Total No. of Printed Pages:02

SUBJECT CODE NO- NEPHR-01-2025

FACULTY OF SCIENCE AND TECHNOLOGY

EXAMINATION WINTER 2025

M.SC (FIRST YEAR) (SEM-I)

COMMON PAPER

SVECRM-401-RESEARCH METHODOLOGY(COMPULSORY)

[Time: 3:00 Hours] **[Max.Marks:45]**

"Please check whether you have got the right question paper."

N.B.
1. Question No. 1 is Compulsory.
2. Solve any TWO questions from Question No. 2 to 5.
3. Calculator and log table allowed.

Q.1 Write notes on: **5X3=15**

1. Research objectives
2. Features of good research designing
3. Editing processing operations
4. statistical measures in research
5. Variables

Q.2 1. Describe various steps involved in research. **08**

2. Explain types of research hypothesis. **07**

Q.3 1. Explain meaning and need of good research designing. **08**

2. Describe descriptive and fundamental types of research. **07**

Q.4 1. Calculate, mean, median and mode of the following data. **08**

Class Interval (CI)	Frequency (F)
50-54	2
45-49	5
40-44	8
35-39	7
30-34	10
25-29	5
20-24	9
15-19	2
10-14	1
5-9	1

2. Describe observation method for collection of primary data. **07**

Q.5 1. calculate chi square (x^2) value of the following data. **08**

Excellent	Average	Poor	Total
58	32	30	120

2. Explain in detail case study. **07**

This question paper contains **2** printed pages]

NEPHR—305—2025

FACULTY OF SCIENCE AND TECHNOLOGY

M.Sc. (First Year) (First Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

MICROBIOLOGY

(SMICC-403)

(Microbial Physiology and Metabolism)

(Monday, 22-12-2025) **Time : 10.00 a.m. to 12.30 p.m.**

Time—2½ *Hours* *Maximum Marks*—60

N.B. :— (1) Question No. **1** is compulsory.

(2) Attempt any *three* questions from Q. No. **2** to Q. No. **6**.

(3) Each question carries equal marks.

1. Write short notes on the following :

(*a*) 'nif' gene 3

(*b*) Chemolithotrophs 3

(*c*) Concept of enthalpy 3

(*d*) Amino acid families 3

(*e*) Different types of purine nucleotides. 3

P.T.O.

This question paper contains **2** printed pages]

NEPHR—484—2025

FACULTY OF SCIENCE AND TECHNOLOGY

M.Sc. (First Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

(NEP 2020)

MICROBIOLOGY

SMICE-401

(Commercial Microbiology)

(Wednesday, 24-12-2025) **Time : 10.00 a.m. to 12.00 noon**

Time— 2 *Hours* *Maximum Marks*—45

N.B. :— (*i*) Question No. **1** is compulsory.

(*ii*) Of the remaining Q. No, **2-5**, attempt any *two* questions.

(*iii*) Draw well labelled diagrams wherever necessary.

1. Write in brief on all of the following (**3** for each) : 15

(*a*) GEMEOR

(*b*) Types of nanoparticles

P.T.O.

(*c*) Electroactive microorganisms

(*d*) Types of agricultural wastes

(*e*) Microbial indicators for petroleum exploration.

2. Take a detailed account on microbial treatment of petroleum waste. 15

3. Define nanotechnology. Discuss applications of nanotechnology in industries. 15

4. What are the goals, grand challenges and future predictions in electromicrobiology. 15

5. Discuss the production, degradation and applications of bioplastics. 15

This question paper contains **2** printed pages]

NEPHR—305—2025

FACULTY OF SCIENCE AND TECHNOLOGY

M.Sc. (First Year) (First Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

MICROBIOLOGY

(SMICC-403)

(Microbial Physiology and Metabolism)

(Monday, 22-12-2025) **Time : 10.00 a.m. to 12.30 p.m.**

Time—2½ *Hours* *Maximum Marks*—60

N.B. :— (1) Question No. **1** is compulsory.

(2) Attempt any *three* questions from Q. No. **2** to Q. No. **6**.

(3) Each question carries equal marks.

1. Write short notes on the following :

(*a*) 'nif' gene 3

(*b*) Chemolithotrophs 3

(*c*) Concept of enthalpy 3

(*d*) Amino acid families 3

(*e*) Different types of purine nucleotides. 3

P.T.O.

2. Explain in detail multienzyme complex in ETC. 15

3. Describe mechanism of generation of energy in cyanobacteria. 15

4. Give a detailed account on urea cycle. 15

5. Elaborate 'N_2' cycle in detail. 15

6. Write in brief about (any *three*) :

   (*a*) Inhibitors and uncouplers of E.T.C. 5

   (*b*) Classification of photosynthetic bacteria 5

   (*c*) Digestion and absorption of lipids 5

   (*d*) Oxidative phosphorylation. 5

This question paper contains **2** printed pages]

NEPHR—485—2025

FACULTY OF SCIENCE AND TECHNOLOGY

M.Sc. (First Year) (First Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

PHYSICS

Paper SPHYE-401

(Electronic Devices)

(Wednesday, 24-12-2025) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—45

N.B. :— (1) *All* questions carry equal marks.

(2) Question No. **1** is compulsory.

(3) Solve any *two* questions from Q. No. **2** to Q. No. **5**.

(4) Figures to the right indicate full marks.

1. Attempt the following : 15

(*a*) Differentiate between *n*-type and *p*-type semiconductors.

(*b*) Explain the working of a photodiode.

(*c*) Write the symbol and truth table of NAND gate.

(*d*) Define differential Amplifier.

(*e*) Write *three* applications of IC555 timer.

P.T.O.

2.	(*a*)	Explain the construction and VI characteristics of SCR.	8
	(*b*)	Explain in detail MOSFET with neat diagram.	7
3.	(*a*)	Explain the construction and working of solar cell with V-I characteristics.	8
	(*b*)	Explain the construction and working of phototransistors.	7
4.	(*a*)	Explain Op-Amp as an adder and subtractor with circuit diagrams.	8
	(*b*)	Explain Op-Amp as comparator with suitable diagram.	7
5.	(*a*)	Explain with symbol and working of JK flip-flops and its truth-table.	8
	(*b*)	Write a detailed note on R-2R ladder DAC.	7

Total No. of Printed Pages:1

SUBJECT CODE NO:- NEPHR-42-2025
FACULTY OF SCIENCE & TECHNOLOGY
EXAMINATION WINTER 2025
M.Sc.(FIRST YEAR) (SEM –II)
MICROBIOLOGY
SMICC 1457 MICROBIAL METHODS FOR ENVIRONMENTAL MANAGEMENT

[Time: 3:00 Hours] **[Max.Marks:60]**

"Please check whether you have got the right question paper."

N.B. (1) Question No.1 is compulsory.
(2) Of the remaining, attempt any three questions.
(3) Draw a neat & well labelled diagram whenever required.

Q.1 Write brief notes on the following: **15**
a) Nutrient enrichment
b) Toxicity of mercury
c) Fluidized bed reactor
d) UV-A
e) Nitrous oxide

Q.2 Describe in detail process of biodegradation of plastics. **15**

Q.3 Take a detailed account bio magnification of chlorinated hydrocarbons. **15**

Q.4 Explain in detail the process of phytoremediation and its applications. **15**

Q.5 Discuss the causes & impact of acid mine drainage. **15**

Q.6 Write brief notes on the following. (Any three) **15**
a) Control of Eutrophication
b) Bio deterioration of pharmaceutical products
c) Activated sludge
d) Global warming

This question paper contains **2** printed pages]

NEPHR—409—2025

FACULTY OF SCIENCE AND TECHNOLOGY

M.Sc. (First Year) (Second Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

(NEP 2020)

MICROBIOLOGY

SMICE-1451

(Bioprocess Technology)

(Tuesday, 23-12-2025) **Time : 10.00 a.m. to 12.00 noon**

Time— 2 *Hours* *Maximum Marks*—45

N.B. :— (*i*) *All* questions carry equal marks.

(*ii*) Question No. **1** is compulsory.

(*iii*) Of the remaining (Q. No. **2** to Q. No. **5**) attempt any *two*.

(*iv*) Draw neat and labelled diagram wherever required.

1. Write brief notes on : 15

(*a*) Pluge flow reactor.

(*b*) Fractional distillation

P.T.O.

(*c*) Biofuel

(*d*) Reynold number and its significance.

(*e*) Solid state fermentation.

2. Define bioreactor. Explain in detail principle, working and types of perfectly mixed continuous bio reactor and add a note on maintenance of continuous fermentation. 15

3. Explain in detail steps involved in separation, isolation, purificator and packaging of extracelluar product from fermented liquor. 15

4. What is biotransformation ? Explain in detail microbial transformation of steroids. Add a note on significance of biotransformation over chemical transformation. 15

5. Take an detailed account of amylase production on industrial scale using both submerged and solid state fermentation. Add a note on industrial uses of amylase. 15

This question paper contains **2** printed pages]

NEPHR—130—2025

FACULTY OF SCIENCE

M.Sc. (Second Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

MICROBIOLOGY

(SMICC-1452)

(Microbial Bioinformatics Genomics and Proteomics)

(Tuesday, 16-12-2025) **Time : 10.00 a.m. to 12.30 p.m.**

Time— 2½ *Hours* *Maximum Marks*—60

N.B. :— (*i*) Question No. **1** is compulsory.

(*ii*) Of the remaining attempt any *three* questions.

(*iii*) Draw neat and labelled diagram wherever necessary.

1. Write brief notes on the following : 15

(*a*) Bioinformatics

(*b*) Genomics

(*c*) Pharmacogenomics

(*d*) Clustal W

(*e*) EMBL database.

P.T.O.

2. Describe in detail database management system. 15

3. Explain in detail cosntruction of phytogenetic tree. 15

4. Elaborate the term microbial genome structure and organization. 15

5. Explain in detail protein structure visualization and prediction. 15

6. Write brief notes on the following (any *three*) : 15

   (*a*) Databases

   (*b*) De novo sequence

   (*c*) Palindromes

   (*d*) Blast.

Total No. of Printed Pages:01

SUBJECT CODE NO- NEPHR-18-2025

FACULTY OF SCIENCE AND TECHNOLOGY

EXAMINATION WINTER 2025

M.SC. (SECOND YEAR) (SEM-III)

MICROBIOLOGY

ENVIRONMENTAL AND AGRICULTURAL MICROBIOLOGY

[Time: 3:00 Hours] **[Max.Marks:80]**

"Please check whether you have got the right question paper."

N.B.
1. Question No. 1 is Compulsory.
2. Of the remaining attempt any three.
3. Draw well labelled Figures/Diagrams whenever necessary.
4. All questions carry equal marks.

Q.1 Write short notes on the following (any four) **20**

1. Climate Change.
2. Genetically Modified Foods
3. Plant microbiomes
4. Applications of compost.
5. Concept of Biomagnification
6. Psychrophiles

Q.2 1. Explain impacts of microbial water pollution and sanitation. **10**

2. Describe significant applications of microbes in solving environmental pollutions. **10**

Q.3 1. Explain various strategies of microbial bioremediation of xenobiotic compounds. **10**

2. Discuss biotechnological applications of extremophilic microorganisms. **10**

Q.4 1. Elaborate in detail role of microorganisms in carbon cycle. **10**

2. Discuss plant disease-resistance and microbiological control of plant pathogens. **10**

Q.5 1. Define composting and write in detail methods of compost production. **10**

2. Define biofertilizer. Discuss in detail types, production and inoculation of biofertilizer. **10**

Q.6 Write a brief note on the following (any four) **20**

1. Environmental segments
2. Fungal plant diseases
3. Types of biopesticides.
4. Vermicomposting.
5. Metallophiles
6. Oil Pollution

This question paper contains **2** printed pages]

NEPHR—180—2025

FACULTY OF SCIENCE AND TECHNOLOGY

M.Sc. (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

(NEP 2020)

MICROBIOLOGY

Paper SMICC-1503

(Molecular Biology and *r*-DNA Technology)

(Wednesday, 17-12-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time— 3 *Hours* *Maximum Marks*—80

N.B. :— (*i*) Question No. **1** is compulsory.

(*ii*) Of the remaining, attempt any *three* questions.

(*iii*) Draw neat and well labelled diagrams wherever required.

1. Write brief notes on the following : 20

(*a*) Adaptors and linkers

(*b*) In-situ hybridization

(*c*) Genomic DNA libraries

(*d*) DNA chip technology.

P.T.O.

2. (*a*) Explain in detail tools used in *r*-DNA technology. 10

(*b*) Define bacteriophage vector. Explain in detail λ-vector. 10

3. (*a*) Write on chemical DNA sequencing. 10

(*b*) Take a detailed account on southern blotting method with well labelled diagram. 10

4. (*a*) Write a mechanism of T-DNA transfer in plant. 10

(*b*) Explain in detail construction of *c*-DNA libraries. 10

5. (*a*) Explain the applications of r-DNA technology in Agriculture and Veterinary Science. 10

(*b*) Write on ethical and environmental issues associated with r-DNA technology. 10

6. Write brief notes on the following : 20

(*a*) DNA polymerase

(*b*) Chromosome walking

(*c*) Ti plasmid

(*d*) Molecular markers.

This question paper contains **2** printed pages]

NEPHR—306—2025

FACULTY OF SCIENCE

M.Sc. (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

MICROBIOLOGY

(SMICE-1501)

(Pharmaceutical Microbiology)

(Monday, 22-12-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time— 3 *Hours* *Maximum Marks*—80

N.B. :— (*i*) Question No. **1** is compulsory.

(*ii*) Of the remaining attempt any *three* questions.

(*iii*) Draw neat and labelled diagram wherever required.

1. Write brief notes on the following : 20

(*a*) MHRA

(*b*) Gaseous sterilization

(*c*) FDA

(*d*) Monoclonal antibodies.

P.T.O.

2. (*a*) Describe different stages of clinical trials in detail. 10

(*b*) Give a detailed account on designing of microbiology laboratory. 10

3. (*a*) Discuss the process for recombinant insulin production. 10

(*b*) Describe advances and use of different cell lines in production of biopharmaceutical products in detail. 10

4. (*a*) Explain FDA perspective and legislative perspective in detail. 10

(*b*) Describe DNA vaccine and synthetic peptide vaccines in detail. 10

5. (*a*) Explain mechanism of action of protein synthesis inhibitors in detail. 10

(*b*) Describe importance of microbiology in pharmaceutical industry. 10

6. Write brief notes on the following : 20

(*a*) Quality control

(*b*) CHO

(*c*) Multivalent subunit vaccine

(*d*) Antitumour substances.

This question paper contains **2** printed pages]

NEPHR—85—2025

FACULTY OF SCIENCE AND TECHNOLOGY

M.Sc. (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

MICROBIOLOGY

(SMICC-1502)

(Molecular Immunology and Human Microbiome)

(Monday, 15-12-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time— 3 *Hours* *Maximum Marks*—80

N.B. :— (*i*) Question No. **1** is compulsory.

(*ii*) Of the remaining attempt any *three* questions.

(*iii*) Draw neat and labelled diagram wherever necessary.

1. Write brief notes on the following : 20

(*a*) Mast cell

(*b*) Idiotypic determinants

(*c*) Basophil cell

(*d*) Prebiotics.

P.T.O.

2. (*a*) Describe in detail thymus organ with their structure and function in immune system. 10

(*b*) Discuss in detail growth factors associated in hematopoiesis. 10

3. (*a*) Explain the theory of antibody production. 10

(*b*) Describe in detail the heavy chain genes and VH gene segments. 10

4. (*a*) Take a detailed account on MHC class-I molecule with structure and function in immune response. 10

(*b*) Explain in detail immune deficiency diseases. 10

5. (*a*) Describe function of microbiota in the respiratory system and Gastro-intestinal tract. 10

(*b*) Explain concept of microbiota manipulation using prebiotics and probiotics with their significance in maintaining human health. 10

6. Write brief notes on the following : 20

(*a*) B-lymphocytes

(*b*) Superantigens

(*c*) HLA system

(*d*) Antibody IgE.

Total No. of Printed Pages:1

SUBJECT CODE NO:- NEPHR-44-2025
FACULTY OF SCIENCE & TECHNOLOGY
EXAMINATION WINTER 2025
M.Sc.(SECOND YEAR) (SEM –IV)
(COMMON PAPER)
RESEARCH PUBLICATION ETHICS (NEPPE - 1002)

[Time: 2:00 Hours] **[Max.Marks:40]**

"Please check whether you have got the right question paper."

N.B. i) Question number 1 is compulsory.
ii) Solve any three questions from Question NO.2 to 6.

Q1 Explain: **5×2=10**
a) Nature of philosophy
b) Intellectual honesty
c) World association of medical editor's.
d) Open access publications.
e) Web of Science

Q2 a) What do you mean by philosophy? Gives the IR branches. **2x5=10**
b) Write an essay on scientific misconduct.

Q3 a) Define publication ethics? Why publication of research paper is important. Explain. **2x5=10**
b) SHERPA / ROMEO is an excellent online resource. Explain.

Q4 a) What are predatory Journals? How to identify a predatory Journals! **2×5=10**
b) What is impact Factor? How it calculate? Explain it with suitable example.

Q5 a) Give an account on violation of publications ethics. **2x5=10**
b) What is plagiarism? Describe different software of plagiarism.

Q6 Write short notes on: **4×2.5=10**
a) Scope of ethics
b) Salami slicing
c) Springer
d) h-index

This question paper contains **3** printed pages]

NEPHR—410—2025

FACULTY OF SCIENCE

M.Sc. (Second Year) (Fourth Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

MICROBIOLOGY

SMICE-1551

(Medical Laboratory Technology)

(Tuesday, 23-12-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time—3 *Hours* *Maximum Marks*—80

N.B. :— (*i*) Question No. **1** is compulsory.

(*ii*) Of the remaining attempt any *three* questions.

(*iii*) Draw neat and labelled diagram wherever required.

1. Write brief notes on the following : 20

(*a*) Clinical significance of plasma proteins

(*b*) Laboratory safety and first aid

(*c*) Quality control in microbiology

(*d*) Common serodiagnostic tests.

P.T.O.

2. (*a*) Discuss the significance of glycosylated haeomoglobin in diabetes management. 10

(*b*) Explain the importance of Vit B_{12} and Vit. D_3 in human body. Add a note on laboratory methods used for their determination. 10

3. (*a*) Take a detailed account on process and significance of homeostasis and fibrinolysis ? 10

(*b*) Define blood transfusion. Describe the importance of compatibility testing in blood transfusion. 10

4. (*a*) Explain in detail different methods of urine collection and their processing for laboratory analysis. 10

(*b*) Define pathogenic microorganism. Write on laboratory diagnosis of Tuberculosis. 10

5. (*a*) What are Antigen–antibody reactions ? Give their significance in Immunodiagnosis. 10

(*b*) Define Serology ? Discuss the serodiagnosis of Malaria ? 10

6. Write brief notes on the following : 20

(*a*) Diagnostic importance of transaminases

(*b*) Blood banking

(*c*) Minimum inhibitory concentration

(*d*) Immunologic test for pregnancy.

This question paper contains **2** printed pages]

NEPHR—131—2025

FACULTY OF SCIENCE & TECHNOLOGY

M.Sc. (NEP) (Second Year) (Fourth Semester) EXAMINATION

NOVEMBER/DECEMBER, 2025

MICROBIOLOGY

Paper–SMICC-1551

(Advanced Enzyme Technology)

(Tuesday, 16-12-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time—3 *Hours* *Maximum Marks*—80

N.B. :— (*i*) Question No. **1** is compulsory.

(*ii*) From the remaining attempt any *three* questions.

(*iii*) Draw neat and labelled diagram wherever required.

1. Write brief notes on the following : 20

(*a*) Importance of Enzyme purification

(*b*) MWC Model

(*c*) Structure of Active Sites

(*d*) Extremozymes

P.T.O.

2. (*a*) Take a detailed explanation of the principles of affinity chromatography. 10

(*b*) Explain the physical and chemical methods used for cell disintegration. 10

3. (*a*) Derive Michaelis-Menten equation assuming steady state kinetics. 10

(*b*) Describe in detail the difference between Reversible and Irreversible inhibition with suitable examples. 10

4. (*a*) Explain the concept of enzyme-substrate binding and the role of active sites in enzyme catalysis. 10

(*b*) Take a detailed account on site directed mutagenesis. 10

5. (*a*) Discuss the factors that affect the immobilisation of enzymes, including enzyme properties, support materials and immobilisation methods. 10

(*b*) Explain in detail microbial enzymes in textiles and wood industries. 10

6. Write brief notes on the following : 20

(*a*) Enzyme Crystallization Technique

(*b*) Competitive inhibition

(*c*) Vitamins

(*d*) Microbial enzymes in leather industries.