

D-2556

Sub. Code

36411

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2026.

First Semester

GENERAL MICROBIOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Comment on three domain concept.
2. Define moulds.
3. TEM.
4. Methylene blue.
5. Disinfection.
6. Pili.
7. Lichen.
8. *Azolla*.
9. Capsid.
10. Prions.

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Write short notes on Haeckel's three-kingdom concept.

Or

- (b) Write brief note on general characteristics of fungi.

12. (a) Describe the principle and applications of Fluorescent microscope.

Or

- (b) Add short note on different stages of bacterial growth.

13. (a) Add short notes on factors influencing microbial growth.

Or

- (b) Write in detail about culture preservation methods.

14. (a) Write brief note on prokaryotic cell wall.

Or

- (b) Describe the structure of Archeal cell wall.

15. (a) Write in brief about microalgae structural organization and their properties.

Or

- (b) Write brief note on ultrastructure of viruses.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss in detail about industrial uses of yeast and mould.
 17. Write elaborate note on working principles of electron microscope.
 18. Write elaborate note on structural properties of protozoa
 19. Discuss in detail about biological and economic importance of algae.
 20. Write in detail about viral genome structure and types.
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D-2557

Sub. Code

36412

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2026.

First Semester

MICROBIAL BIOCHEMISTRY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. How do reducing sugars differ from non-reducing sugars? Give one example of each.
2. What are essential amino acids?
3. Classify lipids based on functions.
4. Explain omega oxidation of fatty acids.
5. What are Okazaki fragments?
6. Explain the role of active site in enzyme specificity.
7. Define allosteric inhibition with suitable example.
8. What is the significance of phosphorescence in bacterial photosynthesis?
9. What is the effect of botulinum toxin on the nervous system?
10. What is the role of vitamin D in calcium metabolism?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Outline the steps involved in pentose phosphate pathway.

Or

- (b) Classify amino acids based on their structure and polarity.

12. (a) What are triglycerides? Mention their biological importance.

Or

- (b) Discuss in brief the characteristic features of Watson and Crick model of DNA.

13. (a) Give brief account of Koshland's induced fit theory of enzyme catalysis.

Or

- (b) Explain the general properties of enzymes.

14. (a) What are abzymes? Explain its mechanism of action.

Or

- (b) Explain the role of phosphorescence in microbes.

15. (a) Explain the structure of bacteriochlorophyll and its role in anaerobic photosynthesis.

Or

- (b) What is aflatoxin? Explain the acute toxic effects of aflatoxin.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the structure and function of peptidoglycans with neat illustrations.
 17. Explain in detail the secondary structure of protein with suitable examples.
 18. Discuss the beta oxidation pathway of fatty acids and its energetics.
 19. Describe in detail the IUBMB classification of enzymes with examples.
 20. Elaborate in detail the properties and functions of fat soluble vitamins.
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D-2558

Sub. Code

36413

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2026.

First Semester

MICROBIAL PHYSIOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Growth kinetics
2. Autotrophy
3. Methanogens
4. Bacteriochlorophyll
5. Osmoregulation
6. Oxidative stress
7. Denitrification
8. Glyoxalate pathway
9. Entropy
10. Active transport

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Write a brief note on bacterial growth kinetics.

Or

- (b) Give a brief account on nutritional types of microorganism.

12. (a) Add note on photosynthetic pigments in bacteria.

Or

- (b) Describe the physiology and importance of methylotrophs.

13. (a) Discuss about the Osmotic stress and osmoregulation.

Or

- (b) Write in detail about anoxygenic photosynthesis in bacteria.

14. (a) Give an account on nitrogen metabolism.

Or

- (b) Briefly explain about the TCA cycle.

15. (a) Write in detail about mechanism of electron transport chain.

Or

- (b) Briefly explain about transport across the membrane.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain in detail about growth kinetics of bacteria.
 17. Write elaborate note on factors affecting microbial growth.
 18. Discuss the mechanism of nitrogen fixation in symbiotic bacteria.
 19. Write in detail about mechanism of oxidative phosphorylation.
 20. Describe in detail about quorum sensing.
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D-2559

Sub. Code

36421

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2026.

Second Semester

MICROBIAL GENETICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define Mutagenesis.
2. What are base analogs?
3. What is mating type switching?
4. Define site specific recombination.
5. Define conjugational mapping.
6. Write down the significance of transformation.
7. What is attenuation?
8. Define Col plasmid.
9. What are transposable elements?
10. What is integrons?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain the types of mutagens.

Or

- (b) Describe about pyrimidine dimer repair pathway.

12. (a) Discuss about the types of recombinations.

Or

- (b) Elaborate about conjugation by *E. Coli* F factor.

13. (a) Explain briefly about arabinose operon and its regulation.

Or

- (b) Write short notes on properties of plasmids.

14. (a) Explain about the plasmid amplification.

Or

- (b) Discuss about the structure and genetic organization of DNA transposons.

15. (a) Write short notes on mechanism of Tn5 transposons.

Or

- (b) Describe the epigenetic mechanisms in bacteria.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Describe in detail about the SOS inducible repair.
 17. Elaborate about specialized transduction.
 18. Discuss in detail about tryptophan operon and its gene regulation.
 19. Explain about types of plasmids.
 20. Write in detail about types of transposable elements.
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D-2560

Sub. Code

36422

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2026

Second Semester

MOLECULAR BIOLOGY & rDNA TECHNOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

Write short notes on

1. Z-Form of DNA.
2. Primase.
3. Okazaki fragments.
4. Replication fork
5. Rho Factor.
6. Reverse transcription.
7. Interferon
8. Shot gun cloning.
9. RAPD.
10. Microinjection.

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Enlist the properties of DNA.

Or

- (b) Write a short note on enzymes involved in DNA replication.

12. (a) Give a detailed account on RNA polymerase.

Or

- (b) Discuss the various inhibitors of transcription.

13. (a) Write about events of initiation of transcription.

Or

- (b) Write a short note on YAC vectors.

14. (a) Explain the steps involved in development of recombinant vaccine.

Or

- (b) Discuss the process of Northern blotting and its applications.

15. (a) Comment on Automated sequencing of DNA.

Or

- (b) Explain the mechanism of gene silencing.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Give a detailed account on types of RNA with a neat diagram.

17. Explain the process of transcription in prokaryotes.

18. Describe the process of cloning of human insulin in E.Coli.
 19. Explain in detail about the construction of cDNA library.
 20. Elaborate the Polymerase Chain Reaction (PCR).
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D-2561

Sub. Code

36423

DISTANCE EDUCATION

M.Sc. DEGREE EXAMINATION, MAY 2026

Second Semester

Microbiology

FOOD AND DAIRY MICROBIOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. What are the primary sources of microbial contamination in food?
2. How does pH influence microbial growth in food?
3. What are extrinsic factors of food, and how do they influence microbial growth?
4. What are the common sources of microbial contamination in vegetables?
5. Which bacteria are commonly associated with meat spoilage?
6. Name two bacterial pathogens responsible for food poisoning and their associated toxins.
7. Which bacterial pathogens are commonly associated with foodborne infections, and what diseases do they cause?

8. What is food preservation, and why is it essential in food safety?
9. Which lactic acid bacteria are commonly found in fermented milk products, and what role do they play?
10. How can spoilage of milk and dairy products be prevented?

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Write brief note on the role of water content in food microbiology.

Or

- (b) Elaborate the impact of redox potential as a factor affecting food.

12. (a) Discuss on the contamination of cereals and its causes.

Or

- (b) Explain the role of microbes in the spoilage of sea foods.

13. (a) Differentiate between the acidophilus milk & bifidus milk.

Or

- (b) Describe the impact of fermentation in food industry

14. (a) Elaborate on the processes involved in the production of SCP with an example.

Or

- (b) Discuss the production of any one cereal based fermented beverage.

15. (a) Write about the industrial production of amylases.

Or

- (b) List out the objectives of investigating food borne disease outbreaks.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Elaborate the extrinsic factors that will impact the nature of the food.
17. Write in great detail about the preventive measures taken in sea food industry to avoid the spoilage of sea foods.
18. Explain in detail about the physical and chemical methods of food preservation.
19. Describe in detail on the steps involved in the industrial production of pectinase and its applications.
20. List out and discuss the principles of HACCP and its importance in the aspect of food safety.
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D-2562

Sub. Code

36431

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2026.

Third Semester

IMMUNOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Haematopoiesis
2. Acquired immunity
3. Chemokines
4. Adjuvants
5. Epitopes
6. Precipitation
7. MHC molecules
8. Rheumatoid Arthritis
9. Isograft
10. HAT medium

SECTION B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Explain in brief about cells of the immune system.

Or

- (b) Discuss about humoral mediated immune response.

12. (a) Write short note on cell mediated immunity.

Or

- (b) Describe about maturation and differentiation of T-cells.

13. (a) Give an account on structure and role of IgA antibodies.

Or

- (b) Write in detail about immunoglobulin genes for structure and organization.

14. (a) Add short note on antigen processing and presentation.

Or

- (b) Explain about MHC molecule structure and interaction with peptides.

15. (a) Discuss about oncogenes and anti-oncogenes.

Or

- (b) Briefly explain about hybridoma technology.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Write in detail about secondary lymphoid organs.
 17. Explain in detail about structure and functions of IgG.
 18. Elaborately explain about Antigen and antibody interactions.
 19. Discuss in detail about different types of vaccine.
 20. Explain about organ transplantation and HLA tissue typing.
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D-2563

Sub. Code

36432

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2026.

Third Semester

MEDICAL MICROBIOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Normal flora of skin
2. Cerebrospinal fluid
3. Pharyngitis
4. Anthrax
5. Leprosy
6. Leptospirosis
7. HIV
8. SARS
9. Amoebiasis
10. Metraindazole

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

11. (a) Give an account on collection and transport of clinical sample

Or

- (b) Briefly explain about normal flora of gastrointestinal tract

12. (a) Add short note on pathogenesis and clinical symptoms of pneumonia

Or

- (b) Describe the about the nocardiasis

13. (a) Explain about clinical manifestation caused by yersiniosis

Or

- (b) Briefly explain about pathogenesis caused by vibrio

14. (a) Write in brief about superficial mycosis

Or

- (b) Discuss in short about mycotoxicosis

15. (a) Describe the symptoms and treatment for Chikungunya

Or

- (b) Add a brief note on reemerging viruses

PART C — (3 × 10 = 30 marks)

Answer any **THREE** questions.

16. Explain in detail about nosocomial infections
 17. Write elaborate note on symptoms and treatment for tetanus
 18. Discuss in detail about pathogenesis and prevention of Japanese encephalitis
 19. Write in detail about systemic mycosis
 20. Illustrate the classification of antibiotics based on mode of action
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D-2564

Sub. Code

36433

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2026.

Third Semester

ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define ecological pyramids
2. Eutrophication
3. Comment on activated sludge
4. Define gasification
5. Biomagnification
6. Biomining
7. Lipoxygenase
8. Phyllosphere
9. Bacterial blight paddy
10. Biological control.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Describe about composition and structure of environment.

Or

- (b) Add short note on food chain and food web.

12. (a) Write brief note on solid waste treatment

Or

- (b) Give brief note on oxygen pond.

13. (a) Summarize about microbiological degradation of heavy metals.

Or

- (b) Write in short about copper extraction from low grade ores.

14. (a) Discuss in detail about properties of soil.

Or

- (b) Give an account on symbiotic association of microbes with plant roots.

15. (a) Discuss in brief about phosphorus cycle.

Or

- (b) Add a brief note on mosaic diseases of mosaic disease of tobacco.

PART C — (3 × 10 = 30 marks)

Answer any **THREE** questions.

16. Discuss in detail about various organic and inorganic pollutants of eutrophication.
 17. Write in detail about biotechnological approaches to manage the global environmental issues.
 18. Elaborately explain about rhizosphere microbial interaction with plants.
 19. Describe in detail about the carbon cycle.
 20. Explain in detail about molecular aspects of host defense reactions.
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D-2565

Sub. Code

36441

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2026.

Fourth Semester

BIOPROCESS TECHNOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. List two essential components required for the formulation of an industrial fermentation medium.
2. Define 'strain isolation' in the context of industrial microbiology.
3. Name two methods used for the sterilization of fermentation media.
4. What is the primary function of an agitator in a fermentor?
5. Differentiate between batch and continuous fermentation processes based on product recovery.
6. Briefly explain the purpose of 'cell disruption' in downstream processing.
7. Name two physical methods used for cell disruption.

8. Which microbial process is primarily responsible for the production of Lactic Acid?
9. Mention one economic factor that influences the market potential of a fermented product.
10. State the main use of Penicillin in medicine.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Discuss the role of carbon sources and buffers in the formulation of an optimal fermentation medium.

Or

- (b) Describe the key steps involved in the isolation and screening of industrial microorganisms for a specific metabolite production.

12. (a) Explain the design considerations for a typical industrial fermentor.

Or

- (b) Compare and contrast aerobic and anaerobic fermentation processes, providing an example for each.

13. (a) Outline the general steps involved in the removal of microbial cells from a fermentation broth during downstream processing.

Or

- (b) Describe the principles of precipitation and centrifugation as methods for product recovery.

14. (a) Elaborate on the industrial production process of Citric Acid, highlighting the key raw materials and microorganisms involved.

Or

- (b) Discuss the critical steps in the downstream processing of a typical antibiotic, taking Penicillin as an example.
15. (a) What factors contribute to the market potential of a bioprocess product?

Or

- (b) Explain the importance of intellectual property and patenting in the bioprocess industry, especially concerning new product development.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss in detail the various methods employed for the preservation of industrial microorganisms, explaining the principles behind each method.
17. Describe the different types of fermentors based on their operation (batch, continuous, fed-batch).
18. Elaborate on the various unit operations involved in the downstream processing of a whole broth, from initial cell separation to final product purification and drying/crystallization.
19. Choose any two of the following bioproducts: Glutamic Acid, Acetone-Butanol, or Riboflavin.
20. What is fermentation economics? Discuss the major cost components associated with an industrial fermentation process.

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36442

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2026.

Fourth Semester

MICROBIAL BIOTECHNOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. List two key applications of microbial biotechnology in therapeutics.
2. Define Single Cell Protein (SCP) and mention its nutritional significance.
3. Briefly explain the principle of antagonism in microbial control.
4. Name two specific microbial herbicides and their target weeds.
5. What are cytokines? Give one example of a medically important cytokine.
6. Distinguish between microbial polysaccharides and polyesters.
7. How is hydrogen gas (H₂) produced through microbial processes?

8. Define a microbial biosensor.
9. List two applications of Genetically Modified Microbes (GMMs) in human health.
10. State one major ethical concern associated with the use of Genetically Modified Organisms (GMOs).

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Discuss the broad scope of microbial biotechnology with specific examples in the food industry.

Or

- (b) Elaborate on the role of genetic engineering in enhancing the environmental applications of algae.
12. (a) Explain the mechanism of action of microbial pesticides based on parasitism, providing a suitable example

Or

- (b) Describe the development and significance of Bt cotton as a microbial insecticide
13. (a) Discuss the medical applications and production of Tissue Plasminogen Activator (TPA).

Or

- (b) Explain the principles of microbial immobilizations and their application in biosensors.
14. (a) Outline the process of biogas production and enumerate its advantages as a renewable energy source.

Or

- (b) Describe the applications of microbial polysaccharides in various industries.

15. (a) Explain the molecular tools commonly employed in the creation of Genetically Modified Organisms (GMOs)

Or

- (b) Discuss the applications of GMM-derived products in agricultures citing relevant examples.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the comprehensive scope of microbial biotechnology, detailing its applications in agriculture and environmental remediation.
17. Describe the different categories of biological control agents, focusing on microbial insecticides and viral pesticides, and their practical implications in pest management.
18. Elaborate on the production and environmental importance of biocompost and biodiesel from a microbial biotechnology perspective.
19. Discuss the significance of growth hormones and cytokines in medical biotechnology. Explain how microbial processes can be harnessed for hydrogen production
20. Critically analyze the applications of Genetically Modified Organisms (GMOs) in human health and the environment. Discuss the major ethical issues and societal concerns raised by their widespread use.

D-2567

Sub. Code

36443

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2026.

Fourth Semester

BIOINFORMATICS AND BIOSTATISTICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define the Operating system.
2. Write the role of the gene bank.
3. Define multiple sequence alignment.
4. What is proteomics?
5. Define the protein data bank.
6. What is Genomics?
7. Differentiate correlation and regression.
8. Define Poisson distribution.
9. Write different methods of correlation.
10. Write the importance of ANOVA.

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Brief about the basics and generations of computers.

Or

- (b) Describe about Genomics and sequence analysis.

12. (a) Differentiate between Unix and Linux.

Or

- (b) What are biological databases? Briefly explain them.

13. (a) Explain about the Genbank database.

Or

- (b) Elaborate on structural databases.

14. (a) Brief about Multiple Sequence alignment methods and their applications.

Or

- (b) Explain the concept of the mathematical basis of a molecular phylogenetic tree.

15. (a) Write about the ANOVA.

Or

- (b) Explain about Probability.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the various approaches in biological databases.

17. Write briefly about the phylogenetic tree construction.

18. Explain in detail about Biostatistics.
 19. Explain about Regression.
 20. Write briefly about the importance of statistical software in data analysis.
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