

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

NEPKR—01—2026

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2026

RESEARCH METHODOLOGY (Compulsory)

Paper NEPRM-1001

(Thursday, 16-4-2026)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—45

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

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

(3) Calculator and log table is allowed.

1. Write notes on :

5×3=15

(a) Research motive

(b) Need of research design

(c) Coding processing operation

(d) Statistical techniques in research

(e) Variables.

P.T.O.

2. (a) Explain in detail various steps involved in research process. 8
- (b) What is research hypothesis ? Give their characteristics. 7
3. (a) Give an account on good research design. 8
- (b) Describe types of research. 7
4. (a) Calculate the mean, median and mode of the following data : 8
- 3, 6, 3, 7, 4, 3, 9.
- (b) Describe interview method for the collection of primary data. 7
5. (a) Calculate the chi-square (χ^2) value of the following data : 8

Fully Agree	Not Sure	Not Agree	Total
102	108	28	238

- (b) Write an essay on case study. 7

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NEPKR—85—2026

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2026

(NEP-2020)

MICROBIOLOGY

Paper SMICC-401

(Microbial Diversity and Evolution)

(Saturday, 18-4-2026)

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) Of the remaining, solve any *three* questions.

(3) *All* questions carry equal marks.

1. Write brief notes on the following :

15

(a) RNA world

(b) Evolutionary significance of hyperthermophiles

(c) Phylum planctomyces

(d) Deinococci

(e) Nitrospira.

P.T.O.

2. (a) Take a detailed account on metabolism and autotrophy in archaea. 8
- (b) Describe in detail phylum Nanoarchaeota. 7
3. (a) Describe in detail origin of Eukaryotes. 8
- (b) Describe in detail methods for determining evolutionary relationship. 7
4. (a) Take a detailed account on phylum Deinococci. 8
- (b) Describe branching of hyperthermophiles. 7
5. (a) Describe phylum iron oxidizing bacteria. 8
- (b) Take a detailed account on phylum Cyanobacteria. 7
6. Solve any *three* of the following : 15
 - (a) Heat stable biomolecules
 - (b) Prochlorophytes
 - (c) Ribosomal RNA sequencing
 - (d) Green non-sulfur bacteria.

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NEPKR—185—2026

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2026

MICROBIOLOGY

Paper—SMICC-1402

(Advanced Techniques in Microbiology)

(Tuesday, 21-4-2026)

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 required.

1. Write brief notes on the following :

15

(a) Sedimentation Coefficient

(b) DNA probe

(c) Electron gun

(d) Colony counting

(e) Northern blotting.

P.T.O.

2. Discuss the determination of Molecular weight of Macromolecules by Viscosity. 15
3. Describe in detail definition, principle and procedure of SDS-PAGE electrophoresis with application. 15
4. Write in detail Confocal Microscopy. 15
5. Explain in detail the mapping use in transcription starts site. 15
6. Write brief notes on the following (any 3) : 15
 - (a) ORD
 - (b) Polyacrylmide gel
 - (c) Fluorescent stain
 - (d) Artificial Intelligence (AI).

This question paper contains 2 printed pages]

NEPKR—316—2026

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2026

MICROBIOLOGY

(Microbial Physiology and Metabolism)

(Thursday, 23-4-2026)

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

(iii) Each question carries equal marks.

1. Write short notes on the following : 5×3=15

(a) Pentose phosphate pathway

(b) Mechanism of energy generation in green bacteria and purple sulphur bacteria

(c) Degredation of purines

(d) Nitrogen fixation-free living

(e) Mode of nutrition in bacteria.

P.T.O.

2. Electron transport chain in bacteria in detail. 15
3. Explain biosynthesis of fatty acids in detail. 15
4. Biosynthesis of purine nucleotides by de novo pathway. 15
5. Write in detail about Nitrogen cycle. 15
6. Write short notes (any *three*) :
 - (a) Cyclic photophosphorylation 5
 - (b) Regulation of Nitrogenase 5
 - (c) Inhibitors and uncouplers of E.T.C. 5
 - (d) Glyoxylate pathway. 5

This question paper contains 2 printed pages]

NEPKR—43—2026

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2026

MICROBIOLOGY

Paper SMICC-1451

(Microbial Methods for Environment Management)

(Friday, 17-4-2026)

Time : 10.00 a.m. to 1.00 p.m.

Time—3 Hours

Maximum Marks—60

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

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

(3) Draw a neat and well labelled diagram wherever required.

1. Write brief notes on the following :

15

- (a) Organic pollutants
- (b) Hexachlorobenzene
- (c) Stabilization ponds
- (d) Greenhouse gases
- (e) Zoogical film.

P.T.O.

2. Describe in detail factors influencing eutrophication and control of eutrophication. 15
3. Take a detailed account of methods of bioleaching for extraction of metals. 15
4. Explain in detail primary and secondary methods for waste water treatment. 15
5. Discuss the causes and impact of greenhouse effect. 15
6. Write brief notes on the following (any *three*) : 15
 - (a) Chlorinated hydrocarbons
 - (b) Application of bioleaching
 - (c) Rotary biological contractors
 - (d) Ozone depletion.

This question paper contains 2 printed pages]

NEPKR—136—2026

FACULTY OF SCIENCE

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

APRIL/MAY, 2026

MICROBIOLOGY

SMICC-1452

(Microbial Bioinformatics, Genomics and Proteomics)

(Monday, 20-4-2026)

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) Of the remaining attempt any *three* questions

(3) Draw neat and labelled diagram wherever necessary.

1. Write brief notes on the following :

15

(a) PUBMED

(b) Sequence alignment

(c) Molecular docking

(d) FASTA

(e) Microbial genome project.

P.T.O.

2. Explain in detail Data Mining. 15
3. Explain in detail multiple sequence alignment. 15
4. Explain in detail Annotation of microbial genome. 15
5. Define proteomics and explain in detail tools for protein separation. 15
6. Write brief notes on the following (any *three*) : 15
 - (a) Internet Bioinformatics
 - (b) Nucleic acid sequence database
 - (c) Drug discovery
 - (d) Palindromes.

This question paper contains 2 printed pages]

NEPKR—237—2026

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2026

MICROBIOLOGY

Paper-SMICC 1453

(Food Microbiology and Food Safety)

(Wednesday, 22-4-2026)

Time : 10.00 a.m. to 12.30 p.m.

Time—2½ Hours

Maximum Marks—60

N.B. :— (i) Question number 1 is compulsory.

(ii) Of remaining, attempt any three.

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

1. Write in brief on :

15

(a) Fermented milk products.

(b) Food borne infection.

(c) Antioxidant preservatives.

(d) EPA

(e) FDA.

P.T.O.

2. Define starter culture. Explain in detail classification and preservation of starter cultures. 15
3. Define food spoilage. Give a detailed account on food spoilage by microorganism and microbial enzymes. 15
4. Write down various methods for controlling the growth of microorganisms in food. 15
5. Write a note on FSSAI and HACCP. 15
6. Write short notes on (any *three*) : 15
 - (a) Fermented vegetables
 - (b) Food spoilage management
 - (c) Traditional techniques of food processing
 - (d) FPO.

This question paper contains 2 printed pages]

NEPKR—18—2026

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2026

(NEP Pattern)

MICROBIOLOGY

Paper SMICC-1501

(Environmental and Agricultural Microbiology)

(Thursday, 16-4-2026)

Time : 2.00 p.m. to 5.00 p.m.

Time—Three Hours

Maximum Marks—80

N.B. :— (i) Q. No. 1 is compulsory.

(ii) Of the remaining attempt any three.

(iii) Figures/Diagrams should be drawn wherever necessary.

(iv) All questions carry equal marks.

1. Write short notes on the following (any four) :

20

- (a) Abiotic Environment
- (b) Pesticides pollution
- (c) Acidophiles
- (d) Composting process
- (e) Xenobiotic compound
- (f) Carbon cycle.

P.T.O.

2. (a) Explain the characteristics, structure and function of an ecosystem. 10
- (b) Discuss the role of microorganisms in solving environmental pollution problems. 10
3. (a) Describe microbial diversity in extreme environments. 10
- (b) Explain environmental impact and ethical issues of GMOs. 10
4. (a) Discuss the interrelationship between soil microorganisms and higher plants. 10
- (b) Explain the importance of microorganisms for agriculture. 10
5. (a) Explain the production and applications of biofertilizers. 10
- (b) Describe in detail types and applications of biopesticides. 10
6. Write short notes on the following (any four) : 20
- (a) Eutrophication
- (b) Genetically modified crops
- (c) Viral plant diseases
- (d) Bioinoculant
- (e) Oligotrophs
- (f) Types of composts.

This question paper contains 2 printed pages]

NEPKR—186—2026

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2026

(NEP 2020)

MICROBIOLOGY

Paper SMICC-1503

(Molecular Biology and rDNA Technology)

(Tuesday, 21-4-2026)

Time : 2.00 p.m. to 5.00 p.m.

Time—Three Hours

Maximum Marks—80

N.B. :- (i) Q. 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) Gene Probe
 - (b) DNA fingerprinting
 - (c) cDNA libraries
 - (d) Stem cell therapy.
2. (a) Write down in detail Restriction Endonucleases and its types. 10
 - (b) Explain in detail pBR322 vector. 10

P.T.O.

3. (a) Write on polymerase chain reaction (PCR) and its applications. 10
(b) Take a detailed account on dideoxy DNA sequencing. 10
4. (a) Explain chemical and physical methods of gene transfer. 10
(b) Write on role of virulence gene. 10
5. (a) Explain the types and applications of molecular markers in rDNA technology. 5
(b) Write down the applications of rDNA technology in medicine and agriculture. 5
6. Write in brief on : 20
(a) Reverse transcriptase
(b) Primer design
(c) Knockout (KO) cells
(d) Gene therapy.

Total No. of Printed Pages:02

SUBJECT CODE NO- NEPKR-45-2026
FACULTY OF SCIENCE AND TECHNOLOGY
EXAMINATION SUMMER 2026
M.SC. (SECOND YEAR) (SEM-IV)
RESEARCH PUBLICATION ETHICS
NEPRPE-1002

[Time: 2:00 Hours]

[Max. Marks:40]

“Please check whether you have got the right question paper.”

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

- Q1. Write note on:** **10**
- a) Scope of philosophy.
 - b) Principles of good scientific practices.
 - c) Objective of publishing paper.
 - d) Open access publication.
 - e) International standard book number.
- Q2.** **5**
- a) Write briefly on any two branches of philosophy.
 - b) Explain common form of scientific misconduct. **5**
- Q3.** **5**
- a) What constitute a violation of publication ethics? **5**
 - b) Mention various steps of Sherpa Romeo online resource to view detail of journal. **5**
- Q4.** **5**
- a) What are the characteristics of predatory journals? **5**
 - b) What is i_{10} index? calculate the i_{10} index of following citation. **5**

Rank	Citation
1	29
2	26
3	15
4	14
5	12
6	11
7	11
8	09
9	06

- Q5.** a) Define publication ethics. Discuss unethical practices prevalent in research publications. **5**
b) What is plagiarism? Explain its types and importance in research. **5**

Q6. Explain:

- a) Types of ethics. **10**
b) Salami slicing
c) Elsevier
d) Turnitin

This question paper contains 3 printed pages]

NEPKR—137—2026

FACULTY OF SCIENCE AND TECHNOLOGY

M.Sc. (Fourth Semester) EXAMINATION

APRIL/MAY, 2026

(NEP)

MICROBIOLOGY

Paper SMICC-1551

(Advanced Enzyme Technology)

(Monday, 20-4-2026)

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) Importance of enzyme purification.

(b) Allosteric regulation

P.T.O.

- (c) Structure of active sites
- (d) Methods of immobilisation.
2. (a) Explain the physical and chemical methods used for cell disintegration. 10
- (b) Write a detailed explanation of the importance of enzyme purification, including the need to remove contaminants and impurities. 10
3. (a) Explain the Michaelis-Menten equation. 10
- (b) Describe in detail the difference between reversible and irreversible inhibition with suitable example. 10
4. (a) Define vitamins and coenzyme and explain in detail their structure and functions. 10
- (b) Take a detailed account on site directed Mutagenesis. 10
5. (a) Write a note on immobilisation with their methods and properties. 10
- (b) Discuss in detail microbial enzymes in textiles and wood industries. 10

6. Write brief notes on the following :

20

- (a) Extracellular enzymes
- (b) Competitive inhibition
- (c) Chemical modification of enzymes
- (d) Advanced immobilisation techniques.

This question paper contains 2 printed pages]

NEPKR—238—2026

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2026

MICROBIOLOGY

Paper SMICC-1552

(Advances in Virology)

(Wednesday, 22-4-2026)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—80

N.B. :— (i) Question number 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) ICTV
 - (b) Tissue culture technique
 - (c) TMV
 - (d) Antiviral drugs.
2. (a) Write in detail morphology, ultrastructure and properties of viruses. 10
 - (b) Explain in detail methods of cultivation of viruses. 10

P.T.O.

3. (a) Discuss in detail genomic replication of viruses. 10
- (b) Explain in detail transcriptional and post-transcriptional synthesis of RNA. 10
4. (a) Take a detailed account on pathogenesis of plant virus. 10
- (b) Describ in brief structure and pathogenesis of adenovirus. 10
5. (a) Define vaccines. Write a note on viral vaccines and their preparation. 10
- (b) Explain in detail viral evolution and emergence of new viruses. 10
6. Write brief notes on the following : 20
- (a) Baltimore classification
- (b) mRNA production of animal viruses
- (c) Orthomyxovirus
- (d) New vaccine technology.