D–8566

Sub. Code
36411

DISTANCE EDUCATION

M.Sc.(Microbiology) DEGREE EXAMINATION, MAY 2025.

First Semester

GENERAL MICROBIOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Yeast.

2. Germ theory of disease.

3. Refractive index.

4. Moderate stain.

5. Disinfection.

6. Nucleoid.

7. Lichens.

8. Capsid.

9. Prophage.

10. Viroids.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Write in detailed account on classification of yeast.

Or

(b) Elucidate the Haeckel's three kingdom concept.

12. (a) Describe the general principles of microscope.

Or

(b) Explain about Gram's staining technique.

13. (a) Briefly explain about the bacterial endospores.

Or

(b) Write the general characters of blue green algae.

14. (a) State the structural characteristics of protozoa.

Or

(b) Elucidate the organelles and structure of eukaryotic cell.

15. (a) Summarize the types and structures of virus.

Or

(b) Examine the role of virus in clinical field.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Write a detailed account of bacteria morphology and cultural characteristics.

17. Identify the economic importance of algae.

18. Examine the life cycle of virus.

19. Explain the principles and applications of electron microscope.

20. Classify bacteria based on Bergey's manual.

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D–8567

Sub. Code
36412

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2025.

First Semester

MICROBIAL BIOCHEMISTRY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. How is cholesterol synthesis in *E.coli?*

2. Write the properties of monosaccharides.

3. Define enzyme.

4. What is the chemical nature of lipids?

5. How the vitamins are acting as co-factors?

6. Differentiate the reversible and irreversible actions of enzymes.

7. Important examples of carbohydrates.

8. How are complex carbohydrates different from simple carbohydrates?

9. What are the types for lipids?

10. What are enzymes with an example?

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Describe the major function of cellulose and agar - agar.

Or

(b) Explain the Entner Doudroff pathway.

12. (a) Write about the types of lipids and their structure.

Or

(b) How the enzymes are catalyzed the biological pathway?

13. (a) Mention the essential and non-essential amino acids.

Or

(b) Explain the mechanism of allosteric inhibition reaction.

14. (a) Summary report on biomolecules involved in biological metabolism.

Or

(b) Write the importance of antibiotics from the natural sources.

15. (a) How the vitamins are regulating the specific?

Or

(b) Explain the mechanism of induced fit theory.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Write about the function and structure of nucleic acids.

17. Elaborate on the classification based on the structure and polarity of proteins.

18. Detail about the hexose monophosphate shunt.

19. Mention the structural organization of biomolecules.

20. Explain the types of microbial toxins and their mode of action.

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D–8568

Sub. Code
36413

DISTANCE EDUCATION

M.Sc.(Microbiology) DEGREE EXAMINATION, MAY 2025.

First Semester

MICROBIAL PHYSIOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Batch culture.

2. Chemotrophs.

3. Synchronous culture.

4. Anoxygenic photosynthesis.

5. Osmotic stress.

6. Oxidative stress.

7. Ammonification.

8. Mitochondria.

9. Phosphorylation.

10. Enthalpy.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Write the importance of chemotrophism.

Or

(b) Elucidate the reductive acetyl COA pathway.

12. (a) Describe the general principles of methanogens.

Or

(b) Explain about photosynthetic pigments.

13. (a) Briefly explain about the glyoxalate cycle.

Or

(b) Write the general mechanism of oxidative phosphorylation.

14. (a) State five points about substrate level phosphorylation.

Or

(b) Elucidate the significance of anaerobic respiration.

15. (a) Summarize the types and mechanism of signaling molecules.

Or

(b) Examine the importance of transport across membrane.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Describe the physiology and economic importance of methylotrophs.

17. Explain about the composition of bacterial nutrition.

18. Examine the importance of nitrogen cycle.

19. Explain the principles and applications of transport across membrane.

20. Summarize the environmental importance of anaerobic respiration.

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D–8569

Sub. Code
36421

DISTANCE EDUCATION

M.Sc.(Microbiology) DEGREE EXAMINATION, MAY 2025.

Second Semester

MICROBIAL GENETICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Mutagens.

2. What is a SOS inducible repair?

3. Conjugation.

4. Transduction.

5. What is tryptophan operon?

6. Plasmid.

7. Homologous recombination.

8. Gene expression.

9. Replication.

10. Epigenetics.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Explain about mutagenesis.

Or

(b) Give a brief note on nucleotide excision repair pathway.

12. (a) Discuss the biological role of site specific recombination.

Or

(b) Explain about specialised transduction.

13. (a) Write a short note on catabolite repression.

Or

(b) Elucidate the properties of plasmid.

14. (a) Explain about conjugational mapping.

Or

(b) Write short notes on transformation by inducing artificial competence.

15. (a) Write short note on plasmid amplification.

Or

(b) List the types of transposable elements in detail.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Discuss about any four repair pathways.

17. Write the mechanism of natural competence and transmission in *Bacillus subtilis*.

18. Explain about the plasmid and its different types.

19. Explain about arabinose operon and its regulation.

20. Illustrate in detail about epigenetics.

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D–8570

Sub. Code
36422

DISTANCE EDUCATION

M.Sc. (Microbiology) DEGREE EXAMINATION, MAY 2025.

Second Semester

MOLECULAR BIOLOGY AND rDNA TECHNOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Who discovered DNA?

2. Name any three viruses with RNA as the genetic material.

3. What is DNA polymorphism?

4. Retroviruses do not follow central dogma. Comment on this statement.

5. What are the mechanisms of denaturation?

6. Who first developed insulin by gene cloning technology?

7. What is the meaning of biological responses?

8. Define : Ti plasmid.

9. What is the unique property of DNA?

10. Explain PCR.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Explain the process of DNA replication.

Or

(b) What is the difference between heterochromatin and euchromatin?

12. (a) Give a reason for the discontinuous synthesis of DNA on one of the parentals stands.

Or

(b) Explain about the dual polymerase present in E.coli.

13. (a) What are the functions of the :

(i) Methylated guanosine cap

(ii) Poly-A tail.

Or

(b) Short notes on Lab-on-a-chip.

14. (a) What is the use of protein-based nanostructures?

Or

(b) Describe about the Maxam Gilbert's method.

15. (a) Mention briefly about the mapping of human genes.

Or

(b) Describe about the electroporation.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Elaborate in detail about the definition, methods, and applications of DNA sequencing.

17. Describe the definition, structure, vector, pBR322, Ti plasmid.

18. Enumerate the structure, function and types of RNA.

19. Difference between DNA vaccine and recombinant vaccine.

20. Discuss in detail about the principle, components and types of PCR.

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D–8571

Sub. Code
36423

DISTANCE EDUCATION

M.Sc.(Microbiology) DEGREE EXAMINATION, MAY 2025.

Second Semester

FOOD AND DAIRY MICROBIOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. What is redox potential?

2. Define nutrient content.

3. What is food preservation?

4. Define canned food.

5. What is dairy microbiology?

6. Define SCP.

7. Write the work of amylases.

8. Abbreviations of MFPO, HACCP.

9. Write the objectives of codex alimentarius.

10. List out the microbial food products.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Explain the gaseous atmosphere.

Or

(b) Describe the buffering capacity and water activity.

12. (a) Write the physical methods of food preservation.

Or

(b) Discuss the spoilage of fish, egg and poultry products.

13. (a) Write the role of microorganisms in food fermentation.

Or

(b) Write the acidophilus and bifidus milk.

14. (a) Explain the industrial production enzymes.

Or

(b) Write the law and quality control of PFA.

15. (a) Explain the BIS Standard act.

Or

(b) Describe the contamination of canned foods.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Explain the intrinsic factors.

17. Describe the food poisoning and food borne infections.

18. Elaborate the manufacturing process of cheese.

19. Write the rules and regulations of HACCP.

20. Discuss the field investigation, lab testing and preventive measures for food borne diseases.

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D–8572

Sub. Code
36431

DISTANCE EDUCATION

M.Sc.(Microbiology) DEGREE EXAMINATION, MAY 2025.

Third Semester

IMMUNOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Define haematopoiesis.

2. What are primary and secondary lymphoid organs?

3. Name the different classes of immunoglobulins.

4. What is agglutination?

5. What is the cytosolic pathway?

6. Define peptide in the context of immunology.

7. What is an autoimmune disorder?

8. What does HLA stand for?

9. Explain the significance of stem cells in immunology.

10. Mention the role of antibodies in the immune response.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Differentiate between T cells and B cells in terms of origin, function and structure.

Or

(b) Explain the role of toll-like receptors in innate immunity.

12. (a) Describe the structure of an immunoglobulin and its functional domains.

Or

(b) Explain the concept of immunogenicity in haptens and carriers with examples.

13. (a) Differentiate between T-dependent and T-independent antigens.

Or

(b) Describe the classical and alternative pathways of the complement system.

14. (a) Give short note on antibody engineering and its applications.

Or

(b) Explain the process and importance of HLA tissue typing in transplantation.

15. (a) Write short notes on oncogenes and tumor suppressor genes with examples.

Or

(b) Discuss the four types of hypersensitivity reactions.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the structural and functional difference between primary and secondary lymphoid organs.

17. Explain how antigen-antibody interactions contribute to the immune response.

18. Describe the structure and function of class I and class II MHC molecules.

19. Compare the different types of vaccines and their mechanisms of action.

20. Discuss the role of human pluripotent stem cells in immunology and their potential medical applications.

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D–8573	Sub. Code
	36432

DISTANCE EDUCATION

M.Sc.(Microbiology) DEGREE EXAMINATION, MAY 2025.

Third Semester

MEDICAL MICROBIOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Write any two key safety measures implemented in a well-managed laboratory.

2. What are the common transport media used for microbiological specimens?

3. How should a urine sample for culture be collected and transported?

4. What is the primary disease caused by *Streptococcus pyogenes* and how does it manifest?

5. How does *Neisseria gonorrhhoeae* cause gonorrhea, and what are its symptoms?

6. What are the major infections caused by *Escherichia coli* and their clinical significance?

7. What are the environmental control measures to prevent outbreaks of Gram-negative bacilli in healthcare and community settings?

8. Which vector control strategies are used to prevent Japanese encephalitis transmission?

9. How do β – lactam antibiotics inhibit bacterial growth, and why are gram-negative bacteria more resistant to them?

10. How do polyene antifungals exert their fungicidal effect, and why are they selectively toxic to fungi?

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Explain Good Laboratory Practices (GLP) and discuss their importance in maintaining efficiency, accuracy and safety in a research laboratory.

Or

(b) Discuss the standard procedures for collecting, storing and transporting blood samples to prevent contamination and ensure accurate diagnostic results.

12. (a) Compare the pathogenesis, symptoms, and complications of infections caused by *Staphylococcus aureus* and *Neisseria gonorrhoeae.*

Or

(b) Discuss the public health measures implemented to control pertussis outbreak.

13. (a) Explain the structural characteristics of acid-fast bacteria.

Or

(b) Explain the pathogenesis of *Leptospira* spp.

14. (a) Describe the progression of HIV infection from acute phase to AIDS.

Or

(b) Describe the epidemiology and transmission dynamics of SARS.

15. (a) Discuss the serological methods (IgM and IgG ELISA) used in detecting Chikungunya infection.

Or

(b) Describe the molecular techniques used in Zika virus diagnosis.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Elaborate on the microbiological examination of various bodily fluids.

17. Discuss in detail about the control measures of gram-positive cocci diseases with an example.

18. Detailed comment on Yersiniosis its cause, symptoms and diagnosis.

19. Illustrate the pathogenesis of the disease tuberculosis.

20. Elaborate the classification of antibiotics based on its mode of action with appropriate examples and their mechanism.

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D–8574

Sub. Code
36433

DISTANCE EDUCATION

M.Sc.(Microbiology) DEGREE EXAMINATION, MAY 2025.

Third Semester

ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. Define ecosystem.

2. Comment on ecological pyramids.

3. Define eutrophication.

4. Comment on vermicomposting.

5. Write the uses of trickling filter.

6. Comment on clay soil.

7. What is phyllosphere?

8. Write the role of phtoalexins.

9. Grassy shoot of sugar can.

10. Root rot diseases.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Write short note on composition and structure of environment.

Or

(b) Add brief note on food chains and food webs.

12. (a) Give an account on primary treatment of liquid waste.

Or

(b) Briefly explain about mining of copper from low grade ores.

13. (a) Summarize the physical and chemical properties of soil.

Or

(b) Add short notes on nodulation in crop plants.

14. (a) Give an account on carbon cycle.

Or

(b) Write brief note on sulfur cycle.

15. (a) Write an account on role of enzyme and toxins in plant protection.

Or

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

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Elaborately explain about eutrophication of water bodies.

17. Explain in detail about composting of solid waste.

18. Discuss about the secondary waste treatment of liquid waste.

19. Describe in detail about molecular aspects of host defense reactions.

20. Elaborate about symptoms and management of blight disease of paddy.

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D–8575

Sub. Code
36441

DISTANCE EDUCATION

M.Sc.(Microbiology) DEGREE EXAMINATION, MAY 2025.

Fourth Semester

BIO PROCESS TECHNOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. What is fermentation technology?

2. Define secondary metabolites and provide an example.

3. How does dual fermentation differ from single fermentation?

4. What is the role of sprager in fermentor?

5. What is downstream processing?

6. Define chromatography.

7. What is crystallization?

8. Which microorganism is commonly used for the production of lactic acid?

9. What is recombinant protein?

10. Name a common antibiotic produced from *Penicillium chrysogenum*.

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Describe the components of a fermentation process.

Or

(b) Outline the stoichiometry of cell growth and product formation during fermentation.

12. (a) Write short notes on aseptic operation in fermentor.

Or

(b) Explain the principle of submerged fermentation and its importance in industrial processes.

13. (a) Describe any two methods for the removal of microbial cells and other solid materials.

Or

(b) Write down the whole broth processing of cell disruption.

14. (a) What are the key raw materials and fermentation conditions used in the production of riboflavin?

Or

(b) Draw a flowchart for the biosynthesis of glutamic acid.

15. (a) Write a brief note on continuous fermentation.

Or

(b) What are the challenges and essential factors involved in the recovery of bioproducts from fermentation?

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Elaborate the isolation, preservation and maintenance of industrial microbes.

17. Explain in detail the construction and components of a fermentor.

18. Summarize the physical method of cell disruption methods.

19. Illustrate the steps involved in the production of citric acid through fermentation.

20. Provide a detailed outline of the process for the production of ethyl alcohol and its applications.

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D–8576

Sub. Code
36442

DISTANCE EDUCATION

M.Sc.(Microbiology) DEGREE EXAMINATION, MAY 2025.

Fourth Semester

MICROBIAL BIOTECHNOLOGY

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the questions.

1. What is Single-Cell Protein (SCP)?

2. Define algal genomics.

3. What is amensalism in microbial interactions?

4. What is nematophagy?

5. Define toxin.

6. Expand VAM.

7. What are polyesters?

8. What is biogas?

9. Define biosensor.

10. What is GMMs?

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Explain the hybridization technology used in algae and its applications in biotechnology.

Or

(b) Discuss the transformation and expression vectors in algae for genetic engineering.

12. (a) Differentiate between antagonism and parasitism in microbial interactions, with examples.

Or

(b) Describe microbial herbicides and their potential applications in agriculture.

13. (a) Explain the role of Pseudomonas and Bacillus species as biological insecticides.

Or

(b) Discuss the production of human growth hormones using microbial biotechnology and its significance.

14. (a) Write short notes on microbial polysaccharides and its used in biotechnology.

Or

(b) Explain the process and significance of immobilization of microorganisms in industrial applications.

15. (a) Highlight the environmental and health risks associated with the use of genetically modified microorganisms.

Or

(b) Discuss the various applications of genetically modified organisms in agriculture and industry.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Discuss the applications of microbial biotechnology in food production, pharmaceuticals, and agriculture.

17. Explain the mechanisms of action of Bt cotton and its role in pest control.

18. Describe the production and applications of bio compost and biogas.

19. Discuss the role of microbial biosensors in detecting environmental pollutants and pathogens.

20. Explain the molecular tools used in genetic engineering of microorganisms and their significance.

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D–8577

Sub. Code
36443

DISTANCE EDUCATION

M.Sc.(Microbiology) DEGREE EXAMINATION, MAY 2025.

Fourth Semester

BIOINFORMATICS AND BIOSTATISTICS

(CBCS 2018 – 2019 Academic Year Onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer ALL the 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 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 — ($5 \times 5 = 25$ marks)

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

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

Or

(b) Describe about genomics and sequence analysis.

12. (a) Differentiate between the Unix and Linux.

Or

(b) What are biological databases brief 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 a mathematical basis of a molecular phylogenetic tree.

15. (a) Write about the ANOVA.

Or

(b) Explain about probability.

PART C — ($3 \times 10 = 30$ 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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