

Printing Pages: 2

Paper Code: MMLT-M-301

B

(SVSU:2025-26/R)

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|----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Enrollment No. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

Programme Name: M.Sc. MLT (Microbiology and Immunology)

2<sup>nd</sup> Year Semester: 3<sup>rd</sup> Examination

Course/ Subject Name: Virology and Mycology

Course/ Subject Code: MMLT-M-301

Time: 180 Minutes

Max. Marks: 70

Before answering the question, candidate should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after the examination.

**Instructions: All Sections are compulsory. In Section-B and C attempt any one part from each question.**

| SECTION-A |                                                                                              |       |     |
|-----------|----------------------------------------------------------------------------------------------|-------|-----|
| S.No.     | Questions                                                                                    | Marks | COs |
| Q1 (A)    | Name any two methods used for the cultivation of animal viruses.                             | 02    | CO1 |
| Q1 (B)    | Mention the mode of transmission of Hepatitis B virus.                                       | 02    | CO2 |
| Q1 (C)    | Write two characteristic features of Retroviruses.                                           | 02    | CO3 |
| Q1 (D)    | Mention any two laboratory methods used for identification of fungi.                         | 02    | CO4 |
| Q1 (E)    | List two antifungal drugs used in the treatment of candidiasis.                              | 02    | CO5 |
| SECTION-B |                                                                                              |       |     |
| Q2        | Discuss the laboratory identification techniques used for animal viruses.                    | 06    | CO1 |
|           | Explain viral vaccines and interferons, mentioning their types and functions.                | 06    | CO1 |
| Q3        | Discuss the structure, mode of transmission, and serological diagnosis of Hepatitis B virus. | 06    | CO2 |
|           | Write short notes on the Adenovirus-structure, diseases, and laboratory findings.            | 06    | CO2 |

|           |                                                                                                                                                                        |    |     |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----|
| Q4        | Explain the replication cycle of Herpes Simplex Virus and mention the diseases it causes.                                                                              | 06 | CO3 |
|           | Explain the structure and replication mechanism of Influenza virus.                                                                                                    | 06 | CO3 |
| Q5        | Describe the morphology and culture characteristics of yeasts and molds.                                                                                               |    | CO4 |
|           | Write short notes on dermatophytes and the diseases they cause.                                                                                                        | 06 | CO4 |
| Q6        | Explain the laboratory diagnosis of candidiasis in detail.                                                                                                             | 06 | CO5 |
|           | Discuss the pathogenesis and clinical features of superficial and systemic mycosis.                                                                                    | 06 | CO4 |
| SECTION-C |                                                                                                                                                                        |    |     |
| Q7        | Explain the classification of animal viruses based on nucleic acid type, symmetry, and envelope. How does this classification help in their laboratory identification? | 15 | CO1 |
|           | Describe the morphology, replication, and pathogenesis of <i>Rhabdovirus</i> and explain the laboratory diagnostic methods used for its detection.                     | 15 | CO3 |
| Q8        | Describe the structure, genome organization, and replication of <i>Poxvirus</i> and explain its pathogenesis in humans.                                                | 15 | CO2 |
|           | Describe the general laboratory methods used for identification of fungi including microscopic and cultural characteristics.                                           | 15 | CO4 |



|                  |                                                                                                                                 |           |            |
|------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------|------------|
|                  |                                                                                                                                 |           |            |
| <b>Q4</b>        | Describe the laboratory diagnosis of sexually transmitted diseases.                                                             | <b>06</b> | <b>CO3</b> |
|                  |                                                                                                                                 |           |            |
|                  | Describe the procedure for collecting blood specimens for culture.                                                              | <b>06</b> | <b>CO2</b> |
| <b>Q5</b>        | Difference between amoebic dysentery and bacillary dysentery.                                                                   | <b>06</b> | <b>CO3</b> |
|                  |                                                                                                                                 |           |            |
|                  | Discuss the method of collecting and processing CSF samples in suspected meningitis cases.                                      | <b>06</b> | <b>CO2</b> |
| <b>Q6</b>        | Describe the laboratory diagnosis of bacterial food poisoning                                                                   | <b>06</b> | <b>CO3</b> |
|                  |                                                                                                                                 |           |            |
|                  | How are clinical microbiology results interpreted and recorded?                                                                 | <b>06</b> | <b>CO3</b> |
| <b>SECTION-C</b> |                                                                                                                                 |           |            |
| <b>Q7</b>        | Define nosocomial infection and explain its causes, types, transmission, and prevention.                                        | <b>15</b> | <b>CO1</b> |
|                  |                                                                                                                                 |           |            |
|                  | Discuss in detail the specimen collection methods for bacteriological investigation and their importance in accurate diagnosis. | <b>15</b> | <b>CO2</b> |
| <b>Q8</b>        | Explain in detail the normal flora of the human body and discuss their role in health and disease.                              | <b>15</b> | <b>CO1</b> |
|                  |                                                                                                                                 |           |            |
|                  | Explain the streak, pour, and spread plate culture methods with their advantages and limitations.                               | <b>15</b> | <b>CO4</b> |

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Paper Code: MMLT-M-303

C

(SVSU:2025-26/R)

Enrollment No.

Programme Name: M.Sc. MLT (Microbiology and Immunology)

Semester: 3<sup>rd</sup> Year 2<sup>nd</sup> Examination

Course/ Subject Code: MMLT-M-303

Course/ Subject Name: Recent Advances in Microbiology

Time: 180 Minutes

Max. Marks: 70

Before answering the question, candidate should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after the examination.

Instructions: All Sections are compulsory. In Section-B and C attempt any one part from each question.

| SECTION-A |                                                                                                     |       |     |
|-----------|-----------------------------------------------------------------------------------------------------|-------|-----|
| S.No.     | Questions                                                                                           | Marks | COs |
| Q1 (A)    | Define Laser Microscope.                                                                            | 02    | CO1 |
| Q1 (B)    | Discuss Antigen.                                                                                    | 02    | CO3 |
| Q1 (C)    | What is Refractive index?                                                                           | 02    | CO1 |
| Q1 (D)    | State AST.                                                                                          | 02    | CO3 |
| Q1 (E)    | Define Resolution.                                                                                  | 02    | CO1 |
| SECTION-B |                                                                                                     |       |     |
| Q2        | Demonstrate the working mechanism of Fluorescent Microscope.                                        | 06    | CO1 |
|           | Differentiate Gene and Chromosomes.                                                                 | 06    | CO2 |
| Q3        | Categories the various Rapid Antigen-Antibody diagnostic tests for diagnosis of bacterial diseases. | 06    | CO3 |
|           | Describe the rapid tests for the diagnosis of fungal infections.                                    | 06    | CO3 |

|                  |                                                                                           |    |     |
|------------------|-------------------------------------------------------------------------------------------|----|-----|
| <b>Q4</b>        | Explore the importance of Continuous culture system in the diagnosis of viral infections. | 06 | CO2 |
|                  | Demonstrate the DNA recombinant technology.                                               | 06 | CO5 |
|                  |                                                                                           |    |     |
| <b>Q5</b>        | Characterize the various boy markers along with their importance in diagnosis.            | 06 | CO5 |
|                  | Classify Phase Contrast and Dark Field microscope.                                        | 06 | CO1 |
| <b>Q6</b>        | Draw the working model of Electron Microscope.                                            | 06 | CO1 |
|                  | Explain q-PCR.                                                                            | 06 | CO2 |
| <b>SECTION-C</b> |                                                                                           |    |     |
| <b>Q7</b>        | Describe the various parts of Dark Field microscope.                                      | 15 | CO1 |
|                  | Explain the PCR in details.                                                               | 15 | CO2 |
| <b>Q8</b>        | Demonstrate the methods of gene sequencing.                                               | 15 | CO4 |
|                  | State Centrifugal micro fluidics.                                                         | 15 | CO5 |

Printing Pages: 2

Paper Code: MMLT-H-304

B

(SVSU:2025-26/R)

Enrollment No.

Programme Name: M.Sc. MLT (Hematology and Blood Transfusion)

M.Sc. MLT (Microbiology &amp; Immunology)

2<sup>nd</sup> Year Semester: 3<sup>rd</sup> Examination

Course/ Subject Code: MMLT-H-304/ MMLT-M-304

Course/ Subject Name: Research Methodology

Time: 180 Minutes

Max. Marks: 70

Before answering the question, candidate should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after the examination.

Instructions: All Sections are compulsory. In Section-B and C attempt any one part from each question.

| SECTION-A |                                                                  |       |     |
|-----------|------------------------------------------------------------------|-------|-----|
| S.No.     | Questions                                                        | Marks | COs |
| Q1 (A)    | What do you understand from bioethics?                           | 02    | CO5 |
| Q1 (B)    | Why Z-test is important?                                         | 02    | CO2 |
| Q1 (C)    | What are the major steps involved in writing a research problem? | 02    | CO1 |
| Q1 (D)    | What are different types of research reports?                    | 02    | CO3 |
| Q1 (E)    | What are the key components of a research article?               | 02    | CO4 |
| SECTION-B |                                                                  |       |     |
| Q2        | What are Intellectual Property Rights?                           | 06    | CO5 |
|           | Write the significance of ICT tools in scientific writing.       | 06    | CO1 |
| Q3        | Design a short questionnaire for your research project.          | 06    | CO2 |
|           | What are major components of a systematic review?                | 06    | CO4 |

|           |                                                                                                                     |    |     |
|-----------|---------------------------------------------------------------------------------------------------------------------|----|-----|
| Q4        | Create a reference in APA style.                                                                                    | 06 | CO3 |
|           | Evaluate significance of ethical considerations in conducting scientific research.                                  | 06 | CO1 |
| Q5        | How to make an effective oral presentation (fonts, visuals, color) for audience engagement?                         |    | CO4 |
|           | What are key elements to make an effective research proposal?                                                       | 06 | CO3 |
| Q6        | Give SOP for drafting a sample patent document.                                                                     | 06 | CO5 |
|           | Write your research topic, objectives, and methodology of your research project.                                    | 06 | CO1 |
| SECTION-C |                                                                                                                     |    |     |
| Q7        | Create a flow chart to explain the process of patent filing in India.                                               | 15 | CO5 |
|           | Formulate a complete outline for making dissertation including all major sections.                                  | 15 | CO3 |
| Q8        | Evaluate the choice of statistical tests (T, F, Z and Chi-square) for a research problem.                           | 15 | CO2 |
|           | Design a research proposal including objectives, methodology, and expected outcomes based on your research project. | 15 | CO1 |

Printing Pages: 2

Paper Code: MMLT-H-301

A

(SVSU:2025-26/R)

Enrollment No.

Programme Name: M.Sc. MLT (Hematology and Blood Transfusion)

2<sup>nd</sup> Year Semester: 3<sup>rd</sup> Examination

Course/ Subject Name: Blood Banking and Transfusion

Course/ Subject Code: MMLT-H-301

Time: 180 Minutes

Max. Marks: 70

Before answering the question, candidate should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after the examination.

Instructions: All Sections are compulsory. In Section-B and C attempt any one part from each question.

| SECTION-A |                                                                                  |       |     |
|-----------|----------------------------------------------------------------------------------|-------|-----|
| S.No.     | Questions                                                                        | Marks | COs |
| Q1 (A)    | Define blood banking and mention its primary objectives.                         | 02    | CO1 |
| Q1 (B)    | What are the antigens and antibodies in ABO blood group system?                  | 02    | CO1 |
| Q1 (C)    | Write any two differences between Rh positive and Rh negative blood.             | 02    | CO1 |
| Q1 (D)    | Mention two uses of Coombs' test.                                                | 02    | CO4 |
| Q1 (E)    | Define transfusion reaction and list two common types.                           | 02    | CO5 |
| SECTION-B |                                                                                  |       |     |
| Q2        | Explain the principle and steps involved in forward and reverse blood grouping.  | 06    | CO2 |
|           | Describe the reagents and equipment used in the blood bank laboratory.           | 06    | CO1 |
| Q3        | Discuss antibody screening and identification techniques used in the blood bank. | 06    | CO2 |
|           | Explain compatibility testing and its significance in transfusion practice.      | 06    | CO2 |

|                  |                                                                                                    |           |            |
|------------------|----------------------------------------------------------------------------------------------------|-----------|------------|
| <b>Q4</b>        | Describe blood collection and processing steps, including anticoagulants used.                     | <b>06</b> | <b>CO3</b> |
|                  | Explain the preparation and clinical use of blood components.                                      | <b>06</b> | <b>CO3</b> |
| <b>Q5</b>        | Write short notes on:<br>(a) Transfusion transmitted diseases<br>(b) Autologous transfusion.       |           | <b>CO4</b> |
|                  | Discuss blood transfusion safety and regulatory requirements.                                      | <b>06</b> | <b>CO4</b> |
| <b>Q6</b>        | Explain Hemolytic Disease of the Newborn (HDN) – causes, diagnosis, and prevention.                | <b>06</b> | <b>CO5</b> |
|                  | Describe the steps in investigating a suspected transfusion reaction.                              | <b>06</b> | <b>CO5</b> |
| <b>SECTION-C</b> |                                                                                                    |           |            |
| <b>Q7</b>        | Explain in detail the types, causes, and management of transfusion reactions.                      | <b>15</b> | <b>CO5</b> |
|                  | Describe Hemolytic Disease of the Newborn (HDN), its pathogenesis, and prevention.                 | <b>15</b> | <b>CO5</b> |
| <b>Q8</b>        | Write detailed notes on quality assurance and special investigations in transfusion services.      | <b>15</b> | <b>CO5</b> |
|                  | Discuss in detail the immunohematology techniques used to resolve discrepancies in blood grouping. | <b>15</b> | <b>CO4</b> |



|                  |                                                                                                                  |    |     |
|------------------|------------------------------------------------------------------------------------------------------------------|----|-----|
| <b>Q4</b>        | Demonstrate how centrifugation is used in separating plasma from blood.                                          | 06 | CO1 |
|                  |                                                                                                                  |    |     |
|                  | Demonstrate how HPLC can be applied for drug purity analysis with precautions.                                   | 06 | CO3 |
| <b>Q5</b>        | Demonstrate how centrifugation is used in separating plasma from blood.                                          |    | CO1 |
|                  |                                                                                                                  |    |     |
|                  | Use density gradient centrifugation to purify viruses from a cell lysate.                                        | 06 | CO1 |
| <b>Q6</b>        | Describe the working principle applied in spectrophotometry.                                                     | 06 | CO1 |
|                  |                                                                                                                  |    |     |
|                  | Illustrate an ion selective electrode used to measure blood pH or bicarbonate.                                   | 06 | CO1 |
| <b>SECTION-C</b> |                                                                                                                  |    |     |
| <b>Q7</b>        | Create an integrated safety management system combining fire, chemical, and infection control measures.          | 15 | CO4 |
|                  |                                                                                                                  |    |     |
|                  | What are Burnout syndromes? Explain causes, sign, symptoms and its management.                                   | 15 | CO3 |
| <b>Q8</b>        | Apply the principle of agarose gel electrophoresis to separate DNA fragments with proper illustration.           | 15 | CO1 |
|                  |                                                                                                                  |    |     |
|                  | Prepare a protocol for comparative analysis of sodium levels using flame photometry and ion selective electrode. | 15 | CO3 |

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Paper Code: MMLT-H-303

A

(SVSU:2025-26/R)

Enrollment No.

Programme Name: M.Sc. MLT (Hematology and Blood Transfusion)

2<sup>nd</sup> Year Semester: 3<sup>rd</sup> Examination

Course/ Subject Code:MMLT-H-303

Course/ Subject Name: Recent Advances in Hematology and Blood Bank

Time: 180 Minutes

Max. Marks: 70

Before answering the question, candidate should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after the examination.

Instructions: All Sections are compulsory. In Section-B and C attempt any one part from each question.

| SECTION-A |                                                                                         |       |     |
|-----------|-----------------------------------------------------------------------------------------|-------|-----|
| S.No.     | Questions                                                                               | Marks | COs |
| Q1 (A)    | Define automation in hematology.                                                        | 02    | CO1 |
| Q1 (B)    | What is the role of cell counters in hematology laboratories?                           | 02    | CO1 |
| Q1 (C)    | Define laboratory statistics.                                                           | 02    | CO4 |
| Q1 (D)    | Mention two uses of microtomes in histopathology.                                       | 02    | CO1 |
| Q1 (E)    | Name any two regulatory bodies related to blood banking.                                | 02    | CO5 |
| SECTION-B |                                                                                         |       |     |
| Q2        | Explain the working principle of automated hematology analyzers.                        | 06    | CO1 |
|           | Describe ESR measurement by automation and its advantages.                              | 06    | CO1 |
| Q3        | Discuss automation in histopathology with reference to tissue processing and embedding. | 06    | CO1 |
|           | Explain the function and applications of new-generation microtomes.                     | 06    | CO1 |

|                  |                                                                                                   |           |            |
|------------------|---------------------------------------------------------------------------------------------------|-----------|------------|
| <b>Q4</b>        | Explain the recent tools used in blood collection and storage in blood banks.                     | <b>06</b> | <b>CO2</b> |
|                  | Discuss the role of automated systems in blood component preparation.                             | <b>06</b> | <b>CO2</b> |
| <b>Q5</b>        | What is laboratory data management? Explain its importance in hospital laboratories.              | <b>06</b> | <b>CO4</b> |
|                  | Discuss the role of financial management in laboratory administration.                            | <b>06</b> | <b>CO4</b> |
| <b>Q6</b>        | Write a note on the National Blood Transfusion Council (NBTC) and its key functions.              | <b>06</b> | <b>CO5</b> |
|                  | Explain the regulation for cord blood banking in India.                                           | <b>06</b> | <b>CO5</b> |
| <b>SECTION-C</b> |                                                                                                   |           |            |
| <b>Q7</b>        | Describe in detail the automation process in hematology, including open and closed systems.       | <b>15</b> | <b>CO1</b> |
|                  | Explain the various cell counter technologies and their clinical applications.                    | <b>15</b> | <b>CO2</b> |
| <b>Q8</b>        | Write an essay on blood banking data management and its impact on laboratory efficiency.          | <b>15</b> | <b>CO4</b> |
|                  | Discuss the structure and functions of regulatory authorities controlling blood banking in India. | <b>15</b> | <b>CO5</b> |