S–5871

Sub. Code
23BMC1S1

B.Sc. DEGREE EXAMINATION, APRIL 2025

First Semester

Microbiology and Clinical Lab Technology

SKILLS IN MICROBIOLOGY AND CLINICAL LABORATORY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Asepsis
2. Slant culture
3. Toxins
4. Virulence
5. GTT
6. Plasma
7. Microbiocides
8. Antivirals
9. CT
10. Autoanalysers

Part B (5 × 5 = 25)

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

11. (a) Explain in brief disinfection techniques.

Or

(b) Write a short note on maintenance of microbial cultures.

12. (a) Define carriers and describe their types.

Or

(b) Analyse nosocomical infections in human.

13. (a) Discuss on ABO blood grouping.

Or

(b) Explain the method of haemoglobin determination.

14. (a) Write a short note on vaccine and its types.

Or

(b) Discuss in brief on applications of antimicrobial drugs.

15. (a) Explain the working principle and applications of X-ray.

Or

(b) Write a short note on ECHO and its applications.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain in detail the principle and working system of autoclave and hot air oven.

17. Elaborate the opportunistic infections and their causes in human.

18. Analyze in detail various types of diabetes mellitus.

19. Explain the discovery of different antibiotics and their mode of actions.

20. Write a detailed account on the applications of MRI, ultra sound scan, mammography and sphygmanometer.

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S–5872

Sub. Code
23BMC1FC

B.Sc. DEGREE EXAMINATION, APRIL 2025

First Semester

Microbiology and Clinical Lab Technology

INTRODUCTION TO CLINICAL LAB DIAGNOSIS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. PPE
2. Chemical burn
3. Swap
4. Anticoagulants
5. Depression plate
6. Volumetric pipette
7. Water bath
8. Distillation
9. Molarity
10. Percent solution

Part B (5 × 5 = 25)

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

11. (a) Analyze the role of medical laboratory technologists.

Or

(b) Discuss in brief laboratory safety.

12. (a) Write the roles of EDTA and Oxalate in clinical laboratory.

Or

(b) Analyze the importance of sodium citrate and heparin in hematological laboratory.

13. (a) Write the importance of volumetric flask used in clinical laboratories.

Or

(b) Describe different types of cuvette and their uses.

14. (a) Explain the working principle and uses of Incubator.

Or

(b) Describe the various parts in pH meter and its uses.

15. (a) Write a short note on normal and buffer solutions.

Or

(b) Explain the preparation of 0.1 N NaCl solutions.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Critically analyze the common accidents in laboratory and their prevention.

17. Write in detail the collection and transportation of various clinical specimens.

18. Enumerate the different types of pipettes used in clinical laboratories.

19. With neat sketch describe the different parts of calorimeter and its maintenance.

20. Explain in detail the methods of preparation of stock solution and working standard.

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S–5877

Sub. Code
23BMC2C1

B.Sc. DEGREE EXAMINATION, APRIL 2025

Second Semester

Microbiology and Clinical Lab Technology

GENERAL MICROBIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is the significance of the germ theory of disease in microbiology?

2. What is the primary characteristic that distinguishes bacteria from archaea?

3. What is the role of inclusion bodies in bacteria?

4. What are the advantages of using fluorescent staining techniques?

5. What is the lag phase of bacterial growth?

6. What is the main difference between disinfection and sterilization?

7. What is the advantage of using ethylene oxide (ETO) sterilization?

8. What is the role of microscopes in materials science?

9. What is the resolving power of a microscope?

10. Give two examples of anaerobic media.

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

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

11. (a) Write about the contributions of Louis Pasteur in microbiology.

Or

(b) Write about the contributions of Robert Koch in microbiology.

12. (a) Describe the cell membrane, structure, and function of bacterial cells

Or

(b) Describe the role of the "reproduction fork" in bacterial reproduction

13. (a) Briefly explain about the bacterial growth curve.

Or

(b) Classify bacteria based on the temperature requirements.

14. (a) Write about the chemical methods of sterilization

Or

(b) Write about the β-lactam class of antibiotics

15. (a) Explain the principle, construction, and uses of a phase contrast microscope.

Or

(b) Explain the principle, construction, and uses of Dark field microscope.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the structure of bacteria, detailing the functions of its key components.

17. Describe the classification of the microbial kingdom, highlighting the major groups of microorganisms.

18. Discuss the various factors that influence microbial growth and explain how each factor impacts microbial activity and proliferation of microbial growth.

19. Describe the principle and process of physical methods of sterilization.

20. Explain the working principle of a light microscope and discuss its components.

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S–5878

Sub. Code
23BMC2S1

B.Sc. DEGREE EXAMINATION, APRIL 2025

Second Semester

Microbiology and Clinical Lab Technology

HUMAN ANATOMY AND HAEMATOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Centrioles
2. Osteoclast
3. Perichondrium
4. Sub Arachnoid space
5. Parafollicular cells
6. Surfactant
7. Fibroblast
8. Schwan cells
9. Sickle cell anemia
10. Heparin.

Part B (5 × 5 = 25)

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

11. (a) Explain the microscopic structure of compact bone.

Or

(b) Explain the various tight junctions.

12. (a) Explain the histology of stomach.

Or

(b) Tabulate the difference between the various types of cartilages.

13. (a) Describe the Ventricles of brain.

Or

(b) Draw and label the cerebrum.

14. (a) List out the various cytokines.

Or

(b) Explain platelet phase of prevention of blood loss.

15. (a) List out the various anticoagulant.

Or

(b) Explain about any two wight blood cell disorder.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain the plasma membrane and various transporters in details.

17. Explain the liver in detail with suitable illustrations.

18. Explain the various tracts of spinal cord in detail with suitable illustrations.

19. Give a detail notes on various blood cells with suitable illustrations.

20. Describe the blood coagulation in detail.

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S–5879

Sub. Code
23BMC2S2

B.Sc. DEGREE EXAMINATION, APRIL 2025

Second Semester

Microbiology and Clinical Lab Technology

MICROBIAL PHYSIOLOGY AND METABOLISM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is synchronous growth?

2. Define methylotrophs.

3. Recall passive diffusion.

4. State out significance of siderophores.

5. Infer bacteriochlorophylls.

6. Assess the importance of electron transport.

7. Prioritize the function of the pentose phosphate pathway?

8. Determine gluconeogenesis.

9. Interpret about biological nitrogen fixation.

10. Show the mechanism of denitrification.

Part B (5 × 5 = 25)

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

11. (a) Describe the phases of microbial growth in a batch culture.

Or

(b) How do psychrophilic microorganisms adapt to extreme cold conditions?

12. (a) Explain primary and secondary active transport with examples.

Or

(b) Predict how do microorganisms acquire iron from their environment?

13. (a) Distinguish cyclic photophosphorylation from non-cyclic photophosphorylation?

Or

(b) Discuss the structure of photosynthetic pigments and mention their roles in photosynthesis.

14. (a) Elaborate about the major steps and enzymes involved in TCA cycle.

Or

(b) Illustrate the process of electron transport phosphorylation.

15. (a) Relate the glutamate dehydrogenase pathway for ammonia assimilation.

Or

(b) Evaluate the rote of nitrogenase in nitrogen fixation.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Describe microbial growth in response to different nutritional and energy sources.

17. Explain the different nutritional requirements of microorganisms and their importance.

18. Discuss the photosynthetic apparatus in prokaryotes and its role in bacterial photosynthesis.

19. Compare and contrast mitochondrial and bacterial electron transport chains.

20. How does nitrogen metabolism contribute to the global nitrogen cycle?

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S–5882

Sub. Code
23BMC4C1

B.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Microbiology and Clinical Lab Technology

MOLECULAR BIOLOGY AND MICROBIAL GENETICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Purines and pyrimidines

2. Stop codon

3. Spontaneous mutation

4. F plasmid

5. DNA polymerase

6. Replication fork

7. Reverse transcription

8. Rho factor

9. Oncogene

10. *araBAD.*

Part B (5 × 5 = 25)

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

11. (a) Discuss the major structural differences between DNA and RNA.

Or

(b) Explain the genetic code and how codons are diciphered?

12. (a) Differentiate between spontaneous and induced mutations

Or

(b) Briefly explain mechanism of bacterial conjugation.

13. (a) List out the experimental evidence supporting DNA replication is semi conservative.

Or

(b) Illustrate in brief about DNA replication with a neat diagram.

14. (a) Give short notes on reverse transcription with application.

Or

(b) Define in brief account on eukaryotic transcription initiation.

15. (a) Add an account on significance of protein kinases in oncogenesis.

Or

(b) Mention the role of lac operon in bacteria with neat illustration.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss in brief account on the different types of DNA and their significance.

17. Write in detail about the different types of gene transfer methods in bacteria.

18. Explain in detail the various models of DNA replication.

19. Analyze the eukaryotic transcription initiation, elongation and termination with neat diagram.

20. With neat sketch describe the regulation of gene expression in prokaryotes using the *trp* operon.

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S–5883

Sub. Code
23BMC4S1

B.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Microbial and Clinical Lab Technology

COMMUNICABLE AND NON-COMMUNICABLE DISEASE

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define human development index.
2. Define disease.
3. Define contamination.
4. Define host.
5. Define endemic.
6. What is sporadic?
7. What is epornithic?
8. What is an iatrogenic disease?
9. What is active immunity?
10. Rubella.

Part B (5 × 5 = 25)

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

11. (a) Discuss about outside air pollution.

Or

(b) Comment on post COVID fungal infection.

12. (a) Write down the difference between communicable and non-communicable disease.

Or

(b) Describe the surveillance in rabies.

13. (a) Explain the lifecycle of Chagas disease parasite.

Or

(b) Discuss the role of vaccine in global health maintenance.

14. (a) Discuss WHO recommendation measures to prevent hypertension.

Or

(b) Explain the laboratory diagnosis of Dengue.

15. (a) Discuss on the adverse effects of radiation water on health of an individual.

Or

(b) Elaborate the mode of transmission and symptoms for rabies.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. What is the causative agent for tuberculosis? How clinically diagnosed caused of tuberculosis are classified.

17. Write in detail about the aetiology incubation period and mode of transmission of hepatitis B virus.

18. Write in detail about the life cycle of malaria parasite and add a note on its symptoms.

19. What are immunoglobulins? Write in detail about their types and functions.

20. Define blood pressure. Write in detail about hypertension, its types and complications.

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S–5884

Sub. Code
23BMC4S2

B.Sc. DEGREE EXAMINATION, APRIL 2025

Fourth Semester

Microbiology and Clinical Lab Technology

ENVIRONMENTAL MICROBIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Actinomycetes
2. Droplet nuclei
3. Mutualism
4. Denitrification
5. Chlorination
6. Oxidation Lagoons
7. Phytoremediation
8. In situ method
9. Biohazards
10. Mention environmental monitoring microbes.

Part B (5 × 5 = 25)

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

11. (a) List out the soil microorganisms and their significances in detail.

Or

(b) Write a short notes on examination of air microflora.

12. (a) Draw and explain the phosphorous cycle.

Or

(b) Give a short notes on positive interaction between microorganisms.

13. (a) Explain the activated sludge process with suitable diagram.

Or

(b) Discuss the filteration method of water purification.

14. (a) Write a short notes on types of bioremediation and their uses.

Or

(b) Give a detailed account on genetically engineered microbes for bioremediation.

15. (a) Mention the biosafety measures.

Or

(b) Write about the monitoring of genetically engineered microbes in the environment.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss about the composition, characteristics and microorganisms of air.

17. Give a detailed account on carbon cycle with neat diagram.

18. Explain the microbial analysis of drinking water.

19. Write about the in situ and Ex situ methods of microbial leaching.

20. Briefly explain the types of biohazards.

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