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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—338—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

MICROBIOLOGY

Paper—(SMICE-401)

(Commercial Microbiology)

(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 in brief on any *three* :

15

(a) Biogenesis of petroleum

(b) Nanobacteria

(c) Electroactive microorganisms

(d) Antimicrobial textile.

P.T.O.

2. (a) Take a detailed account of Microbial Enhanced Oil Recovery. 8
- (b) What are the different microbial treatment methods for petroleum waste. 7
3. (a) Discuss role of microbial nanotechnology in agriculture and food industries. 8
- (b) Write on Microbial-Mediated synthesis of Metallic Nanoparticles (MNPs). 7
4. (a) Define electromicrobiology. Write on Extracellular Electron Transfer (EET) mechanisms and ecophysiology of electroactive Microorganisms. 8
- (b) Explain in detail applications of Electromicrobiology. 7
5. (a) Elaborate on significance of Microbial Products in cosmetic industry. 8
- (b) Interpret the role of microbes in textile industry. 7
6. Write in brief on any *three* : 15
- (a) Hydrocarbon exploration using microorganisms
- (b) Role of microbial enzymes in nanoparticle synthesis
- (c) Grand challenges in Electromicrobiology
- (d) Applications of Bioplastics.

This question paper contains 2 printed pages]

NEPWT—126—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

(NEP-2020 Pattern)

MICROBIOLOGY

Paper—(SMICC-401)

(Advance Techniques in Microbiology)

(Saturday, 14-12-2024)

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, attempt any *three* questions.

(iii) Draw a neat labelled diagram wherever required.

1. Write brief notes on the following :

20

(a) Types of motor

(b) EDTA buffer

(c) Tungsten filament

(d) Microbial characterization.

P.T.O.

2. (a) Write in detail differential centrifuge. 10
- (b) Explain the methods for determination size and shape of macromolecules. 10
3. (a) Explain in detail principle and techniques of capillary electrophoresis. 10
- (b) Take a detailed account of step within Northern blotting. 10
4. (a) Write down the working and principle of atomic force Microscope. 10
- (b) Describe in detail process of FISH techniques. 10
5. (a) Explain in detail various machine learning methods in microbiology laboratory. 10
- (b) Describe the deep learning of detection of Microorganism. 10
6. Write brief notes on the following : 20
- (a) Isopicnic centrifuge
- (b) EtBr (Ethidium bromide)
- (c) Positive staining
- (d) NMR (Nuclear magnetic resonance).

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NEPWT—193—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

MICROBIOLOGY

Paper—SMICC-403_

(Microbial Physiology and Metabolism)

(Tuesday, 17-12-2024)

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, attempt any *three* questions.

(iii) Draw neat and labelled diagram wherever required.

1. Write brief notes on the following :

20

(a) Gluconeogenesis

(b) Biosynthesis of fatty acids

(c) Urea Cycle

(d) Regulation of nitrogenase.

P.T.O.

WT

(2)

NEPWT—193—2024

2. (a) Take a detailed account of regulation and significance of HMP shunt. 10
(b) Describe the regulation of ATP synthase activity. 10
3. (a) Write down the C_4 pathway in detail. 10
(b) Explain the role of lipids in cellular signalling and membrane structure. 10
4. Write notes on :
(a) Synthesis of Pyrimidines through the de novo pathway. 10
(b) Discuss the importance of protein degradation and recycling. 10
5. (a) Discuss the importance of nitrogen metabolism in human health. 10
(b) Explain the nitrogen cycle. 10
6. Write down the brief notes on the following : 20
(a) Inhibitors of electron transport chain
(b) Structure of chloroplast
(c) Regulation of amino acid metabolism
(d) Genetics of Nitrogen fixation.

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NEPWT—25—2024

FACULTY OF SCIENCE & TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

MICROBIOLOGY

Paper SMICC1451

(Microbial Methods of Environment Management)

(Wednesday, 11-12-2024)

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 down the brief notes on the following : 20

(a) Bioamplification

(b) Toxicity of Arsenic

(c) Fluidized bed reactor

(d) UV-B.

2. (a) Take a detailed account of biodeterioration of pharmaceutical products. 10

(b) Describe in detail causes of entrophication. 10

P.T.O.

3. (a) Define biotransformation and add a note on biotransformation of pesticides. 10
- (b) Take a brief account of different bioleaching techniques. 10
4. (a) Describe in detail the aerobic biological methods to treat waste water. 10
- (b) Discuss in brief primary waste water treatment. 10
5. (a) Write down the causes and impact of acid rain. 10
- (b) Explain the different biotechnological approaches to manage environmental problems. 10
6. Write down brief notes on the following : 20
 - (a) Chlorinated hydrocarbons
 - (b) Xenobiotic compounds
 - (c) Removal of Nitrogenous compounds
 - (d) Global warming.

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NEPWT—91—2024

FACULTY OF SCIENCE & TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

MICROBIOLOGY

SMICC-1452

(Biostatistics and Bioinformatics)

(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) Histogram
 - (b) Mode
 - (c) PDB
 - (d) FASTA.
2. (a) Describe sampling methods in detail and add a note on merits and demerits of it. 10
(b) A certain drug was administered to 500 peoples, out of total of 800 to test efficiency against typhoid. Find out the effectiveness of the drug against the disease. 10

P.T.O.

(The X^2 table value at 5% level is 3.84)

	No. of persons affected by typhoid	No. of persons not affected by typhoid	Total
No. of persons administred	200	300	500
No. of persons without drug	280	20	300
Total	480	320	800

3. (a) Define correlation. Describe types and methods of correlation. 10
- (b) Explain RBD and factorial experiment in detail. 10
4. (a) Discuss in brief database management system. 10
- (b) Take a detailed account on NCBI. 10
5. (a) Discuss in detail sequence queries by using BLAST. 10
- (b) Describe in detail pairwise sequence analysis. 10
6. Write short notes on the following : 20
 - (a) Normal distribution
 - (b) CRD
 - (c) EMB
 - (d) Swiss Prot.

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NEPWT—158—2024

FACULTY OF SCIENCE AND TECHNOLOGY

M.Sc. (Second Semester) EXAMINATION

NOVEMBER/DECEMBER, 2024

MICROBIOLOGY

Paper-SMICC-1453

(Food Microbiology and Food Safety)

(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 diagrams wherever required.

1. Write brief notes on the following :

20

(a) Spoilage of fruits

(b) BIS

(c) Chemical antimicrobials

(d) Genetically Modified (GM) food.

P.T.O.

2. (a) Describe in detail general factors affecting food spoilage. 10
- (b) Take a detailed account on spoilage of meat and meat products. 10
3. (a) Describe in brief mycotoxins. 10
- (b) Discuss the risk analysis and HACCP. 10
4. (a) Describe in detail drying techniques. 10
- (b) Write on biosensors in food industry. 10
5. (a) Take a detailed account on Sauerkraut fermentation. 10
- (b) Nutraceutical applications of probiotic food. 10
6. Write brief notes on the following : 20
 - (a) Spoilage of milk products
 - (b) Food safety
 - (c) Commercial sterilization
 - (d) Fermented pickles.

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NEPWT—261—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

MICROBIOLOGY

Paper SMICE-1451

(Bioprocess Technology)

(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 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) Continuous fermentation
 - (b) Centrifugation
 - (c) Biopreservatives
 - (d) Application of Gibberellins
2. (a) Define bioreactors. Explain batch reactor and its importance. 8
(b) Explain growth kinetics and monod model. 7

P.T.O.

3. (a) Explain co-current and counter current solvent extraction with example. 8
- (b) Write on storage and packaging of purified product. 7
4. (a) Write on fermentative production of streptomycin. 8
- (b) Explain production of ethanol from starchy waste using *saccharomyces cerevisiae*. 7
5. (a) Explain microbiology and biochemistry of citric acid production on commercial scale. 8
- (b) Write on lactic acid production from whey. 7
6. Write brief notes on any *three* : 15
- (a) Fed-batch reactors
- (b) Rotary vacuum drum filtration
- (c) Ethanol production using r-DNA technology
- (d) Riboflavin production.

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NEPWT—60—2024

FACULTY OF SCIENCE & TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

MICROBIOLOGY

SMICC-401

(Microbial Diversity and Evolution)

(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 diagrams wherever necessary.

1. Write brief notes on the following : 20

(a) Carbon and energy metabolism

(b) Extremophiles

(c) Nitrobacter

(d) Pigment and ecology of green sulfur bacteria.

2. (a) Explain in detail Ribosomal RNA sequencing and its applications. 10

(b) Describe systematic evolution of earth and early life forms. 10

P.T.O.

3. (a) Take a detailed account of archaeal general metabolism and autotrophy in archaea. 10
- (b) Discuss the phylum Euryarchaeota and explain its *three* main classes. 10
4. (a) Write on the role of proteobacteria in Nitrogen cycle. 10
- (b) Take a detailed account of bacterial phylum Cyanobacteria. 10
5. (a) Take a detailed account of phylum Deinococci. 10
- (b) Describe in detail phylum Nitrospira. 10
6. Write brief notes on the following : 20
- (a) RNA World
- (b) Halophilic archaea
- (c) Purple non-sulfur bacteria
- (d) Phylum aquifex.

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NEPWT—11—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

MICROBIOLOGY

Paper—SMICC-1501

(Environmental and Agricultural Microbiology)

(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 (any *four*) : 20

(a) Global warming

(b) Oligotrophs

(c) Oxidation and reduction of iron by bacteria

(d) Biofertilizer types

(e) Microbial-inoculants for agriculture

(f) Oil pollution.

P.T.O.

2. (a) Explain types and applications of biopesticides. 10
- (b) Write a note on abiotic factors. 10
3. (a) Explain in detail potential applications of extremophiles. 10
- (b) Write a note on biomagnification process. 10
4. (a) Write in brief nitrogen cycle. 10
- (b) Explain types of plant diseases and their symptoms caused by plant pathogens. 10
5. (a) Explain in detail production and applications of biofertilizers. 10
- (b) Explain techniques of producing transgenic crops. 10
6. Write brief notes on the following (any *four*) : 20
- (a) Acidophiles
- (b) Biotic environment
- (c) Sulfur cycle
- (d) Vermicompost
- (e) Xenobiotic compound
- (f) Water pollution.

This question paper contains 2 printed pages]

NEPWT—143—2024

FACULTY OF SCIENCE AND TECHNOLOGY

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

NOVEMBER/DECEMBER, 2024

(NEP-2020 Pattern)

MICROBIOLOGY

Paper—(SMICC-1503)

(Molecular Biology and r-DNA Technology)

(Saturday, 14-12-2024)

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) Artificial chromosome vectors

(b) DNA fingerprinting

(c) Construction of c-DNA libraries

(d) Gene therapy.

P.T.O.

2. (a) Explain in detail enzymes used in *c*-DNA technology. 10
(b) Define vectors. Take a detailed account on pBR₃₂₂ vector. 10
3. (a) Discuss in detail Polymerase Chain Reaction (PCR) and its applications. 10
(b) Explain in detail chemical DNA sequencing method. 10
4. (a) Take a detailed account on chemical and physical methods of gene transfer. 10
(b) Discuss the mechanism of DNA transfer and role of virulence gene in plants. 10
5. (a) What is molecular markers ? Describe types and applications of molecular markers. 10
(b) Explain in detail applications of recombinant DNA technology in medicine, agriculture and forensic. 10
6. Write brief notes on the following : 20
 - (a) Lambda (λ) vector
 - (b) Primer design
 - (c) Knockout (Ko) cells
 - (d) DNA chip technology.

This question paper contains 2 printed pages]

NEPWT—224—2024

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2024

(NEP-2020)

MICROBIOLOGY

SMICE-1501

(Pharmaceutical Microbiology)

(Tuesday, 17-12-2024)

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 diagrams wherever necessary.

1. Write brief notes on the following : 20

(a) QA

(b) Z-value

(c) Multivalent subunit vaccine

(d) Disinfectants.

2. (a) Describe chemical and biochemical indicators in detail. 10

(b) Explain microbiological analysis of Pharmaceutical water. 10

P.T.O.

WT

(2)

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3. (a) Discuss in brief about different modes of sterilization. 10
- (b) Describe types of monoclonal antibodies and its mode of action. 10
4. (a) Explain microbial production of ophthalmic preparation and implants in detail. 10
- (b) Describe manufacturing procedure and in process control of Pharmaceuticals. 10
5. (a) Discuss modes of action of cell wall synthesis inhibitors in detail. 10
- (b) Describe antitumour substances in detail. 10
6. Write brief notes on the following : 20
- (a) GMP
- (b) Fed-batch fermentation
- (c) Single use bioreactor
- (d) Biosimilars.

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