S–4191

Sub. Code
23MMI1C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

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. List down the contribution of Edward Jenner.

2. Write the principle of confocal microscope.

3. Write any two techniques used for isolation of pure culture.

4. List down the safety guidelines to be followed in the microbiological laboratories.

5. Draw the structure of spirogyra with suitable labelling.

6. List down the criteria for classifying algae.

7. Differentiate the cell wall structure of gram positive and gram negative bacteria.

8. Write the nutritional requirements for the growth of bacterial culture.

9. List down the applications of barophiles.

10. Mention the similarities between archaea and bacteria.

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

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

11. (a) Explain the principle and application of fluorescence microscope.

Or

(b) Discuss the contribution of Louis Pasteur.

12. (a) Discuss any two methods for cultivation of anaerobic bacteria.

Or

(b) Paraphase the Gram staining technique for staining bacteria.

13. (a) Discuss the life cycle of Chlamydomonas.

Or

(b) Discuss the method of culturing algae.

14. (a) Explain the lysogenic cycle of T_4 bacteriophage.

Or

(b) Discuss the factors affecting the growth of bacteria.

15. (a) Explain the classification and habitats of methanogens.

Or

(b) Differentiate the cell wall and membrane structure of acidophiles and bacteria.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. List out the types of microscope. Explain the principle and applications of transmission electron microscope.

17. Explain the method of staining bacteria with suitable illustrations.

18. Explain the structure and reproduction of ectocarpus.

19. Discuss the economic importance of fungi with suitable examples.

20. Discuss the significance of extremophiles in environment.

———————

S–4192

Sub. Code
23MMI1C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Microbiology

MICROBIAL PHYSIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Differentiate facilitated and passive diffusion.

2. List the types of heterotrophism.

3. What is log phase in growth curve of bacteria?

4. What is batch culture? Give an example.

5. What are enzymes?

6. Draw the structure of ATP molecule.

7. Give an example for each of the following :
   (a) Purine
   (b) Triglycerides
   (c) Sulphur containing amino acid
   (d) Phospho lipid

8. What is cyclic photophosphorylation?

9. Define fermentation.

10. List the pigments present in bacteria which helps in photosynthesis.

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

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

11. (a) Classify bacteria based on its nutritional requirements.

Or

(b) Explain facilitated diffusion with suitable illustrations example.

12. (a) Write a procedure to measure the growth of a given bacterial culture.

Or

(b) Explain how synchronous culture is obtained by "Helmstetter-Cummings Technique".

13. (a) Discuss β - oxidation of fatty acid.

Or

(b) Explain Tricarboxylic Acid (TCA) cycle.

14. (a) Explain Gluconeogensis as an alternative pathway of glycolysis. What are key enzymes in their pathway?

Or

(b) Explain the steps in the 'denovo' synthesis of purine.

15. (a) Illustrate and explain light dependent phase of photosynthesis.

Or

(b) Differentiate oxygenic and anoxygenic photosynthesis with examples.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss the specific transport system in bacteria.

17. Elaborate on bacterial growth curve and the factors affecting growth.

18. Discuss how glucose is oxidized to CO_2 and H_2O by aerobic bacteria.

19. Describe the process of anaerobic respiration.

20. Discuss how anabolic process of formation of glucose occurs in autotrophs.

———————

S–4193	Sub. Code
	23MMI1E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Microbiology

Elective – FORENSIC SCIENCE

(CBCS – 2023 onwards)

Time : Three Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Forensic Science.

2. Describe the need of Forensic Science in present scenario.

3. Name any two state level Forensic Science laboratory in India.

4. Define Forensic Microbiology.

5. Describe the medicolegal significance of saliva sample.

6. Enlist the types of body fluids of Forensic significance.

7. Define STR.

8. Define RFLP.

9. Write down the significance of medicolegal post mortem.

10. Define Forensic toxicology.

Part B (5 × 5 = 25)

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

11. (a) Explain the duties of a Forensic Scientist.

Or

(b) Elaborate in detail about any five techniques used in Forensic Science.

12. (a) List down and describe the role of central level Forensic Science laboratories in India.

Or

(b) Summarize the role of mobile Forensic Science laboratory.

13. (a) Discuss the steps involved in Forensic identification and examination of urine.

Or

(b) Describe the tests used for identification of hair sample.

14. (a) Elaborate the history of DNA typing.

Or

(b) Discuss the steps involved in organic extraction of DNA from blood samples.

15. (a) Summarize the procedure of Forensic Autopsy.

Or

(b) Describe the concept of Forensic toxicology and its significance.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe in detail about various branches of Forensic Science.

17. Explain the types and identification of microorganisms of Forensic significance.

18. Discuss in detail about Forensic identification and examination of blood sample.

19. Illustrate and explain PCR technique.

20. Comment on types of poisons and their mode of action.

———————

S–4195	Sub. Code
	23MMI1E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024.

First Semester

Microbiology

Elective – MICROALGAL TECHNOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Describe the economic importance of any two algal species.

2. Define eutrophication.

3. Define photobioreactor.

4. Enlist the types of media used for cultivation of microalgae.

5. Describe the role of polyunsaturated fatty acids in neutraceuticals.

6. Discuss the commercial application of phycobili proteins.

7. Define phycoremediation.

8. Name any four alglcides used to control algae.

9. Define biodiesel.

10. Comment on syngas.

Part B (5 × 5 = 25)

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

11. (a) List down the general characteristics of algae.

Or

(b) Discuss in detail about the distribution of algae.

12. (a) Describe in detail about heterotrophic cultivation of algae.

Or

(b) Summarize the techniques used for maintenance of microalgal culture.

13. (a) Write a short note on cultivation of spirulina.

Or

(b) Write a short note on production of microalgal carotenoids and their uses.

14. (a) Discuss the role of microalgae in sequestration of carbon dioxide.

Or

(b) Explain the role of algae in domestic and industrial waste water treatment.

15. (a) Discuss the life cycle analysis of algal biofuel.

Or

(b) Write a short note on Botryococcus braunii and its significance.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Elaborate in detail about Fritsch classification of algae.

17. Describe in detail about isolation and enumeration of microalgae.

18. Write a detailed note on production and application of microalgal biofertilizers.

19. Discuss the negative effects of algae and algal blooms.

20. Comment on integrated biorefinery concept.

———————

S–4196	Sub. Code
	23MMI1E4

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Microbiology

Elective – BIOINSTRUMENTATION

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Differentiate aerobic and anaerobic incubator.
2. Mention the necessity of Biosafety cabinet in a Microbiology lab.
3. Comment on the significance of GLC.
4. Write the uses of stimulated moving bed chromatography.
5. Explain the principle involved in immuno electrophorsis.
6. Compare starch gel and disc gel electrophoresis.
7. Write short note on the theory of absorption of light by molecules.
8. Abbreviate FISH and GISH.
9. Comment on Radiactive decay.
10. How do you determine the half-life of Radioactive isotopes?

Part B (5 × 5 = 25)

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

11. (a) Discuss the basic principles of centrifugation.

Or

(b) Write the working mechanism of pH meter with suitable diagram.

12. (a) Explain the applications of thin layer chromatography.

Or

(b) Compare and contrast Ultra performance convergence and flash chromatography.

13. (a) Write in detail about the various chemical ingredients involved and their role in polyacrylamide gel electrophoresis.

Or

(b) Describe the principle behind Southern blotting and its significance in molecular biology.

14. (a) Explain the functions of different components of FTR.

Or

(b) Discuss the role of Flame photometer and AAS in agricultural research.

15. (a) Discuss the commonly used isotopes in biology with suitable examples.

Or

(b) Enumerate the safe handling methods of radioactive isotopes in a laboratory.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe the principle, methodology and applications of differential and density gradient centrifugation.

17. Enumerate the protocol and working mechanism of HPLC.

18. Highlight the protocol involved in the separation of nucleic acids using Agarose gel electrophoresis.

19. Discuss the principle and mechanism of NMR. Add a not on its application.

20. Elicit the method of detection and measurement of radioactivity using Geiger Muller and Scintillation counters.

———————

S–4199	Sub. Code
	23MMI1S1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

First Semester

Microbiology

ENTREPRENEURSHIP IN BIOBUSINESS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Biobusiness.
2. What are the four elements of SWOT analysis?
3. List down the essential requirement for an entrepreneur.
4. What are biosensors? Give example.
5. Define biopesticide.
6. List down the scope for entrepreneurship opportunity in industrial biotechnology.
7. What are prebiotics? Give examples.
8. What is the scope of stem cell bank in Tamil Nadu for entrepreneurship?
9. List any Two challenges in India to build a biotech business.
10. Highlight any one Government scheme to develop a biobusiness.

Part B (5 × 5 = 25)

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

11. (a) Explain the criteria for stating a small-scale unit.

Or

(b) Define entrepreneurship and explain its main characteristics.

12. (a) Discuss a case study on polyhouse culture and evaluate its challenges.

Or

(b) 'Value added products as an opportunity for biobusiness' Justify.

13. (a) Explain global scope and production opportunities in biopesticide /insecticide.

Or

(b) Illustrate the steps involved in the industrial production of secondary metabolites.

14. (a) Explain the scope and production opportunity for fermented products.

Or

(b) Analzye the essential requirements of integrated compost production.

15. (a) Analyze the process of project identification and selection.

Or

(b) What is project formulation? Explain the different aspects of project formulation.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss the SWOT analysis of biobusiness with a case study.

17. Explain the scope and challenges in bio ethanol production using algal sources.

18. Discuss the marketing strategies and challenges in developing biobusiness on microbe enriched compost.

19. Discus the business opportunity, requirement scope and challenges instem cell production.

20. Discuss the steps needed for the successful startups substantiate your answer with a proper project proposal.

———————

S–4200	Sub. Code
	23MMI2C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Microbiology

MEDICAL BACTERIOLOGY AND MYCOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Zoonotic disease.

2. List the normal bacterial flora of oral cavity and its significance.

3. What are the laboratory diagnosis of Streptococci?

4. Describe the characteristics of Neisseriae.

5. List the symptoms of Yersiniosis.

6. How infection of Francisella tularensis occurs?

7. What are superficial mycoses?

8. Define aflatoxin.

9. What are opportunistic fungi? Give example.

10. Name any four antifungal agent.

Part B (5 × 5 = 25)

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

11. (a) What are the steps of processing of clinical samples in laboraties?

Or

(b) Write the procedure for antimicrobial susceptibility test.

12. (a) Explain the symptoms, laboratory diagnosis and treatment of disease caused by Mycobacteria sps.

Or

(b) Discuss the clinical manifestation of Staphylococci.

13. (a) Describe the laboratory diagnosis and treatment of disease caused by Rickettsiae.

Or

(b) Discuss the prevention and control of any one zoonolic disease.

14. (a) Discuss the various testing methods of antifungal agents.

Or

(b) Explain the detection and recovery of fungi from clinical specimens.

15. (a) Discuss any two PCR assays in fungal diagnosis.

Or

(b) Discuss the various laboratory techniques for diagnosis of Blastomycosis.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss the various microbiological examination of clinical specimen with examples.

17. Describe the morphology, characteristics and pathogenesis of disease caused by Coryne bacteria.

18. Discuss how nosocomial infection can be prevented and controlled.

19. Discuss the immuno diagnostic assay for the diagnosis of fungal infection.

20. Discuss the medically important yeast with suitable illustration.

———————

S–4201	Sub. Code
	23MMI2C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Microbiology

MEDICAL VIROLOGY AND PARASITOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What are Prions?
2. Mention one physical method used for virus purification.
3. Briefly explain pathogenesis.
4. What is lab diagnosis in the context of viral infections?
5. Define the lysogenic cycle.
6. Give an example of an antiviral agent.
7. Define medical parasitology.
8. Describe host-parasite relationship.
9. Name three types of cestodes.
10. Describe the lab diagnosis of parasitic infection.

Part B (5 × 5 = 25)

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

11. (a) Differentiate viruses, viroids and prions.

Or

(b) What are the main steps involved in the purification of viruses?

12. (a) Describe the process of virus entry into host cells.

Or

(b) Discuss two host defence mechanisms against viral infections.

13. (a) Discuss the mechanisms of action of antiviral agents and their importance in treating viral infections.

Or

(b) Describe the life cycle of bacteriophages such as T_4 and lambda.

14. (a) Explain the life cycle of Giardia lamblia including it's different stages and transmission to humans.

Or

(b) Describe the pathogenic mechanisms employed by protozoa such as Entamoeba histolytica to cause human infections.

15. (a) Discuss the classification of parasites, including helminths and protozoa.

Or

(b) Compare and contrast the treatment options available for parasitic infections caused by nematodes.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the epidemiological factors influencing the spread of viral infections.

17. Compare the advantages and limitations of using experimental animals versus cell cultures in virus research.

18. Analyze the advantages and disadvantages of the lytic and lysogenic cycles in bacterio phages.

19. Evaluate the life cycle and transmission dynamics of Trypanosoma.

20. Analyze the life cycles, pathogenicity and epidemiology of parasites such as Taenia solium and Ascaris lumbricoides.

———————

S–4203

Sub. Code
23MMI2E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024.

Second Semester

Microbiology

Elective – CLINICAL DIAGNOSTIC MICROBIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours — Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. How should potentially infectious materials be handled in a microbiology lab?

2. Name one Standard Operating Procedure (SOP) that should be followed when handling hazardous materials.

3. Name two common methods for transporting clinical specimens to the laboratory.

4. Why is it essential to maintain the integrity of clinical specimens during transport?

5. Name two common microbiological methods used for diagnosing microbial diseases.

6. What is the purpose of clinical diagnosis in identifying microbial diseases?

7. Define antibiotic sensitivity testing.

8. Define MBC and MIC.

9. Name two common types of nosocomial infections,

10. What are nosocomial infections, and where do they occur?

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

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

11. (a) Outline the steps involved in conducting a risk assessment before starting an experiment in a microbiology lab.

Or

(b) Discuss the role of Biosafety Cabinets (BSCs) in handling biological hazards in a laboratory setting.

12. (a) Compare and contrast the storage requirements for different types of clinical specimens in a microbiology laboratory.

Or

(b) Explain the significance of specimen labeling in the context of specimen acceptance and injection criteria.

13. (a) Discuss the process of clinical diagnosis in identifying microbial diseases, including patient history, physical examination and symptom assessment.

Or

(b) Analyze the impact of novel technologies such as Next – Generation Sequencing (NGS) and metagenomics in microbial diagnosis.

14. (a) Explain the difference between agar dilution and broth dilution methods for determining Minimum Inhibitory Concentration (MICs) of antibiotics.

Or

(b) Discuss the advantages and limitations of dilution methods (agar dilution and broth dilution) in antibiotic sensitivity testing.

15. (a) Outline the various control measures implemented in hospitals to prevent and manage nosocomial infections, including hand hygiene protocols and environmental sanitation practices.

Or

(b) Evaluate the functions of a hospital infection control committee in over seeing infection control practices, promoting staff education and implementing surveillance systems.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Analyze the challenges associated with managing emerging and re-emerging infections in healthcare settings and purpose strategies to address these challenges.

17. Compare and contrast manual versus automated specimen processing systems in a microbiology laboratory, highlighting their advantages and limitations.

18. Differentiate diagnostic capabilities of traditional culture – based methods with molecular – based methods in detecting microbial pathogens.

19. Analyze the challenges associated with interpreting antibiotic sensitivity test results for slow-growing or fastidious microorganisms.

20. Interpret the modes of transmission for different types of nosocomial infections, such as airborne, contact and droplet transmission.

———————

S–4205	Sub. Code
	23MMI2E4

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Microbiology

Elective — BIOINFORMATICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Section A (10 × 2 = 20)

Answer **all** questions.

1. Define primary database. Give one example.

2. What is meant by cluster analysis?

3. Define phylogenetic tree.

4. What is hierarchical clustering?

5. Enlist the methods used for prediction of 3D structure of proteins.

6. Describe ab initio 3D structure prediction.

7. Explain comparative molecular field analysis.

8. List down any two properties of ligand compounds.

9. Describe non-bonded interaction.

10. Mention any two tools used for molecular docking.

Section B (5 × 5 = 25)

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

11. (a) Enlist the types of BLAST and its applications.

Or

(b) Write a short note on biological data mining tools.

12. (a) Describe the parts of phylogenetic tree with diagram.

Or

(b) Elaborate in detail about maximum parsimony method in tree reconstruction.

13. (a) Discuss in detail about secondary structure of proteins.

Or

(b) Mention the molecular file formats in bioinformatics.

14. (a) Comment on quantity structure - property relationship.

Or

(b) Explain 3D-MORSE descriptors.

15. (a) Differentiate flexible and rigid docking.

Or

(b) Describe in detail about target - ligand preparation.

Section C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Mention the steps involved in multiple sequence alignment.

17. Write a short note on distance based tree reconstruction.

18. Explain in detail about homology modeling.

19. Describe the role of bioinformatics in prediction of toxicity of compounds.

20. Discuss in detail about the principles of immunoinformatics and vaccine development.

———————

S–4208

Sub. Code
23MMI2S1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Second Semester

Microbiology

VERMITECHNOLOGY

(CBCS – 2023 onwards)

Time : Three Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions

1. Enlist the significance of organic fertilizer.

2. Define vermiculture.

3. What are the key morphological features used to identify different species of earthworms?

4. Diagrammatically explain the anatomy of Eudrilus eugeniae.

5. Mention the importance of paper pulp and card boards in the preparation of vermicompost.

6. Comment on the stabilization phase of vermicomposting.

7. Enlist the separation techniques used in vermitechnology.

8. How do you identify and address issues related to odour or pests in a vermicomposting setup?

9. Differentiate vermicompost and vermicastings.

10. Mention the role of vermitechnology in agriculture marketing.

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

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

11. (a) Explain the economic importance of vermicompost in improving the soil fertility.

Or

(b) Discuss the local and exotic species of earthworm used in vermitechnology.

12. (a) Describe the taxonomy and physiology Eudrilus Eugeniae.

Or

(b) How do environmental factors such as temperature, moisture and pH levels impact the success of vermicomposting and what steps can be taken to mitigate issues related to these factors?

13. (a) Discuss the various methods of vermicomposting process with a neat diagram.

Or

(b) Highlight the importance of feeds for vermitech system.

14. (a) What are the best practices for ensuring a healthy and productive vermicomposting system?

Or

(b) Discuss the methods of harvesting earthworm.

15. (a) How will you enumerate the application quantity of vermicompost to be used in agricultural fields?

Or

(b) Discuss the commonly used by-products produced from vermitechnology with suitable examples.

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Elucidate the classification of vermiculture and discuss the factors that affect the distribution of earthworm in soil.

17. Describe about reproduction and vital cycle of Eisenia fetida.

18. Write in detail about the basic process of vermicomposting at initial, mesophilic and maturation phase.

19. Explain in detail about the nutritional analysis and packing strategies of vermicompost.

20. Describe the benefits of vermiculture for a sustainable agriculture. Add a note on its limitations.

———————

S–4209

Sub. Code
23MMI3C1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

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. T cells
2. Antigen
3. Antibody
4. TCR
5. Bombay blood group
6. ELISA
7. Nucleosome
8. Telomeres
9. Transformation
10. Conjugation

Part B (5 × 5 = 25)

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

11. (a) Write an account on innate immunity.

Or

(b) Give a short notes on T lymphocytes with neat diagram.

12. (a) Discuss about Monoclonal antibodies and its synthesis.

Or

(b) Comment on cell mediated cytotoxicity with neat diagram.

13. (a) Describe in detail of Autoimmunity with example.

Or

(b) Write short notes on ABO blood grouping with neat illustration.

14. (a) Give a brief account on Prokaryotic genome with neat sketch.

Or

(b) Explain in a detail of Chromosomes with its structure and functions.

15. (a) Discuss about Transduction and write its applications.

Or

(b) Write a short notes on Transposable elements.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain in detail about complement pathway in immunology.

17. Give a detailed account on theories of antibody production.

18. Write an account on Transplantation immunology with neat sketch.

19. Explain about Post translational modifications with examples.

20. Discuss in detail of Conjugation process with a neat illustration.

———————

S–4210

Sub. Code
23MMI3C2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

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** the questions.

1. Semi Conservative Replication
2. Wobble hypothesis
3. Photoreactivation
4. Lac Operon
5. Adapters
6. pUC Vectors
7. Pyrosequencing
8. RFLP
9. Callus
10. Monoclonal Antibody

Part B (5 × 5 = 25)

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

11. (a) Elucidate different Post translational modifications.

Or

(b) Briefly describe the modes of DNA Replication in E.coli.

12. (a) Describe the process of regulation of gene expression in Lac Operon.

Or

(b) Comment on various types of mutation.

13. (a) Illustrate the steps involved in Gene Cloning.

Or

(b) Write down the methods involved in the screening of recombinants.

14. (a) Explain any two types of PCR and its applications.

Or

(b) Describe the steps involved in the construction of Genomic DNA library.

15. (a) Give an account on Monoclonal antibodies in therapy.

Or

(b) What are the different processes employed in Human Gene Therapy?

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the process of transcription in prokaryotes. State any four differences from eukaryotic transcription.

17. Elaborate repair mechanisms of DNA damage.

18. Describe Artificial gene transfer techniques.

19. Briefly outline the principle, methodology and applications of DNA sequencing by Sanger's method.

20. Discuss in detail about any four applications of Genetic Engineering.

———————

S–4211

Sub. Code
23MMI3C3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Microbiology

FERMENTATION TECHNOLOGY AND PHARMACEUTICAL MICROBIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Serial Dilution technique
2. Sterilization
3. Fermentor
4. Baffles
5. Down stream processing
6. Flocculation
7. Contamination
8. Ophthalmology
9. Vaccines
10. WHO

Part B (5 × 5 = 25)

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

11. (a) Write an account on importance of industrially important Microbes.

Or

(b) Give a short notes on Media formulation in Bioprocess technology.

12. (a) Discuss about parts and functions of Fermentor with neat illustration.

Or

(b) Comment on computer applications in fermentation technology.

13. (a) Describe in detail of types of centrifugation with neat diagram.

Or

(b) Write short notes on Reverse osmosis.

14. (a) Give a brief account on Spoilage of pharmaceutical products.

Or

(b) Write a detailed note on implants with its applications.

15. (a) Discuss about Antibiotic production with one example.

Or

(b) Describe in detail of sterility test in pharmaceutical products.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain in detail about types of screening for industrially important Microorganism.

17. Give a detailed account on yield coefficient in fermentation technology.

18. Write an account on cell disintegration methods with neat sketch.

19. Explain about microbes present in respiratory flora of workers.

20. Discuss in detail of quality management in pharmaceuticals.

———————

S–4212

Sub. Code
23MMI3E1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

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** questions.

1. Biological nitrogen fixation
2. Soil formation
3. SAR
4. Phytoalexins
5. Mutualism
6. Rhizosphere
7. Biofilm
8. Microbial community
9. CPU
10. Microbial biomass

Part B (5 × 5 = 25)

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

11. (a) Explain briefly the role of microbes in soil fertility.

Or

(b) What are the nutritional groups of bacteria found in soil? Explain.

12. (a) Summarize the disease cycle of plant pathogens.

Or

(b) Describe the causal organism, symptoms and control measures of *Citrus canker*.

13. (a) With suitable examples explain commensalism.

Or

(b) Enlist the contributions of microbes in animal nutrition.

14. (a) How succession occurs within biofilm communities? Explain.

Or

(b) Describe the dynamics of microbial community in nature.

15. (a) Summarize sample collection and determination of microbial numbers.

Or

(b) How would you detect non culturable bacteria?

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Elaborate the chemistry and genetics of biological nitrogen fixation.

17. Explain in detail about the causal organism, symptoms and control measures of Tikka disease.

18. With a neat sketch explain Ectomycorrhizae.

19. How microbial communities contribute to the ecosystem? Explain.

20. Describe about the determination of microbial biomass.

———————

S–4213

Sub. Code
23MMI3E2

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Microbiology

Elective : MICROBIAL TOXICOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Leukocidin
2. Sepsis
3. Non-protein toxin
4. Hemolysin
5. Alkaloid
6. Toxin-A
7. Streptolysin -O
8. Toxic shock syndrome
9. TEMED
10. Agarose

Part B (5 × 5 = 25)

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

11. (a) How bacterial toxin damage the host cell?

Or

(b) Write short notes on effects of toxin on body.

12. (a) Differentiate the exotoxin and endotoxin.

Or

(b) Explain briefly about the cholera protein toxin.

13. (a) Write about the structure and properties of Ergot alkaloids.

Or

(b) Differentiate the aflatoxin and mycotoxin.

14. (a) Describe briefly about the structure and properties of LPS.

Or

(b) Write the structure and mode of action of Anatoxin-A.

15. (a) Write the method of isolation toxin protein from bacterial cell.

Or

(b) Explain the ion-exchange chromatography method for separation of toxin protein.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write about the molecular mechanism of action of Neurotoxins.

17. Explain in detail the production of and mode of action of tetanus toxin.

18. Write in detail the structure and properties of Patulin and Leukosytrine.

19. Explain in detail the structure and properties of Hepatotoxin and Neurotoxin.

20. Describe the HPLC method for separation and purification of toxin protein.

———————

S–4214

Sub. Code
23MMI3E3

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

Third Semester

Microbiology

Elective – WATER CONSERVATION AND WATER TREATMENT TECHNOLOGIES

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Infrastructure water scarcity.

2. Problems of too much groundwater.

3. Water conservation practices integrated into daily life to reduce overall water consumption.

4. Technological innovations aimed at reducing water scarcity.

5. Primary characteristics of groundwater.

6. Land use and urbanization impact the quality and management of flowing water resources.

7. Principle behind sedimentation in water treatment.

8. Activated carbon filtration.

9. Primary steps involved in conventional drinking water treatment processes.

10. Environmental impacts associated with desalination.

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

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

11. (a) What are the social impacts of water scarcity on daily life and quality of life for individuals and communities?

Or

(b) Explain how seasonal variations in water availability can lead to temporary water scarcity. And what strategies can be used to manage this issue?

12. (a) Provide examples of successful rainwater harvesting projects from different regions. What factors contributed to their success and how were they implemented?

Or

(b) How can community involvement and public education contribute to water scarcity prevention?

13. (a) How do water quality standards address both short-term and long-term health risks associated with water consumption?

Or

(b) Discuss the potential sources and types of contamination specific to flowing water, such as agricultural runoff and wastewater discharge.

14. (a) Compare and contrast chlorine disinfection, ultraviolet (UV) disinfection, and ozone disinfection in terms of effectiveness and application.

Or

(b) What are the potential by-products of chemical disinfection? And how can they impact water quality and safety?

15. (a) Compare and contrast the advantages and disadvantages of using activated carbon vs. sand filters in drinking water treatment.

Or

(b) Discuss the potential applications and limitations of Aquasporin technology in large-scale

Part C $(3 \times 10 = 30)$

Answer any **three** questions.

16. Evaluate the economic impacts of water scarcity on various industries, including agriculture, manufacturing, and energy production.

17. Discuss the challenges associated with implementing water-saving technologies in older systems.

18. Discuss the potential health impacts of consuming water with high levels of specific impurities such as heavy metals or pesticides.

19. Discuss the operational challenges of ultrafiltration systems, including membrane cleaning and maintenance.

20. Discuss the challenges associated with desalination, energy consumption, brine disposal and long-term sustainability.

———————

S–4215

Sub. Code
23MMI3S1

M.Sc. DEGREE EXAMINATION, NOVEMBER 2024

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. Organic seeds
2. Green manure
3. NPOF
4. Soil health
5. Frankia
6. Symbiosis
7. VAM
8. BOA
9. Autoclave
10. Fermentation

Part B (5 × 5 = 25)

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

11. (a) What are organic amendments? Write down their advantages and disadvantages.

Or

(b) Explain the method of preparation of panchagavya.

12. (a) Explain about the soil health management.

Or

(b) Write about the certification process of Organic compounds.

13. (a) Write about the characteristic features of bio-fertilizer *Pseudomonas* sp.

Or

(b) Describe briefly about the characteristic features of azospirillum.

14. (a) Write about the mechanism of phosphate solubilization.

Or

(b) Write short notes on Anabaena.

15. (a) Mention the specifications for storage and transport of organic products.

Or

(b) Write about mass production of liquid bio-fertilizer

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe in detail about the integrated pest management system.

17. Write in detail about the integrated farming system for agriculture development.

18. Explain production and application of bio-*fertilizer Rhizobium*.

19. Write about the production and field application of AM mycorrhiza.

20. Write in detail about the factors influencing the efficacy of bio-fertilizers.

———————