

**S-1278**

**Sub. Code**

**23MMI1C1**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025.**

**First Semester**

**Microbiology**

**GENERAL MICROBIOLOGY AND MICROBIAL  
DIVERSITY**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** questions.

1. Comment on TEM
2. Define micrometry
3. Give two examples for disinfectant
4. Comment on MTCC
5. Comment on the vegetative reproduction of algae
6. Write the importance of brown algae
7. What is synchronous growth?
8. Comment on sporulation
9. Define methanogens
10. What is halotolerant?

**Part B**

(5 × 5 = 25)

Answer **all** questions. Choosing either (a) or (b).

11. (a) Write the principle and application of bright field microscope.

Or

- (b) Give a brief account on the application of SEM.

12. (a) Discuss the safety guidelines in microbiology.

Or

- (b) Write briefly about pure culture technique.

13. (a) Give a brief account morphology of algae.

Or

- (b) List out the different type of medium used for isolation of microorganism.

14. (a) Add note on general characteristics of actinomycetes.

Or

- (b) Briefly explain about growth curve and kinetics of bacteria.

15. (a) Discuss in brief about thermophilic archea and its applications.

Or

- (b) Explain about the cell wall and membrane adaptation of halophiles.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Write elaborate note on confocal microscope.
  17. Discuss about maintenance and preservation of pure cultures.
  18. Give detailed note on life cycle of cyanobacteria.
  19. Write elaborate note on reproduction and economic importance of fungi.
  20. Discuss in detail cell wall and membrane of alkalophiles.
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**S-1279**

**Sub. Code**

**23MMI1C2**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**First Semester**

**Microbiology**

**MICROBIAL PHYSIOLOGY**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** questions.

1. What are chemotrophs?
2. Define active transport in bacteria.
3. What is synchronous culture?
4. Define turbidostat.
5. Comment on oxidation reduction reaction.
6. Define chemiosmosis.
7. What is methanogenesis?
8. Write the biological importance of triglycerides.
9. Give example for anoxygenic photosynthesis.
10. What is bioluminescence?

**Part B**

(5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Write the nutritional requirement of bacteria.

Or

- (b) Give brief note on facilitated diffusion.

12. (a) Discuss the bacterial growth curve in the batch culture.

Or

- (b) Describe the method for the measurement of cell number and biomass.

13. (a) Write the enzyme properties and function.

Or

- (b) Explain how ATP is synthesised during aerobic metabolism?

14. (a) Add note on anaerobic respiration.

Or

- (b) Write short note on biosynthesis of phospholipids.

15. (a) Describe the cyclic photophosphorylation.

Or

- (b) Explain in detail about Calvin – Benson cycle.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Write in detail about mechanism of active and passive transport.
  17. Discuss about the various factors affecting growth.
  18. Describe in detail about oxidative respiration.
  19. Elaborate the pathway for peptidoglycan synthesis.
  20. Discuss in detail about bioluminescence process and application.
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**S-1280**

**Sub. Code**

**23MMI1E1**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**First Semester**

**Microbiology**

**Elective — FORENSIC SCIENCE**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** questions.

1. Why is DNA profiling important in forensic science?
2. Mention two branches of forensic science.
3. What is forensic microbiology?
4. What is the role of forensic science laboratories in criminal investigations?
5. How is blood identified in forensic examinations?
6. What is the significance of saliva in forensic serology?
7. What is the significance of DNA fingerprinting in forensic science?
8. Define RFLP.
9. What is the mode of action of a corrosive poison?
10. What is the primary objective of a medico-legal post mortem examination?

**Part B**

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) What is the scope of forensic science in solving crimes?

Or

- (b) Describe the need for forensic science in the present scenario.

12. (a) Discuss the role of forensic microbiology in the identification of microbial organisms.

Or

- (b) Describe the key departments found in a forensic science laboratory and their functions.

13. (a) What are the methods used for identifying sweat and urine in forensic investigations?

Or

- (b) Explain how forensic scientists examine hair and fibres found at crime scenes?

14. (a) What is STR (Short Tandem Repeat) analysis in DNA profiling and how is it used to identify individuals?

Or

- (b) Explain the differences between organic and inorganic methods of DNA extraction and their respective advantages.

15. (a) What are the key responsibilities of a forensic toxicologist during a medico-legal post mortem examination?

Or

- (b) Discuss the different types of poisons based on their source and their effects on the human body.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the tools and techniques used in forensic science for analysing evidence and explain their role in solving crimes.
  17. Discuss the central and state-level forensic science laboratories in India. How do they differ in terms of functions and jurisdiction?
  18. How blood is analysed in forensic serology including methods such as blood typing, DNA profiling and blood spatter analysis?
  19. Explain the role of PCR in DNA profiling and its advantages in amplifying DNA samples.
  20. Describe the medico-legal post mortem process in detail and its significance in cases of suspected poisoning.
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**S-1282**

**Sub. Code**

**23MMI1E3**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**First Semester**

**Microbiology**

**Elective – MICROALGAL TECHNOLOGY**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** questions.

1. Define Phycology.
2. State the general characteristics of algae.
3. Give some example for freshwater microalgae.
4. Define photobioreactor.
5. Define SCP.
6. Write down the significance of phycobiliproteins.
7. Define algicides.
8. What is CO<sub>2</sub> sequestration?
9. What is carbon-neutral fuel?
10. List out the uses of biohydrogen.

**Part B**

(5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the identification methods of algae.

Or

- (b) Describe about the economically important microalgae.

12. (a) Discuss about the cultivation of marine microalgae.

Or

- (b) Elaborate about harvesting of microalgae biomass.

13. (a) Write briefly about microalgal biofertilizers.

Or

- (b) Summarize about microalgal secondary metabolites.

14. (a) Explain the role of microalgae in environmental applications.

Or

- (b) Discuss about the role of microalgae in CO<sub>2</sub> sequestration.

15. (a) Write short notes on biodiesel from microalgae biomass.

Or

- (b) Describe the life cycle analysis of algae biofuel.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Describe in detail about the classification of algae according to Fritsch.

17. Elaborate about isolation and enumeration of microalgae.

18. Discuss in detail about production and applications of phycobiliproteins.
  19. Explain about the role of microalgae in domestic and industrial waste water treatment.
  20. Write in detail about the importance of microalgae in production of biofuels.
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**S-1283**

**Sub. Code**

**23MMI1E4**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**First Semester**

**Microbiology**

**Elective : BIOINSTRUMENTATION**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** the questions.

1. Define sedimentation coefficient.
2. What is the difference between class I and Class II bio-safety cabinet?
3. Define Rf value.
4. What are ion exchange resins? Give two examples.
5. Enlist the factors affecting the migration of molecules during electrophoresis.
6. Outline the principle of disc gel electrophoresis.
7. State Beer Lambert's law.
8. Define absorption and emission spectrum.
9. What is carbon dating?
10. What are the safety measures to be followed when handling radioisotopes in laboratory?

**Part B**

(5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the working principle of pH meter with neat illustration.

Or

- (b) Briefly explain the centrifugation technique used for separation of sub cellular organelles.

12. (a) Outline the procedure involved in separation of enzymes by affinity chromatography.

Or

- (b) Explain the principle underlying and detectors used in HPLC.

13. (a) Explain the principle, components and application of agarose gel electrophoresis.

Or

- (b) Give a brief account on blotting technique used for detection of RNA.

14. (a) Explain the working principle of atomic absorption spectroscopy in detecting metal ions in environmental samples.

Or

- (b) Briefly discuss the working principle and application of ESR.

15. (a) Explain the working principle of an ionization chamber and how it is used to measure radioactivity?

Or

- (b) Give a brief account on application of tracer techniques in biological research.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Elaborate in detail the centrifugation technique used for determination of molecular weight of protein.
  17. Explain the working principle, technique and applications of HPTLC.
  18. Discuss in detail the electrophoresis technique used for the separation of isoenzymes.
  19. Elaborate in detail the working principle of FISH and its application in detection of biomolecules in living cell.
  20. Discuss in detail measurement of radioactivity using Scintillation counter.
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**S-1285**

**Sub. Code**

**23MMI1E6**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**First Semester**

**Microbiology**

***Elective* — ESSENTIALS OF LABORATORY  
MANAGEMENT AND BIOSAFETY**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** questions.

1. How can toxic fume inhalation be prevented in a laboratory?
2. What is the importance of occupational safety in a laboratory?
3. What is the purpose of a fume hood in a laboratory?
4. Define an electric hazard and give one example.
5. Why is proper disposal of PPE important?
6. What is the function of an eye wash station in a laboratory?
7. What is the purpose of a Biological Safety Cabinet (BSC)?

8. List two methods of sterilization used in laboratories.
9. What does the Institutional Biosafety Committee (IBSC) do?
10. Define the function of the Recombinant DNA Advisory Committee (RDAC).

**Part B**

(5 × 5 = 25)

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

11. (a) Write in short the different types of laboratory hazards with examples.

Or

- (b) Explain how to handle and dispose of broken glass safely that carries microbial materials.

12. (a) Outline the proper storage guidelines for laboratory chemicals.

Or

- (b) Describe the stages of fire and their characteristics.

13. (a) Describe the proper procedure for handling and disposing of used laboratory gloves.

Or

- (b) Explain the emergency response procedures for chemical burns from acids or alkalis.

14. (a) Elaborate the primary containment measures for biohazards in laboratories.

Or

- (b) What are the different risk groups of infectious agents? Provide examples.

15. (a) Describe the process of implementing biosafety guidelines in research institutions.

Or

- (b) Explain the role of the National Institutes of Health (NIH) in biosafety regulations.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss Good Laboratory Practices (GLP) and their role in ensuring laboratory safety.
17. Explain the role of Material Safety Data Sheets (MSDS) and Physical Agent Data Sheets (PADS) in laboratory safety.
18. Explain the types of PPE required for different laboratory hazards and the proper procedures for their use and disposal.
19. Discuss case studies on biosafety, including hand hygiene, safe working practices and laboratory security.
20. Elaborate the importance of international and national biosafety regulations in preventing biological hazards.
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**S-1286**

**Sub. Code**

**23MMI1S1**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**First Semester**

**Microbiology**

**ENTREPRENEURSHIP IN BIOBUSINESS**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** questions.

1. What is bio-entrepreneurship?
2. Define SWOT analysis in the context of bio-business.
3. What is the role of agricultural microbiology in entrepreneurship?
4. Define nutraceuticals with an example.
5. What is single-cell protein (SCP)?
6. Define bioremediation with an example.
7. Define monoclonal and polyclonal antibodies.
8. What are secondary metabolites? Give one example.

9. What is BIRAC, and how does it support biotech startups?
10. Mention one key challenge faced by biotech startups in India.

**Part B**

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Discuss the different types of business ownership in bio-entrepreneurship.

Or

- (b) Describe the stages involved in the entrepreneurial process.

12. (a) Explain the key challenges faced by bio-entrepreneurs in agricultural microbiology.

Or

- (b) How can system biology be integrated into agricultural applications for better productivity?

13. (a) Explain the business opportunities available in industrial biotechnology.

Or

- (b) What are the key marketing strategies for bio-based industrial products?

14. (a) How are probiotics and prebiotics beneficial to human health?

Or

- (b) Explain the fermentation process involved in antibiotic production.
15. (a) Explain the role of DBT in promoting biotechnology in India.

Or

- (b) What are the key components of a project proposal for a biotech startup?

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss the role of bio-entrepreneurship in the development of the biotechnology industry.
17. Explain in detail the process and challenges involved in herbal bulk drug production.
18. Write an essay on the production, applications, and economic potential of single-cell proteins (SCPs).
19. Elaborate in detail the production and applications of monoclonal and polyclonal antibodies in biotechnology.
20. Present a case study of a successful biotech startup in India, highlighting its journey, challenges, and achievements.

**S-1290**

**Sub. Code**

**23MMI2E2**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**Second Semester**

**Microbiology**

**Elective – CLINICAL DIAGNOSTIC MICROBIOLOGY**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** questions.

1. What are the different categories of biomedical waste?
2. Explain the role of autoclaving in laboratory safety.
3. What is the ideal time for collecting a blood sample for culture?
4. How should sputum samples for tuberculosis testing be stored?
5. What staining techniques are commonly used in microbial diagnosis?
6. Give an example of an immunological test used for viral infections.
7. How does the Stokes method differ from the Kirby-Bauer method?
8. Define Minimum Inhibitory Concentration (MIC).

9. What are nosocomial infections?
10. Enlist the common bacterial pathogens responsible for nosocomial infections.

**Part B**

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) What are the different sterilization and disinfection techniques used in microbiology laboratories?

Or

- (b) What are the environmental and health risks of improper biomedical waste disposal?

12. (a) Explain the significance of aseptic techniques in clinical specimen collection.

Or

- (b) Explain the role of culture media in microbiological diagnosis. Add a note on types of media.

13. (a) How do biochemical tests help in identifying microbial species? Give examples.

Or

- (b) Explain the principle of PCR and its application in microbial diagnosis.

14. (a) Compare the Stokes and Kirby-Bauer methods of antibiotic sensitivity testing.

Or

- (b) Why is the selection of standard strains essential in antibiotic sensitivity testing? Give examples of commonly used strains.

15. (a) Explain the major sources and reservoirs of nosocomial infections in hospital settings.

Or

- (b) Explain the role of HICC in monitoring and surveillance of hospital infections

**Part C**

(3 × 10 = 30)

Answer any **three** of the following.

16. Describe the strategies for the prevention and control of emerging and reemerging infectious diseases.
17. Elaborate in detail the recommended storage conditions for viral, bacterial and parasitic specimens.
18. Describe the principle and applications of ELISA in microbial disease detection.
19. Discuss the significance of antibiotic susceptibility testing in clinical microbiology and its role in guiding treatment strategies.
20. Describe the pathogenesis of nosocomial infections and the factors contributing to their development.
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**S-1292**

**Sub. Code**

**23MMI2E4**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**Second Semester**

**Microbiology**

**Elective : BIOINFORMATICS**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** questions.

1. CLUSTAL W
2. PAM
3. Substitution matrices
4. Evolutionary tree
5. Molecular file format
6. Geometrical parameters
7. HYBOT descriptors
8. 3 D autocorrelation
9. Molecular docking
10. Active site prediction

**Part B**

(5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) What are the Concept of alignment?

Or

- (b) Write a short note on Scoring matrices.

12. (a) Explain Maximum parsimony method.

Or

- (b) Define hierarchical clustering? Explain methods of hierarchical clustering briefly.

13. (a) What are the concepts of molecular graphics?

Or

- (b) Explain the steps involved on homology modelling.

14. (a) How to Predict toxicity of compounds? Explain.

Or

- (b) Write a note on structure descriptors and it's application.

15. (a) Explain the strategies of ligand preparation.

Or

- (b) Justify the docking algorithm as a selector of protein and ligand.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Detailed note on biological data management.

17. Elaborate evolutionary models.

18. Describe the molecular visualization tools used in bioinformatics.
  19. Write an elaborate note on 4D QSAR.
  20. Account on Principles of vaccine development.
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**S-1296**

**Sub. Code**

**23MMI3C1**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025.**

**Third Semester**

**Microbiology**

**IMMUNOLOGY, IMMUNOTECHNOLOGY AND  
MICROBIAL GENETICS**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** the questions.

1. Enlists the factors influencing immunogenicity.
2. Define HLA typing.
3. Explain the concept class switching in B cells.
4. What is the role of co-stimulatory signals in T cell activation?
5. Compare isograft and allograft.
6. What are the primary causes of immunodeficiency disorder?
7. Explain the role of histone protein in chromosome structure?
8. What is the function of telomere?
9. Define retroposon.
10. Explain the principle of conjugation.

**Part B**

(5 × 5 = 25)

Answer **all** questions. Choosing either (a) or (b).

11. (a) Define acquired immunity and a note on its characteristics.

Or

- (b) Explain the genetic organization of class I MHC molecules and its functions.

12. (a) Illustrate typical structure of Antibody and add a note on their functions.

Or

- (b) Outline the alternate pathway of complement activation.

13. (a) How does X-linked agammaglobulinemia lead to immunodeficiency?

Or

- (b) Explain the concept of immunoelectrophoresis and its diagnostic applications.

14. (a) How does methylation contribute to the epigenetic regulation of the genome?

Or

- (b) Explain the process of genomic imprinting and its implications for inheritance.

15. (a) Briefly discuss the role of F plasmid in bacterial conjugation.

Or

- (b) Explain the structure and function of T10 transposons.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Give a detailed account on cardinal features of innate immune response.
  17. Elaborate in detail the classical pathway of complement activation.
  18. Describe the applications of FACS in immunodiagnostics, particularly in identifying immune cell subsets and assessing immune responses in diseases.
  19. Describe the various types of post-translational modifications of histones and its influence in chromatin structure and regulation of gene expression.
  20. Enumerate the steps involved in bacterial transformation and its role in horizontal gene transfer.
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**S-1297**

**Sub. Code**

**23MMI3C2**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025.**

**Third Semester**

**Microbiology**

**MOLECULAR BIOLOGY AND RECOMBINANT DNA  
TECHNOLOGY**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** questions.

1. Define transcription.
2. Write about role of ribosomes.
3. Define gene rearrangement.
4. What is photoreactivation?
5. Comment on frame shift mutation.
6. What is homopolymer tailing?
7. Comment on HAT.
8. Write about protein sequencing.
9. Comment on transgenic animals.
10. Define vaccines.

**Part B**

(5 × 5 = 25)

Answer **all** questions. Choosing either (a) or (b).

11. (a) Write the mechanism of semi conservative mode of replications.

Or

- (b) Give brief note on post translational modification.

12. (a) Explain the molecular basis of gene mutations.

Or

- (b) Add note on base excision and nucleotide repair.

13. (a) Briefly explain the characteristics of DNA polymerases.

Or

- (b) Explain in brief about screening of recombinant.

14. (a) Add note on restriction length polymorphism.

Or

- (b) Write short note on site directed mutagenesis.

15. (a) Discuss in brief about isolation and selection of explant for callus culture

Or

- (b) Explain about role of vectors gene therapy.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Explain in detail about genetic code and wobble hypothesis.
  17. Describe the gene regulation with tryptophan operon.
  18. Discuss the vectors for eukaryotic gene transfer.
  19. Elaborate the basic concepts for enzyme engineering.
  20. Write in detail about recombinant cytokines and their use in treatment.
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**S-1298**

**Sub. Code**

**23MMI3C3**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025.**

**Third Semester**

**Microbiology**

**FERMENTATION TECHNOLOGY AND  
PHARMACEUTICAL MICROBIOLOGY**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** questions.

1. Define upstream processing.
2. Define batch fermentation.
3. What is fermenter?
4. List out the types of agitators.
5. Define flocculation.
6. Write down the significance of ultrafiltration.
7. What are respiratory floras?
8. Define implants.
9. Define quality control.
10. What is BIS?

**Part B**

(5 × 5 = 25)

Answer **all** questions. Choosing either (a) or (b).

11. (a) Explain the stages of upstream processing.

Or

- (b) Describe about medium sterilization for fermentation.

12. (a) Discuss briefly about the types of fermenter.

Or

- (b) Elaborate about fermentation economics.

13. (a) Explain the types of filtration methods in fermentation process.

Or

- (b) Write short notes on reverse osmosis.

14. (a) Explain about the ecology of microorganisms in water.

Or

- (b) Discuss about spoilage of pharmaceutical products.

15. (a) Write short notes on immunosera.

Or

- (b) Describe the significance of Streptodornase.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Describe in detail about the types of fermentation.
  17. Elaborate about instrumentation and control of fermenter.
  18. Discuss in detail about types of centrifugation methods.
  19. Explain about design and layout of sterile manufacturing unit.
  20. Write in detail about quality assurance and management in pharmaceutical industry.
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**S-1299**

**Sub. Code**

**23MMI3E1**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025.**

**Third Semester**

**Microbiology**

**Elective – SOIL MICROBIOLOGY AND MICROBIAL  
ECOLOGY**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** the questions.

1. Define soil formation.
2. What is biological nitrogen fixation (BNF)?
3. Define the term “phytoalexins.”
4. Name two common types of disease symptoms in plants.
5. Define one negative interaction between microbial populations.
6. What role do microbes play in animal nutrition?
7. What is microbial succession?
8. What is a biofilm?
9. Define microbial biomass
10. What is the difference between culturable and non-culturable bacteria?

**Part B**

(5 × 5 = 25)

Answer **all** questions. Choosing either (a) or (b).

11. (a) What are the characteristics of the O, A, B and C horizons in a soil profile?

Or

- (b) Explain the role of microorganisms in soil fertility.

12. (a) Describe the disease cycle of citrus canker and its management strategies.

Or

- (b) What are plantibodies, and how do they contribute to plant immunity?

13. (a) Discuss the role of microbes in the rhizosphere and how they affect plant growth and health.

Or

- (b) How do microbial interactions vary in various ecosystems?

14. (a) Briefly discuss the importance of microbial succession in ecological stability.

Or

- (b) Describe how environmental factors such as pH, temperature and oxygen levels affect the metabolic activities of microbial communities.

15. (a) Give an outline about the process of sample collection in microbial ecology.

Or

- (b) Write a brief note on any two approaches to determine microbial biomass in an environment.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss in detail the diversity and distribution of major groups of microorganisms in soil.
  17. Highlight the role of pathogenesis related (PR) proteins in plant defense against pathogens.
  18. Analyze the symbiotic relationship between plants and mycorrhizal fungi, explain its benefits, impact on plant growth and nutrient uptake.
  19. Compile an analysis of the dynamics of microbial communities in extreme environments and key adaptation strategies to survive in such harsh conditions.
  20. Construct a brief note on strategies used for detecting non-culturable microorganisms in environmental samples.
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**S-1300**

**Sub. Code**

**23MMI3E2**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**Third Semester**

**Microbiology**

**Elective : MICROBIAL TOXICOLOGY**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** the questions.

1. What are the two main toxins?
2. What disease is caused by botulinum toxin?
3. What is paralysis?
4. Name one common mycotoxin and the type of mold that produces it.
5. How do fumonisins affect human health?
6. What is leukostyrine and what are its effects?
7. How does microcystins affect humans?
8. What is Anatoxin-A and how does it affect the nervous system?
9. What is the percentage of stacking gel in electrophoresis?
10. State the principle of chromatography.

**Part B**

(5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Define toxins and describe their general characteristics.

Or

- (b) How do exotoxins affect host cells and contribute to disease?

12. (a) What is bacterial toxinogenesis, and how does it contribute to bacterial pathogenesis?

Or

- (b) Explain the mechanism of action of the bacterial toxin responsible for tetanus.

13. (a) Outline the structure and health effects of trichothecenes.

Or

- (b) Construct a brief note on the structure and properties of patulin.

14. (a) What is aetokthonotoxin, and how does its structure contribute to its toxic effects?

Or

- (b) Sketch out the structure, and properties of Lipopolysaccharides (LPS).

15. (a) Explain the principle and application of 2-Dimensional Gel Electrophoresis (2-DE).

Or

- (b) Discuss the working principle and procedure of ion exchange chromatography.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. What are the different categories of toxins produced by bacteria, and how do they differ in their mechanisms of action?
  17. Elaborate about the sources, mechanism of action, clinical effects, and therapeutic uses of aflatoxin toxin.
  18. Criticize the structure, properties, and health effects of fungal toxin- ochratoxin
  19. Compile in detail about the structure, mechanism of action and potential health effects associated with neurotoxins.
  20. Discuss the principle, instrumentation, and applications of High-Performance Liquid Chromatography (HPLC).
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**S-1302**

**Sub. Code**

**23MMI3S1**

**M.Sc. DEGREE EXAMINATION, NOVEMBER 2025**

**Third Semester**

**Microbiology**

**ORGANIC FARMING AND BIOFERTILIZER  
TECHNOLOGY**

**(CBCS – 2023 onwards)**

Time : 3 Hours

Maximum : 75 Marks

**Part A**

(10 × 2 = 20)

Answer **all** the questions.

1. List out any two salient features of organic manures.
2. Define biopesticides.
3. Enlist any two factors affecting ecological balance.
4. Define NPMSH&F.
5. What are biofertilizers?
6. Write down the significance of *Azospirillum*.
7. What are fungal biofertilizers?
8. Define phosphate mobilization.
9. Define carrier based biofertilizer.
10. What are FCO specifications?

**Part B**

(5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Explain the biological nutrient management.

Or

- (b) Describe about vermicompost.

12. (a) Discuss briefly about organic certification.

Or

- (b) Elaborate about the causes of land degradation.

13. (a) Write short notes on *Rhizobium*, bacterial biofertilizer.

Or

- (b) Summarize the characteristic features of *Pseudomonas* biofertilizer.

14. (a) Explain about the importance of *Nostoc* in cyanobacterial biofertilizer production.

or

- (b) Discuss about potassium solubilization.

15. (a) Write short notes on mass production of liquid biofertilizer.

Or

- (b) Describe about the storage, shelf life and marketing of biofertilizer.

**Part C**

(3 × 10 = 30)

Answer any **three** questions.

16. Describe in detail about an organic farming.
  17. Elaborate about models of IFS for different categories of farmers.
  18. Discuss in detail about the future perspectives, status and scope of biofertilizers.
  19. Explain in detail about nitrogen fixation.
  20. Write in detail about strain selection, fermentation and mass production of carrier based biofertilizer.
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