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NEPWT—1001—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

(NEP-2020)

RESEARCH METHODOLOGY

(Tuesday, 10-12-2024)

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 solve any *three* questions.

(iii) Calculator and log table is allowed.

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

(a) Motivation in research

(b) Need for research designing

(c) ANOCOVA

(d) Statistical measure in research.

2. (a) What do you mean by research ? Describe the different steps involved in a research process. 8

(b) Discuss the observation method as a technique of data collection. 7

P.T.O.

3. (a) Calculate the mean, median and mode of the following data : 8

3, 6, 3, 7, 4, 3, 9

- (b) Draw the flow diagram for hypothesis testing. 7

4. (a) What is Sampling ? Explain steps in sample design. 8

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

Fully Agree	Not Sure	Not Agree	Total
102	108	75	285

5. (a) Define case study. Give their characteristics. 8

- (b) Explain dependent and independent variables. 7

6. Write short notes on : 15

- (a) Fundamental type of research

- (b) Parametric test

- (c) Secondary data sources.

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NEPWT—49—2024

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2024

BIOTECHNOLOGY

Paper SBTTC-401

(Cell and Developmental Biology)

(Thursday, 12-12-2024)

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) Prokaryotes

(b) Second messenger

(c) Prophase-I

(d) Cleavage.

2. (a) Describe in detail structure and function of Mitochondria. 10

(b) Explain in brief endoplasmic reticulum. 10

P.T.O.

WT

(2)

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3. (a) Describe in detail the extracellular matrix. 10
- (b) Write a note on regulation of hematopoiesis. 10
4. (a) Describe in detail oncogenes and tumor suppressor genes. 10
- (b) Explain in detail mitosis. 10
5. (a) What is Oogenesis ? Describe it in detail. 10
- (b) Describe in brief sex determination in plants and animals. 10
6. Write brief notes on the following : 20
- (a) Chloroplast
- (b) Neurotransmission and its regulation
- (c) Apoptosis
- (d) Stem cells.

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NEPWT—115—2024

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2024

BIOTECHNOLOGY

Paper SBTTC-402

(Microbiology and Virology)

(Saturday, 14-12-2024)

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) Mycobacteria

(b) Synchronous culture

(c) M13 phage

(d) Bergey's manual of bacteriology

P.T.O.

2. (a) Describe in detail lactic acid bacteria. 10
- (b) Describe archaeobacteria. 10
3. (a) Define taxonomy. Describe ribotyping. 10
- (b) Describe primitive earth and metabolic strategies. 10
4. (a) Describe effect of temperature on bacterial growth. 10
- (b) Describe methods of enumeration of bacterial growth. 10
5. (a) Describe methods of cultivation of viruses. 10
- (b) Describe life cycle of herpes virus. 10
6. Write brief notes on : 20
 - (a) Pseudomonas
 - (b) Primary domains of life
 - (c) Continuous culture
 - (d) TMV.

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NEPWT—316—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

(NEP 2020)

BIOTECHNOLOGY

Paper (SBTTE-403)

(Plant Metabolism and Development)

(Thursday, 19-12-2024)

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*) :

3×5=15

(a) Carbonic acid exchange theory

(b) CAM pathway

(c) Auxin

(d) Carpel

P.T.O.

2. (a) Describe the terms diffusion, osmosis and plasmolysis. 8
- (b) Describe the mechanism of nutrient uptake in plants. 7
3. (a) Describe in detail mitochondrial electron transport chain. 8
- (b) Describe photorespiration in detail. 7
4. (a) Give an account on concept of photoperiodism. 8
- (b) Describe in detail regulators of cell division. 7
5. (a) Describe in detail Carpel and Gynoecium. 8
- (b) Define pollination. Describe its mechanism. 7
6. Write brief notes on (any *three*) : 3×5=15
- (a) Mechanism of active absorption
- (b) C4 pathway
- (c) Circadian Rhythms
- (d) Endosperm.

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NEPWT—182—2024

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2024

BIOTECHNOLOGY

Paper SBTTC-403

(Biochemistry)

(Tuesday, 17-12-2024)

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 required.

1. Write brief notes on the following : 20

(a) Chemical bonds

(b) Steroids

(c) Peptides

(d) *t*-RNA

2. (a) Define buffers. Describe haemoglobin buffer. 10

(b) Explain Henderson-Hasselbach equation. 10

P.T.O.

WT

(2)

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3. (a) Describe in detail classification of polysaccharides. 10
(b) Describe structure and functions of Triglycerides and phospholipids. 10
4. (a) Describe in detail classification of amino acids. 10
(b) Describe secondary structures of proteins. 10
5. (a) Describe in detail forms of DNA. 10
(b) Describe physical properties of DNA. 10
6. Write brief notes on the following : 20
 - (a) Ionization of water
 - (b) Vitamin A
 - (c) Enzyme classification
 - (d) Secondary structure of DNA.

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NEPWT—30—2024

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2024

BIOTECHNOLOGY

Paper SBTTC-401

(Molecular Genetics)

(Wednesday, 11-12-2024)

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, solve any *three* questions.

(iii) Draw neat and labelled diagram wherever necessary.

1. Write short notes on : 5×4=20
 - (a) Incomplete dominance
 - (b) C-value paradox
 - (c) RNA polymerases
 - (d) Genetic code.
2.
 - (a) Describe in detail principles of Mendelian inheritance. 10
 - (b) Explain in brief transformation. 10

P.T.O.

WT

(2)

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3. (a) What is replication ? Explain in detail prokaryotic replication. 10
(b) Describe in brief transposition. 10
- 4 (a) Explain in detail initiation of translation. 10
(b) What is Operon ? Describe lac operon in brief. 10
- 5 (a) Explain in detail structure of chromosomes. 10
(b) Describe in brief variation in chromosome number. 10
6. Write brief notes on the following : 20
 - (a) Lethal genes
 - (b) Nucleosomes
 - (c) Transcription factors
 - (d) Tryptophan operon.

NEPWT—30—2024

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NEPWT—96—2024

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2024

BIOTECHNOLOGY

Paper SBTTC-452

(Immunotechnology)

(Friday, 13-12-2024)

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 well labelled diagrams wherever necessary.

1. Write brief notes on the following : 20

(a) Haptens

(b) TCR

(c) Delayed types Hypersensitivity

(d) Agglutination.

2. (a) Describe in detail about immunoglobulins and its types. 10

(b) Describe in detail structure and function of primary lymphoid organs. 10

P.T.O.

WT

(2)

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3. (a) Write a note on Hematopoiesis. 10
- (b) Describe in detail maturation and activation of B-cells. 10
4. (a) Write a note on tumor immunology. 10
- (b) Describe in detail immunity to infectious agent malaria. 10
5. (a) Describe in detail systemic autoimmune disease with example. 10
- (b) Write a note on transplantation immunology. 10
6. Write brief notes on the following : 20
- (a) Flow cytometry
- (b) Helminthes
- (c) Monoclonal antibody
- (d) Recombinant vaccines.

NEPWT—96—2024

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NEPWT—163—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

BIOTECHNOLOGY

SBTTC-453

(Process Biotechnology)

(Monday, 16-12-2024)

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) Depth filter

(b) Air lift bioreactor

(c) Biosensors

(d) SSF (Solid State Fermentation)

P.T.O.

2. (a) Write down the methods of preservation and maintenance of microorganisms. 10
- (b) Explain, how genetic engineering help for strain improvement. 10
3. (a) Describe design and operation of bioreactor. 10
- (b) Write down the ideal properties of bioreactor and add a short note on impeller. 10
4. (a) Explain control measures for temperature in fermentor. 10
- (b) Describe in detail immobilization for cell. 10
5. (a) Describe microbial kinetic of batch sterilization. 10
- (b) Describe scale up of fermentation. 10
6. Write brief notes on the following : 20
 - (a) Z value
 - (b) Screening
 - (c) Reynolds number
 - (d) Fed batch culture.

This question paper contains 2 printed pages]

NEPWT—271—2024

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2024

BIOTECHNOLOGY

Paper-SBTTE-451

(Enzymology)

(Wednesday, 18-12-2024)

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

Time—3 Hours

Maximum Marks—60

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 any *three* : 15

(a) Activation energy

(b) Allosteric reactions

(c) Enzyme activity

(d) Effect of partition on kinetics.

2. (a) Write a note on factors affecting of enzyme activity. 8

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

P.T.O.

WT

(2)

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3. (a) Write a note on Michaelis-Menten equation. 8
- (b) Describe enzyme regulation in detail. 7
4. (a) Write types of inhibitors in detail. 8
- (b) Write a note on turnover number and international unit of enzyme. 7
5. (a) Describe different methods of immobilization. 8
- (b) Write a note on advantages of enzyme immobilization. 7
6. Write notes on any *three* : 15
- (a) Nomenclature of enzyme
- (b) Scatchard plots
- (c) Multienzyme system
- (d) Microencapsulation.

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NEPWT—70—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

BIOTECHNOLOGY

SBTTC-501

(Industrial Biotechnology)

(Thursday, 12-12-2024)

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) Adsorption

(b) Application of alcohol

(c) Polyhydroxybutyrate

(d) Sterility testing in product.

P.T.O.

2. (a) Explain purification of product using the liquid-liquid extraction. 10
- (b) Discuss physical methods of cell disruption methods. 10
3. (a) Describe in detail production, recovery and application of L-glutamic acid. 10
- (b) Discuss the production and application of cellulase. 10
4. (a) What is transformation of non-steroid compounds ? Explain with an example. 10
- (b) Discuss the microbial recovery of petroleum. 10
5. (a) Discuss in detail quality assurance. 10
- (b) Describe fermentation economics in detail. 10
6. Write brief notes on the following : 20
- (a) HPLC
- (b) Application of acetone
- (c) Biodegradable Plastic
- (d) Process design in fermentation

This question paper contains 2 printed pages]

NEPWT—212—2024

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2024

BIOTECHNOLOGY

SBTTE-501

(English and Science Communication Skills)

(Tuesday, 17-12-2024)

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

Time—3 Hours

Maximum Marks—60

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

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

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

(a) Vertical communication

(b) Proxemics

(c) Interpersonal skills

(d) Memos.

P.T.O.

2. (a) What is communication ? Explain communication process. 8
- (b) Discuss the role of communication in the modern corporate world. 7
3. (a) What are the essential skills required for effective verbal communication during business meetings and presentations ? 8
- (b) Discuss the importance of various non-verbal codes used for communication purpose. 7
4. (a) Discuss importance of listening skills. How can we cultivate good listening skills ? 8
- (b) How does effective stress management skills contribute to productivity and work life-balance ? 7
5. (a) Draft a notice and agenda of the 7th annual board of members meeting of Rajiv Gandhi Institute of Biotechnology, Pune. 8
- (b) Write an email applying for the position of research associate at the serum institute of India, Pune. 7
6. Write brief notes on any *three* : 15
- (a) Diagonal communication
- (b) Facial expression
- (c) Importance of Interpersonal skills
- (d) Minutes of meetings.

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NEPWT—04—2024

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2024

(NEP-2020)

BIOTECHNOLOGY

Paper—(SBTTC-501)

(Genetic Engineering)

(Tuesday, 10-12-2024)

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) Ti-Plasmid

(b) Genomic library

(c) Recombinant vaccine

(d) Transgenic Animal.

P.T.O.

2. (a) Describe in detail enzymes used in Genetic engineering. 10
- (b) Describe in detail Electroporation and Microinjection method of gene transfer. 10
3. (a) Describe in detail non-radioactive labelling of probes. 10
- (b) Explain DNA fingerprinting and its applications. 10
4. (a) Describe in detail DNA sequencing methods. 10
- (b) Explain methods of protein engineering. 10
5. (a) Describe in detail somatic and embryonic cell gene therapy. 10
- (b) Describe in detail transposons tagging. 10
6. Write brief notes on the following : 20
- (a) λ phase vectors
- (b) DNA foot printing
- (c) PCR
- (d) Heterologous gene expression.

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NEPWT—213—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

(NEP 2020)

BIOTECHNOLOGY

Paper SBTTE-502

(Intellectual Property Rights)

(Tuesday, 17-12-2024)

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

Time—Three Hours

Maximum Marks—60

Note :— (i) Question Number 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 (any *three*) : 15

(a) Objectives of research

(b) Abstract and introduction in thesis writing.

(c) Intellectual property and its protection

(d) Patenting biological materials.

P.T.O.

2. (a) Explain the steps in research, focusing on research design and hypothesis formulation. 8
- (b) Discuss the significance of the review of literature in research. 7
3. (a) Write about the IMRAD structure in manuscript writing. 8
- (b) Explain the modes of paper communication and criteria for publication. 7
4. (a) Explain the forms of intellectual property protection, including patents, copyrights and trademarks. 8
- (b) Describe the criteria and procedure for patenting in India. 7
5. (a) Write about the patenting of biological materials with examples. 8
- (b) Explain the different types of technology transfer and its Indian scenario. 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.