Or

(b) Discuss the batch and continuous filters used in downstream processing. (CO5, K4)

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R0263	Sub. Code
	530506

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2023

Third Semester

Microbiology

Elective : APPLIED MICROBIOLOGY I

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

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

1. A quality management standard specifically designed for the medical sector is? (CO1, K2)

   (a) ISO 13485 (b) ISO 13476

   (c) ISO 13495 (d) ISO 13455

2. IEC in SO/IEC 17025 stands for (CO1, K2)

   (a) Indian Electro technical Commission

   (b) International Electrochemical Commission

   (c) International Electro technical Commission

   (d) International Electro technical Committee

3. Cytotoxicity assay with tetrazolium dye which is used to assess the metabolic activity of cells, is are (CO2, K3)

   (a) Qualitative (b) Quantitative

   (c) Biostatic (d) None of the above

4. First edition of BS EN ISO 11737-2:2009 was (CO2, K3)

(a) BS EN ISO 11737-2: 1999

(b) BS EN ISO 11737-2: 1998

(c) BS EN ISO 11737-2: 1989

(d) BS EN ISO 11737-2: 1898

5. Indicator organism in milk industry is (CO3, K4)

(a) *Aspergillus* (b) *Pseudomonas*

(c) *Lactobacilli* (d) *Coliforms*

6. Based on functional targets Shiga toxin can be classified into ———— (CO3, K4)

(a) Enterotoxin (b) Neurotoxin

(c) Hepatotoxin (d) Nephrotoxin

7. Expand HEPA in HEPA filters (CO4, K4)

(a) High Energy Particulate Air

(b) High Energy Particle Air

(c) High Efficiency Particle Air

(d) High Efficiency Particulate Air

8. Disinfectants and antiseptics differ in (CO4, K4)

(a) Concentration (b) Composition

(c) Source (d) Application

9. Nanoparticles can be applied in ———— sectors. (CO5, K2)

(a) Environment (b) Medical

(c) Agricultural (d) All of these

10. ———— discovered quantum dots? (CO5, K2)

(a) Heinrich Rohrer (b) Richard Feynman

(c) Alexey Ekimov (d) Prof C.N.R. Rao

Part B (5 × 5 = 25)

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

11. (a) Write briefly about ISO 13485. (CO1, K2)

Or

(b) Explain the quality management of medical devices and their significance. (CO1, K2)

12. (a) Elaborate on BS EN ISO 11737-2:2009 criteria. (CO2, K3)

Or

(b) What is the purpose of sterilization in laboratories? What are the common metho employed? (CO2, K2)

13. (a) What biosafety measures should be adopted in the food industry? Explain briefly. (CO3, K3)

Or

(b) Explain in brief about hygiene indicator organisms and applications. (CO3, K6)

14. (a) What are International disinfectant testing protocols? Explain briefly. (CO4, K4)

Or

(b) Write a short note on biocide manufacturing and effectiveness with examples. (CO4, K4)

15. (a) Define and elaborate nanotechnology terminologies. (CO5, K5)

Or

(b) Briefly explain about nanoparticles and quantum dots with applications. (CO5, K5)

Part C (5 × 8 = 40)

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

16. (a) What are the requirements for the competence of testing and calibration in laboratories? Explain ISO/IEC 17025. (CO1, K2)

Or

(b) Explain about commonly applied ISO standards for medical devices. (CO1, K6)

17. (a) What is cytotoxicity? Write about any two in vitro cytotoxicity assays. (CO2, K2)

Or

(b) What methods are used to sterilize health care products? Explain in detail. (CO2, K2)

18. (a) What are enteric pathogens? Write a detailed note on *Salmonella* pathogenesis. (CO3, K2)

Or

(b) Explain about parts of an ideal fermenter with a diagram and media sterilization methods. (CO3, K6)

19. (a) Explain about sterilisation of work place. With the help of layout, demonstrate clean room design. (CO4, K6)

Or

(b) Write an essay on the "Importance of biosafety in the pharmaceutical industry and methods to be adopted." (CO4, K3)

20. (a) What are nanoparticles? Elaborate on their synthesis methods and advantages. (CO4, K4)

Or

(b) Write an essay on "Biosensors, applications and limitations" with an example. (CO4, K2)

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