

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 ( $\chi^2$ ) 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—57—2026**

**FACULTY OF SCIENCE**

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

**APRIL/MAY, 2026**

**BIOTECHNOLOGY**

**Paper SBTTC-401**

**(Cell and Developmental Biology)**

**(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) From remaining solve any *three*.

(3) Draw neat diagram wherever necessary.

1. Write short notes on :

3×5=15

(a) Osmosis

(b) Lysosomes

(c) Gap junction

(d) Blastulation

(e) Sex determination in plants and animals.

P.T.O.

2. (a) Describe in detail structure and function of mitochondria. Add notes on Biogenesis of Mitochondria. 8
- (b) Explain in brief structure and function of Nucleus. 7
3. (a) Describe in detail extracellular matrix. 8
- (b) Write a note on G-coupled receptor proteins. 7
4. (a) What is mitosis ? Explain in brief different stages of mitosis. 8
- (b) Describe in detail regulation of cell cycle. 7
5. (a) Explain in brief Gametogenesis. 8
- (b) Write a note on Gastrulation and formation of germ layers in animals. 7
6. Write short notes on (any *three*) : 15
- (a) Prokaryotic cells
- (b) Second messengers
- (c) Oncogenes
- (d) Cleavage.

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**NEPKR—157—2026**

**FACULTY OF SCIENCE AND TECHNOLOGY**

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

**APRIL/MAY, 2026**

**BIOTECHNOLOGY**

**SBTTC-402**

(Microbiology and Virology)

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

1. Attempt the following : 15
  - (a) TMV virus
  - (b) Practice of sterilization
  - (c) Methanogens
  - (d) Effect of pH on bacterial growth
  - (e) Ribotyping.
2. (a) Describe the Bergey's nomenclature system of Bacteria. 8  
(b) Write a note on earliest life forms and their strategies used for metabolism. 7

P.T.O.

3. (a) Describe Archaea and their importance. 8
- (b) Write a note on Gliding and sheathed bacteria. 7
4. (a) Describe synchronous and continuous culture. Give their importance. 8
- (b) Explain the effect of temperature on bacterial growth. 7
5. (a) Describe the different steps of virus replication, assembly, maturation and release. 8
- (b) Write a note on Herpes viruses. 7
6. Solve any *three* : 15
- (a) Virus infectivity assay with one example
- (b) Mathematical expression of growth
- (c) Characteristics of Primary domain
- (d) Budding and appendaged bacteria.

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**NEPKR—266—2026**

**FACULTY OF SCIENCE**

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

**APRIL/MAY, 2026**

**(NEP-2020 Pattern)**

**BIOTECHNOLOGY**

**Paper—SBTTC-403**

**(Biochemistry)**

**(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) From remaining attempt any *three*.

(iii) Represent your answers with well labelled diagrams wherever necessary.

(iv) *All* questions carry equal marks.

1. Write notes on :

5×3=15

(a) Hemoglobin buffer

(b) Vitamin D

(c) Peptides

(d) Physical properties of DNA

(e) Isoenzymes.

P.T.O.

2. (a) Explain Henderson-Hasselbalch equation. 8
- (b) Describe in detail chemical bonds. 7
3. (a) Describe in detail classification of Homopolysaccharides ? 8
- (b) Explain structure and functions of Glycolipids. 7
4. (a) Describe in detail classification of enzymes. 8
- (b) Describe classification of amino acids. 7
5. (a) Describe different types of RNA. 8
- (b) Explain different forms of DNA. 7
6. Write short notes on (any *three*) : 15
- (a) Laws of thermodynamics
- (b) Collagen triple helix
- (c) Proteins functions
- (d) DNA sypercoiling.

This question paper contains 2 printed pages]

**NEPKR—28—2026**

**FACULTY OF SCIENCE**

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

**APRIL/MAY, 2026**

**BIOTECHNOLOGY**

**Paper SBTTC-451**

**(Molecular Genetics)**

**(Friday, 17-4-2026)**

**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) From remaining questions solve any *three* questions.

(3) Draw neat diagram wherever necessary.

1. Write short notes on :

3×5=15

(a) Lethal genes

(b) Nucleosomes

(c) Euchromatin

(d) Ribosomes

(e) Codominance.

P.T.O.

2. (a) Write a short note on transformation. 8
- (b) Describe in brief conjugation process. 7
3. (a) Explain in brief variation in chromosome structure. 8
- (b) Describe in detail genome organization in Eukaryotes. 7
4. (a) Explain DNA replication process in Prokaryotes. 8
- (b) Write in brief post-transcriptional modification of RNA. 7
5. (a) Explain in detail tryptophan operon. 8
- (b) Describe translation process in brief. 7
6. Write short notes on (any *three*) : 15
- (a) Incomplete dominance
- (b) Heterochromatin
- (c) Excision repair mechanism
- (d) *t*-RNA.

This question paper contains 2 printed pages]

**NEPKR—107—2026**

**FACULTY OF SCIENCE AND TECHNOLOGY**

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

**APRIL/MAY, 2026**

**(NEP-2020)**

**BIOTECHNOLOGY**

**Paper SBTTC-452**

**(Immunotechnology)**

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

(3) *All* questions carry equal marks.

(4) Represent your answers with well labelled diagrams wherever necessary.

1. Write notes on :

3×5=15

(a) Antigens

(b) Adaptive immunity

(c) FACS

(d) RA

(e) Agglutination.

P.T.O.

2. (a) Describe in detail secondary Lymphoid organs. 8
- (b) Describe structure of Antibody. 7
3. (a) Define complements. Describe in detail alternative complement activation pathway. 8
- (b) Describe in detail mechanism of degranulation. 7
4. (a) Describe in detail mechanism of graft rejection. 8
- (b) Explain organ specific autoimmune diseases. 7
5. (a) Describe in detail AIDS. 8
- (b) Explain Western blotting. 7
6. Write notes on (any *three*) : 15
  - (a) T-Lymphocytes
  - (b) Vaccines
  - (c) MS
  - (d) SCID.

This question paper contains 2 printed pages]

**NEPKR—208—2026**

**FACULTY OF SCIENCE**

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

**APRIL/MAY, 2026**

**BIOTECHNOLOGY**

**Paper-SBTTC-453**

**(Process Biotechnology)**

**(Wednesday, 22-4-2026)**

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

*Time—2.30 Hours*

*Maximum Marks—60*

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

(ii) From remaining solve any *three* questions.

(iii) Draw neat and labelled diagram wherever necessary.

1. Write short notes on :

15

(a) Z value

(b) Photobioreactor

(c) Data logging

(d) SSC

(e) Impeller

P.T.O.

2. (a) Describe in detail strain improvement for fermentative microbial species. 8
- (b) Write formulation, preparation for fermentation media. 7
3. (a) Define bioreactor. Describe in detail body construction of bioreactor. 8
- (b) Explain application of bioreactor. Give a note on Air lift bioreactor. 7
4. (a) Give measurement and control of pH parameter in bioreactors. 8
- (b) Describe immobilization techniques for enzymes. 7
5. (a) Describe in detail microbial growth kinetics for batch fermentation. 8
- (b) Explain sterilization in bioreactor. 7
6. Write short notes on : 15
  - (a) Mutagenesis
  - (b) Packed-bed reactor
  - (c) Online Biosensor
  - (d) Fed batch fermentation
  - (e) Batch culture

This question paper contains 2 printed pages]

**NEPKR—5—2026**

**FACULTY OF SCIENCE**

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

**APRIL/MAY, 2026**

**(NEP Pattern)**

**BIOTECHNOLOGY**

**(SBTTC-501)**

**(Genetic Engineering)**

**(Thursday, 16-4-2026)**

**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) From remaining attempt any *three*.

(iii) All questions carry equal marks.

(iv) Represent your answers with well labelled diagrams wherever necessary.

1. Write notes on :

20

(a) YAC

(b) Genomic library

(c) Enzymatic method of DNA sequencing

(d) Transgenic Animals.

P.T.O.

2. (a) Describe in detail enzymes used in gene cloning. 10
- (b) Define plasmids. Describe plasmid vectors used in gene cloning. 10
3. (a) Describe in detail different methods of C-DNA library preparation. 10
- (b) Explain radioactive labelling of probes. 10
4. (a) Define PCR. Describe in detail PCR with its applications. 10
- (b) Describe in detail production of recombinant insulin and growth hormone. 10
5. (a) Describe in detail Gene therapy. 10
- (b) Explain transposon tagging. 10
6. Write notes on : 20
- (a) Microinjection
- (b) DNA fingerprinting
- (c) Protein engineering applications
- (d) Mapping of genome.

This question paper contains 2 printed pages]

**NEPKR—58—2026**

**FACULTY OF SCIENCE**

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

**APRIL/MAY, 2026**

**BIOTECHNOLOGY**

**SBTTC-502**

(Industrial Biotechnology)

**(Saturday, 18-4-2026)**

**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) From remaining solve any *three* questions.

(iii) Draw neat and labelled diagram wherever necessary.

1. Write short notes on :

20

(a) Cell disruption

(b) Protease

(c) PHB

(d) QC.

P.T.O.

2. (a) Describe in detail liquid extraction for purification. 10
- (b) Explain HPLC with example. 10
3. (a) Describe production, recovery and application of Alcohol. 10
- (b) Describe production, recovery and application of Xanthan. 10
4. (a) Describe transformation of steroids with examples. 10
- (b) Explain chemistry and properties of biodegradable plastics. 10
5. (a) Describe purity testing of product. 10
- (b) Explain fermentation economics. 10
6. Write notes on : 20
- (a) GC-MS
- (b) Dextran
- (c) Antibiotics
- (d) QA.

This question paper contains 2 printed pages]

**NEPKR—158—2026**

**FACULTY OF SCIENCE AND TECHNOLOGY**

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

**APRIL/MAY, 2026**

**BIOTECHNOLOGY**

**Paper—SBTTC-501**

**(Plant Biotechnology)**

**(Tuesday, 21-4-2026)**

**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*.

(iii) Draw neat and labelled diagram wherever necessary.

1. Write short notes on the following :

4×5=20

(a) Initiation and Maintenance of callus culture

(b) R.A.P.D. markers.

(c) Mycorrhizae as biofertilizer.

(d) Chemical pesticides *vs* Biopesticides.

P.T.O.

2. (a) Explain in detail composition and role of various ingredients of plant tissue culture media. 10
- (b) Explain in detail the technique of somatic hybridization. 10
3. (a) Explain various approaches of transgenic crops with resistance to viruses. 10
- (b) Explain various approaches of herbicide resistant crops. 10
4. (a) Give classification of plant diseases based on symptoms. 10
- (b) Explain in detail production technology of cyanobacteria. 10
5. (a) Explain Trichoderma as biopesticide. 10
- (b) Explain the concept of Integrated Pest management and discuss the Constraints in implementation of CPM in Indian agriculture. 10
6. Write short notes on the following : 20
- (a) Somatic embryogenesis
- (b) Terminator gene technology
- (c) Biological control and plant diseases
- (d) Advantages and disadvantages of chemical pesticides.

This question paper contains 2 printed pages]

**NEPKR—268—2026**

**FACULTY OF SCIENCE**

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

**APRIL/MAY, 2026**

**BIOTECHNOLOGY**

**Paper SBTTE-502**

**(Intellectual Property Rights)**

**(Thursday, 23-4-2026)**

**Time : 2.00 p.m. to 4.30 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 well labelled diagram wherever necessary.

1. Write notes on (any *three*) :

3×5=15

(a) Steps in research

(b) Modes of paper communication

(c) G.D.

(d) UPOV.

P.T.O.

2. (a) Define hypothesis. Describe in detail types of hypothesis. 8
- (b) Explain types of sampling. 7
3. (a) Explain preparation of manuscript. 8
- (b) Write a note on IMRAD. 7
4. (a) Describe in detail copyrights and trade secretes. 8
- (b) Explain patent procedure in India. 7
5. (a) Describe patenting of biological material. 8
- (b) Explain PBR. 7
6. Write notes on (any *three*) : 3×5=15
- (a) Types of research
- (b) Criteria for publication
- (c) IPR
- (d) Types of technology transfer.

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

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**NEPKR—108—2026**

**FACULTY OF SCIENCE AND TECHNOLOGY**

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

**APRIL/MAY, 2026**

**(NEP-2020)**

**BIOTECHNOLOGY**

**Paper SBTTC-551**

**(Computational Biology)**

**(Monday, 20-4-2026)**

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

*Time—3 Hours*

*Maximum Marks—80*

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

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

(3) Draw neat and well labelled diagram wherever necessary.

1. Write brief notes on the following :

20

(i) Structural databases

(ii) Drug discovery

(iii) Metagenomics

(iv) Mean and Mode.

P.T.O.

2. Describe in detail the following :
- (i) Database Browsing and Data Retrieval 10
  - (ii) Historical overview 10
3. Describe in detail the following :
- (i) Classification of Proteins 10
  - (ii) Protein structure prediction 10
4. Describe in detail the following :
- (i) Metabolic engineering 10
  - (ii) Gene prediction 10
5. Describe in detail the following :
- (i) Measurement of central tendency 10
  - (ii) Mean deviation, standard deviation 10
6. Write brief notes on the following :
- (i) Sequence databases 5
  - (ii) Disease diagnosis 5
  - (iii) Functional genomics 5
  - (iv) Tabulation of data 5

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**NEPKR—209—2026**

**FACULTY OF SCIENCE AND TECHNOLOGY**

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

**APRIL/MAY, 2026**

**(NEP-2020 Pattern)**

**BIOTECHNOLOGY**

**SBTTC-552**

**(Pharmaceutical Biotechnology)**

**(Wednesday, 22-4-2026)**

**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 labelled diagram wherever necessary.

1. Write short notes on :

20

(a) Secondary metabolites and their types

(b) Corona Virus

(c) Tryptic peptide mapping

(d) Teratogenicity tests.

P.T.O.

2. (a) What are antibiotics ? Classify antibiotics based on mode of action and chemical groups attached to them. 10
- (b) What is microbial resistance to antibiotics ? Explain various approaches of microbial resistance against antibiotics. 10
3. (a) Describe in detail structure and mode of action of quinolones and Nystatin. 10
- (b) Explain in detail mechanism of action of drugs acting on central nervous system. 10
4. (a) Give various methods used in protein sequencing and explain in detail mass spectrometry. 10
- (b) What is protein engineering ? Explain various methods of protein engineering. 10
5. (a) Explain in brief various *in vivo* toxicity tests in animals. 10
- (b) Explain in detail Indian pharmacopoeia. 10
6. Write short notes on the following : 5×4=20
- (a) General features of antibiotics
- (b) Antidiabetic drugs
- (c) Purification of proteins
- (d) Preclinical Trials of drugs