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

NEPSST—1—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(NEP 2020)

RESEARCH METHODOLOGY

Paper NEPRN-1001

(Wednesday, 16-4-2025) **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 solve any *three* questions.

(*iii*) Calculator and log table is allowed.

1. Attempt any *three* of the following : 15

(*a*) Qualities of good research.

(*b*) Features of good design.

(*c*) ANOVA

(*d*) Types of data.

2. (*a*) What is research ? Explain steps involved in research process. 8

(*b*) Discuss interview as a technique of data collection. 7

P.T.O.

3. (*a*) Calculate the Mean, Median and Mode of the following data : 8

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

(*b*) What is hypothesis ? Give the characteristics of good research hypothesis. 7

4. (*a*) Describe non-probability and probability sampling. 8

(*b*) Calculate the Chi-square value of the following data : 7

Excellent	Average	Poor	Total
58	32	30	120

5. (*a*) Define case study. Give their components. 8

(*b*) Explain extraneous variable. 7

6. Write short notes on : 15

(*a*) Descriptive types of research

(*b*) Non-parametric test

(*c*) Primary data sources.

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

NEPSST—55—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

BIOTECHNOLOGY

(SBTTC-401)

(Cell and Developmental Biology)

(Saturday, 19-04-2025) **Time : 10.00 a.m. to 1.00 p.m.**

Time—Three Hours *Maximum Marks*—80

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

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

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

1. Write brief notes on the following : 20

(*a*) Mitochondria

(*b*) Gap junctions

(*c*) Prophase-I

(*d*) Blastulation.

P.T.O.

2. (*a*) Describe in detail structural organization of eukaryotes. 10

(*b*) Explain in brief osmosis and diffusion. 10

3. (*a*) Explain in detail roles of different adhesion molecules in cell communication. 10

(*b*) Describe in detail second messengers. 10

4. (*a*) What is Mitosis ? Explain it in detail. 10

(*b*) Explain in detail gene regulating cell cycle. 10

5. (*a*) Describe in brief gametogenesis. 10

(*b*) Explain in detail stem cells. 10

6. Write brief notes on the following : 20

(*a*) Microtubules

(*b*) Integrins

(*c*) Apoptosis

(*d*) Gastrulation.

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

NEPSST—151—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

BIOTECHNOLOGY

SBTTC-402

(Microbiology and Virology)

(Tuesday, 22-04-2025) **Time : 10.00 a.m. to 1.00 p.m.**

Time—Three Hours *Maximum Marks*—80

Note :— (*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*) Retroviruses

   (*b*) Growth curve

   (*c*) Mycobacterium

   (*d*) Bacterial nomenclature.

2. (*a*) Explain in detail controversy over spontaneous generation. 10

   (*b*) Describe in detail halophiles. 10

P.T.O.

3. (*a*) Describe nomenclature and Bergey's manual. 10

(*b*) Explain the different chemical methods of sterilization. 10

4. (*a*) Define growth. Explain continuous culture system for bacterial cultivation. 10

(*b*) Derive mathematic expression for bacterial growth. 10

5. ((*a*) Describe life cycle of M13 virus. 10

(*b*) Explain in detail procedure for cultivation of embryonated viruses. 10

6. Write short notes on : 20

(*a*) Lytic cycle

(*b*) Synchronous culture

(*c*) Homoacetogenic bacteria

(*d*) Ribosomal RNA sequencing.

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

NEPSST—256—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(NEP-2020 Pattern)

BIOTECHNOLOGY

Paper SBTTC-403

(Biochemistry)

(Thursday, 24-4-2025) **Time : 10.00 a.m. to 1.00 p.m.**

Time—3 *Hours* *Maximum Marks*—80

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

(2) Of the following attempt any *three* questions.

(3) Draw neat and labelled diagram wherever necessary.

1. Write brief notes on the following : 20

(*a*) Chemical bonds

(*b*) Vitamin A

(*c*) Peptides

(*d*) Nucleotides.

P.T.O.

2.	(*a*)	Explain Henderson-Hasselbach equation.	10
	(*b*)	Explain biological buffer system.	10
3.	(*a*)	Describe in detail classification of carbohydrates.	10
	(*b*)	Describe in detail water soluble vitamins.	10
4.	(*a*)	Describe in detail classification of amino acids.	10
	(*b*)	Describe classification and functions of proteins.	10
5.	(*a*)	Explain types of RNA.	10
	(*b*)	Describe in detail forms of DNA.	10
6.		Write brief notes on the following :	20
	(*a*)	Thermodynamics principles	
	(*b*)	Lipid classification	
	(*c*)	Biological roles of enzymes	
	(*d*)	Physical properties of DNA.	

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

NEPSST—450—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

BIOTECHNOLOGY

Paper SBTTE-401

(Techniques in Biotechnology)

(Saturday, 26-4-2025) **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 neat and labelled diagram, wherever required.

1. Write brief notes on any *three* : 15

(*a*) Light microscope

(*b*) Gas liquid chromatography

(*c*) X-ray spectroscopy

(*d*) Flowcytometry.

2. (*a*) What is centrifuge ? Describe types of rotors. 8

(*b*) Describe principle and working of phase contrast microscope. 7

P.T.O.

3. (*a*) What is chromatography ? Describe paper chromatography with its types. 8

(*b*) Write a note on Pulse field gel electrophoresis. 7

4. (*a*) Describe Nuclear magnetic resonance spectroscopy in detail. 8

(*b*) Write a note on UV-visible spectroscopy. 7

5. (*a*) What is ELISA ? Describe different types of ELISA. 8

(*b*) Write a detailed note on Biosensors. 7

6. Write brief notes on any *three* : 15

(*a*) Fluorescence microscope

(*b*) Agarose gel electrophoresis

(*c*) Raman spectroscopy

(*d*) Gieger-Muller counter.

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

NEPSST—451—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(NEP-2020 Pattern)

BIOTECHNOLOGY

Paper SBTTE-403

(Plant Metabolism and Development)

(Saturday, 26-4-2025) **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) From Q. No. **2** to Q. No. **6** solve any *three*.

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

1. Write notes on (any *three*) : 15

(*a*) Chemical properties of water

(*b*) CAM

(*c*) Abscisic acid

(*d*) Pollen development.

P.T.O.

2.	(*a*)	Describe in detail types of stress.	8
	(*b*)	Describe transport system.	7
3.	(*a*)	Describe in detail C-3 pathway.	8
	(*b*)	Describe Glycolysis.	7
4.	(*a*)	Explain role of cytokinins in plant development.	8
	(*b*)	Write a note on circadian rhythms.	7
5.	(*a*)	Describe in detail pollination.	8
	(*b*)	Write a note on Embryo sac.	7
6.	Write notes on (any *three*) :		15
	(*a*)	Plasmolysis	
	(*b*)	C-2 pathway	
	(*c*)	Auxins	
	(*d*)	Endosperm.	

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

NEPSST—26—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

BIOTECHNOLOGY

Paper–SBTTC-451

(Molecular Genetics)

(Thursday, 17-4-2025) **Time : 10.00 a.m. to 1.00 p.m.**

Time—3 *Hours* *Maximum Marks*—80

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

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

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

1. Write brief notes on the following : 20

(*a*) Codominance

(*b*) Heterochromatin

(*c*) DNA as genetic material

(*d*) Catabolite expression.

P.T.O.

2. (*a*) Describe in brief genetic diseases due to defects in Autosomes and sex chromosomes. 10

(*b*) Explain in detail conjugation. 10

3. (*a*) Describe in brief variation in Chromosome structure. 10

(*b*) Explain in detail genome organization in Prokaryotes. 10

4. (*a*) What is replication ? Describe in brief eukaryotic replication. 10

(*b*) Describe in detail *m*RNA processing. 10

5. (*a*) Explain translation termination in brief. 10

(*b*) What is operon ? Describe tryptophan operon. 10

6. Write brief notes on : 20

(*a*) Complementary gene

(*b*) Types of chromosome

(*c*) Transposition

(*d*) Ribosomes.

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

NEPSST—103—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(NEP-2020)

BIOTECHNOLOGY

Paper SBTTC-452

(Immunotechnology)

(Monday, 21-4-2025) **Time : 10.00 a.m. to 1.00 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 labelled diagram wherever necessary.

1. Write brief notes on the following : 20

(*a*) Spleen

(*b*) Monoclonal antibody production

(*c*) Types of graft

(*d*) ELISA.

P.T.O.

2.	(*a*)	Describe in detail cells of Immune system.	10
	(*b*)	Define Antigens. Describe in detail factor affecting on antigens.	10
3.	(*a*)	Describe in detail complement activation pathway.	10
	(*b*)	Define vaccines. Describe DNA vaccines and polysaccharide vaccines.	10
4.	(*a*)	Define Autoimmunity. Describe organ specific autoimmune diseases.	10
	(*b*)	Describe mechanism of graft rejection.	10
5.	(*a*)	Explain SCID.	10
	(*b*)	Describe in detail types of agglutination reaction.	10
6.		Write brief notes on the following :	20
	(*a*)	Structure of Antibody	
	(*b*)	Type-I hypersensitivity	
	(*c*)	SLE	
	(*d*)	AIDS.	

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

NEPSST—200—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

BIOTECHNOLOGY

Paper SBTTC-453

(Process Biotechnology)

(Wednesday, 23-4-2025) **Time : 10.00 a.m. to 1.00 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 labelled diagram wherever required.

1. Write brief notes on the following : 20

(*a*) 'D' value

(*b*) Impeller

(*c*) Scale up

(*d*) SSC.

2. (*a*) Write down media formulation & fermentation. 10

(*b*) Describe isolation methods of mutants. 10

P.T.O.

3. (*a*) Define Bioreactor. Describe types of Bioreactor. 10

(*b*) Explain body construction and designing of bioreactor. 10

4. (*a*) Explain control and measurement of pH in fermentation processes. 10

(*b*) Describe immobilization techniques for cell and enzyme. 10

5. (*a*) Describe microbial growth kinetics for Batch Fermentation. 10

(*b*) Define fermentation and types of fermentation. 10

6. Write brief notes on the following : 20

(*a*) Mutagenesis

(*b*) Air life bioreactor

(*c*) Data logging

(*d*) Batch fermentation.

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

NEPSST—346—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(NEP)

BIOTECHNOLOGY

Paper SBTTE-453

(Nanobiotechnology)

(Friday, 25-4-2025) **Time : 10.00 a.m. to 1.00 p.m.**

Time—3 *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 (any *three*) : 15

   (*a*) Quantum dot

   (*b*) Protein targeting

   (*c*) Magnetic particle

   (*d*) Manomaterial in medicine

2. (*a*) Discuss types of nanomaterial. 8

   (*b*) Explain physical characteristics of nano-particle. 7

P.T.O.

3. (*a*) Explain protein interaction with nanomaterial. 8

(*b*) Discuss in detail MEMS. 7

4. (*a*) Discuss in detail matal oxide nanoparticle. 8

(*b*) Explain lipid nanoparticle for drug delivery. 7

5. (*a*) What is nanomaterial ? Enlist the application of nanomaterial in agriculture.

(*b*) Discuss application of nanomaterial in environment. 7

6. Write notes on : 15

(*a*) Nanocrystal

(*b*) Peptide coupled nanoparticle

(*c*) Anisotropic particle

(*d*) RNA targeting.

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

NEPSST—345—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(NEP-2020)

BIOTECHNOLOGY

Paper SBTTE-451

(Enzymology)

(Friday, 25-4-2025) **Time : 10.00 a.m. to 1.00 p.m.**

Time—3 *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 (any *three*) : 15

   (*a*) Significance of V_{max} & K_m

   (*b*) Characteristics of enzymes

   (*c*) Turnover number

   (*d*) Microencapsulation.

2. (*a*) Describe enzyme classification in detail. 8

   (*b*) Write a note on enzyme substrate complex. 7

P.T.O.

3. (*a*) Describe Michaelis-Menten equation in detail. 8

(*b*) Write a note on Enzyme regulation. 7

4. (*a*) Describe types of inhibitors in detail. 8

(*b*) Write a note on Multienzyme system. 7

5. (*a*) Write a note on Immobilization Enzymes. 8

(*b*) Write a note on effect of partition on kinetics and performance with particular emphasis on charge and hydrophobicity (pH, temp & km).

6. Write short notes on (any **3**) : 15

(*a*) Activation Energy

(*b*) Allosteric Reactions

(*c*) Enzyme-enzyme interaction

(*d*) Advantages of enzyme immobilization.

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

NEPSST—152—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

BIOTECHNOLOGY

(SBTTC-501)

(Plant Biotechnology)

(Tuesday, 22-04-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three Hours *Maximum Marks*—80

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

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

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

1. Write short notes on the following : 20

   (*a*) Suspension culture

   (*b*) R.F.L.P. markers

   (*c*) Biopesticies *Vs* chemical pesticides.

   (*d*) Plant growth promoting rhizobacteria.

2. (*a*) Explain composition and role of various ingredients of plant tissue culture media. 10

   (*b*) Explain in detail various steps involved in cryopreservation. 10

P.T.O.

3. (*a*) Describe in detail terminator gene technology. 10

(*b*) Explain various approaches of transgenic crops with virus resistance. 10

4. (*a*) Explain various biological control measures against plant diseases. 10

(*b*) Describe in detail production technology of mycorrhizae. 10

5. (*a*) Explain in detail mechanism of action of Bt based biopesticides against plant diseases. 10

(*d*) Describe in detail concept of Integrated Pest-Management (IPM). 10

6. Write short notes on the following : 20

(*a*) Haploid plants

(*b*) Ecological risk assessment of genetically modified crops.

(*c*) Phosphate solubilizing microorganism

(*d*) Baculoviruses as biopesticides.

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

NEPSST—05—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

(NEP-2020)

BIOTECHNOLOGY

Paper–SBTTC-501

(Genetic Engineering)

(Wednesday, 16-4-2025) **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 diagrams wherever required.

1. Write brief notes on the following : 20

(*a*) BAC

(*b*) DNA footprinting

(*c*) Site directed mutagenesis

(*d*) Transgenic animals.

P.T.O.

2. (*a*) Define restriction enzymes. Describe in detail types of restriction enzymes. 10

(*b*) Describe in detail plasmid vectors. 10

3. (*a*) Describe the methods of cDNA library preparation. 10

(*b*) Explain Southern blotting. 10

4. (*a*) Describe in detail polymerase chain reaction and its applications. 10

(*b*) Describe production of recombinant Insulin. 10

5. (*a*) Describe Gene therapy. 10

(*b*) Describe in detail transposon tagging. 10

6. Write brief notes on the following : 20

(*a*) Ti-Plsmid

(*b*) DNA fingerprinting

(*c*) Chemical method of DNA sequencing

(*d*) Mapping of genome.

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

NEPSST—258—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

BIOTECHNOLOGY

Paper SBTTE-501

(Intellectual Property Rights)

(Thursday, 24-4-2025) **Time : 2.00 p.m. to 4.30 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 required.

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

   (*a*) Types of research

   (*b*) Summary and conclusion in thesis writing

   (*c*) World organizations involved in IP protection

   (*d*) Plant breeder's rights.

2. (*a*) Explain sampling techniques, and steps in sampling. 8

   (*b*) What are the advantages and limitations of determining sample size in research ? 7

P.T.O.

3. (*a*) Write about the preparation of a manuscript and the instructions to authors. 8

(*b*) Discuss the presentation of a scientific paper and its importance. 7

4. (*a*) Describe the different forms of intellectual property. 8

(*b*) Explain the types of patents and their significance in intellectual property protection. 7

5. (*a*) Explain patenting of biological materials with examples. 8

(*b*) Describe the concept of farmer's rights and its role in plant variety protection. 7

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

(*a*) Sampling techniques and their advantages

(*b*) Patent infringement and its scope

(*c*) Presentation of a scientific paper

(*d*) Farmer's rights in plant variety protection.

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

NEPSST—257—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

BIOTECHNOLOGY

Paper SBTTE-501

(English and Science Communication Skills)

(Thursday, 24-4-2025) **Time : 2.00 p.m. to 4.30 p.m.**

Time—2½ *Hours* *Maximum Marks*—60

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

(2) From the remaining (Q. No. **2** to Q. No. **6**) solve any *three*.

1. Write brief notes on any *three* : 15

   (*a*) Grapevine communication

   (*b*) Chronemics

   (*c*) Negotiation skills

   (*d*) Circulars.

2. (*a*) Discuss formal and informal communication in an organization. 8

   (*b*) Analyze the impact of technological advancements on communication in the modern world. 7

P.T.O.

3. (*a*) Explain the different forms of non-verbal communication. 8

(*b*) Differentiate between oral and written communication. 7

4. (*a*) Examine how interpersonal skills impact leadership and management. 8

(*b*) Analyse the common causes of stress in the workplace and how effective stress management techniques can improve performance and job satisfaction. 7

5. (*a*) Write a report focusing on the technological advancements in the development of biofuels. Give suitable title and use the following points in your report. (Introduction, overview of Biofuel technologies, Advantages of Biofuels challenges in production and adoption, Conclusion, Recommendations) 8

(*b*) Write a letter to Director, National Chemical Laboratory (NCL) permission to visit laboratory. 7

6. Write brief notes on any *three* : 15

(*a*) Verbal communication

(*b*) Kinds of handshake

(*c*) Importance of good listening skills

(*d*) Notices.

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

NEPSST—56—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

BIOTECHNOLOGY

SBTTC-501

(Industrial Biotechnology)

(Saturday, 19-04-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three Hours *Maximum Marks*—80

Note :— (*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*) Reverse osmosis

   (*b*) Application of penicillin

   (*c*) Biodegradable plastic

   (*d*) Pyrogen testing.

2. (*a*) Discuss the precipitation and filtration method for removal and recovery of cell mass. 10

   (*b*) What is chromatography ? Explain ion-exchange chromatography. 10

P.T.O.

3. (*a*) Describe in detail production, recovery and application of alcohol. 10

(*b*) Discuss the production and application of proteases. 10

4. (*a*) Describe the transformation of steroids with an example. 10

(*b*) Discuss the microbial recovery of petroleum. 10

5. (*a*) Discuss in detail quality control. 10

(*b*) Discuss cost estimation in fermentation economics. 10

6. Write brief notes on the following : 20

(*a*) Adsorption

(*b*) Application of citric acid

(*c*) PHB

(*d*) Sterility testing in product.

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

NEPSST—43—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(NEP 2020)

RESEARCH AND PUBLICATION ETHICS

NEPPE-1002

(Thursday, 17-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

(*ii*) Solve any *three* questions of the remaining.

1. Write notes on : 5×2=10

(*a*) Nature of philosophy

(*b*) Research integrity

(*c*) Importance of publication ethics

(*d*) Characteristics to call a journal open

(*e*) *h*-index.

P.T.O.

2. (*a*) Define philosophy. Explain its branches. 5×2=10

(*b*) What do you mean by fabrication, falsification and plagiarism (FFP).

3. (*a*) Define publication ethics. Write the importance of publication ethics. 5×2=10

(*b*) Describe SHERPA/ROMEO online resource and list three variant of text.

4. (*a*) What is predatory journal ? List the common characteristics of it. 5×2=10

(*b*) What is impact factor ? How does it calculate ? Explain it with a suitable example.

5. (*a*) What is plagiarism ? Give their types. 2×5=10

(*b*) Describe in detail SNIP and SJR.

6. Write short notes on : 4×2.5=10

(*a*) Moral philosophy

(*b*) Duplicate publication

(*c*) Principle of transparency

(*d*) Turnitin.

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

NEPSST—104—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

(NEP-2020)

BIOTECHNOLOGY

Paper SBTTC-551

(Computational Biology)

(Monday, 21-4-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time—Three 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 diagram wherever necessary.

1. Write brief notes on the following : 20

   (*i*) Sequence databases

   (*ii*) Mass spectrometry

   (*iii*) Functional genomics

   (*iv*) Standard deviation.

2. Describe in detail the following : 20

   (*i*) Historical overview

   (*ii*) Application of Bioinformatics.

P.T.O.

3. Describe in detail the following : 20

(*i*) 2 d page

(*ii*) Classification of Proteins.

4. Describe in detail the following : 20

(*i*) Microarrays and their applications

(*ii*) Metabolic engineering.

5. Describe in detail the following : 20

(*i*) Tabulation of data and its graphical representation

(*ii*) Measurement of central tenency.

6. Write brief notes on the following : 20

(*i*) Literature databases

(*ii*) Drug discovery

(*iii*) Pharmacogenomics

(*iv*) Variance.

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

NEPSST—201—2025

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2025

BIOTECHNOLOGY

Paper–SBTTC-552

(Pharmaceutical Biotechnology)

(Wednesday, 23-4-2025) **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 short notes on the following : 20

(*i*) Plant secondary metabolites and their types

(*ii*) Mechanism of action of sulphonamides

(*iii*) Two hybrid phage display

(*iv*) Indian pharmacopoeia.

P.T.O.

2. (*i*) Explain in detail, various types of microbial resistance and their mechanism to antibiotics. 10

(*ii*) Explain in detail, classification of antibiotics based on mode of action with suitable example. 10

3. (*i*) Explain in detail mechanism of action of Anticancer drugs. 10

(*ii*) Explain structure and mechanism of action of Quinolones and Azidothymidine (AZT). 10

4. (*i*) What is peptide mapping ? Explain its principle, applications steps involved in peptide mapping. 10

(*ii*) Explain the term protein engineering. Describe various strategies of protein engineering. 10

5. (*i*) Describe in detail pharmacophore modeling and add a note on docking techniques. 10

(*ii*) Explain in detail, clinical trials of drugs and add a note on preclinical evaluation phase. 10

6. Write short notes on the following : 20

(*i*) General characteristics of Antibiotics

(*ii*) Structure and mechanism of action of Nystatin

(*iii*) Mass spectrometry

(*iv*) Acute toxicity studies.

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

NEPSST—347—2025

FACULTY OF SCIENCE

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

APRIL/MAY, 2025

BIOTECHNOLOGY

Paper SBTTE-551

(Environmental Biotechnology)

(Friday, 25-4-2025) **Time : 2.00 p.m. to 5.00 p.m.**

Time—3 *Hours* *Maximum Marks*—60

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

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

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

1. Write short notes on (any **3**) : 15

   (*a*) Carbon cycle

   (*b*) Bioleaching of metals

   (*c*) Composting

   (*d*) Treatment schemes for waste waters of dairy

2. (*a*) Write a detailed note on global environmental problems. 8

   (*b*) Write a note on food chain, food web & tropic levels. 7

P.T.O.

3. (*a*) What is pollution ? Write a note on types of pollution. 8

(*b*) Write a note on environmental mutagenesis and toxicity. 7

4. (*a*) Write a detailed note on Biogas. 8

(*b*) Write a note on microbiologically enhanced oil recovery. 7

5. (*a*) Describe water pollution and if control. 8

(*b*) Write a note on Biological treatment process of waste water. 7

6. Write short notes on (any **3**) : 15

(*a*) Nitrogen cycle

(*b*) Bioemulsifiers

(*c*) Vermiculture

(*d*) Treatment schemes for waste water of antibiotic industries.