

M.Sc. (Semester II)

**M.Sc. Semester Second Examination, April, 2024
(Faculty of Science)
Zoology
First Paper
General Physiology**

Attempt any two questions

Unit-I

Q. 1 Define absorption? How the end product of carbohydrate and protein digestion is absorbed.

Q.2 Write short notes on:

- A. Regulation of Respiration and Respiratory center
- B. Breathing Patterns and modified Respiratory Movements

Unit-II

Q3. Describe the structure of kidney and explain the detailed mechanism of urine formation.

Q.4 What is nerve impulse? How is an impulse transmitted through a nerve fiber?

Unit-III

Q5. Explain the role of Meditation and yoga and their effects on health.

Q.6 Write short notes on:

- A. Counter-current heat exchanger
- B. Hibernation and aestivation

Unit-IV

Q.7: Write an essay on hypothalamic regulation of pituitary gland.

Q.8 Write short notes on

- A. Implantation
- B. Parturition

M.Sc. (Semester II)

**M.Sc. Semester Second Zoology
Assignment 2024
Second Paper – Environmental Biology & Ethology**

Attempt any two questions

Unit I

Q1. Explain Ecological law of minimum and law of tolerance in detail

OR

Explain energy flow in an ecosystem with diagram

Unit II

Q2. Give a detailed account on biodiversity of India and their management

OR

Write short notes on

- Simpson's diversity Index
- Shannon's diversity index

Unit III

Q3. Explain the concept of ethology with the help of psychohydraulic model

OR

Define learning and give a detailed account on types of learning behavior.

Unit IV

Q4. Write properties and advantages of social behavior. Discuss social organization in primates in detail.

OR

Give an account on Communication in animals with examples.

M.Sc. (Semester II)

M.Sc. -Semester-II, Assignment Zoology, April-2024

(Faculty of Science)

Paper-III: Molecular Biology, Biotechnology and Bioinformatics

Attempt any two questions

Unit I

Q1. Discuss prokaryotic and eukaryotic replication process in detail (with suitable diagrams).

Q2. Write short note on (Any two):

- i) DNA Polymerases
- ii) Eukaryotic transcription
- iii) Polyadenylation

Unit II

Q3. Differentiate between prokaryotic and eukaryotic translation process (with suitable diagrams).

Q4. Write short notes on:

- a. Co and post translational modifications of protein
- b. FLP/ FRT and Cre/lox recombination

Unit III

Q5. Discuss the role of various molecular markers (RFLP, RAPD and AFLP) in genome analysis?

Q6. Write short notes on (Any two):

- i) Fluorescence *in situ* hybridization
- ii) ICSI and GIFT
- iii) Genetic and physical mapping

Unit IV

Q7. What is bioinformatics? Discuss the importance of biological databases in bioinformatics.

Q8. Write short notes on:

- a. Phylogenetic analysis tools
- b. Practical aspects of sequence alignment

M.Sc. (Semester II)

Assignment

M.Sc. Zoology Semester I, April, 2024

(Faculty of Science)

Zoology

Paper-IV: Genetics and Molecular Evolution

Attempt any two questions

Unit-I

1. Discuss modern Mendelism and non-Mendelian patterns of inheritance.
2. Explain the concept of recombination frequency and its significance in genetics. Discuss the role of genetics in animal breeding, including inbreeding and outbreeding techniques. Describe heterosis, expressivity, and penetrance in the context of animal genetics.

Unit-II

3. Explain the significance of pedigree analysis and karyotype analysis in human genetics. Discuss how these techniques are used to study patterns of inheritance and chromosomal abnormalities.
4. Describe the Human Genome Project and its significance in understanding human genetics. Discuss the goals, methods, and outcomes of the project, and how it has influenced research in genetics and medicine.

Unit-III

5. Provide a detailed account of destabilizing forces in population genetics, including natural selection, mutation, genetic drift, migration, and meiotic drive. Explain how each of these forces can disrupt genetic equilibrium in populations and lead to evolutionary change.
6. Discuss the Hardy-Weinberg law of genetic equilibrium in population genetics. Explain the assumptions of the Hardy-Weinberg equilibrium and how it describes allele frequencies in idealized populations. Provide examples to illustrate the application of the Hardy-Weinberg principle.

Unit-III

7. Describe convergent and divergent evolution in molecular evolution. Provide examples of each type of evolution and explain how they reflect different patterns of evolutionary change?
8. Write short notes on:
 - a. Molecular clocks
 - b. Molecular drive

M.Sc. (Semester IV)

Assignment

M.Sc. Zoology Semester IV, April, 2024

(Faculty of Science)

Zoology

Paper-I: Applied Zoology and Biostatistics

Unit-I

1. Describe Economic importance of Protozoa in detail.
2. Discuss the management strategies for harmful insects in detail.

Unit-II

3. Discuss the significance of pisciculture and the various products of the fishing industry. How does pisciculture contribute to food security and economic growth?
4. Elaborate on the economic importance of mollusks, focusing on pearl culture. Discuss the process of pearl formation, its cultivation techniques, and the global market for pearls.

Unit-III

5. Provide an introduction to biostatistics, covering its definitions, statistical symbols, scope, and applications. How does biostatistics contribute to the field of biology and health sciences?
6. Write short notes on:
 - a. Standard deviation
 - b. coefficient of variation

Unit-IV

7. Explain the significance of tests of significance in statistical analysis. Discuss the methods used to determine the significance of differences in means, including the standard error of the mean, Student's t-test, and F-test. Provide examples to illustrate their application in research studies.
8. Describe the chi-square test and its applications in testing goodness of fit. Discuss the characteristics of the chi-square distribution and how it is used to analyze categorical data. Explain the importance of Yates's correction in chi-square analysis.

M.Sc. Zoology (Semester IV)

Assignment

M. Sc .Zoology (Semester IV), April 2024

(Faculty of Science)

Paper II –Tools and Techniques in Biology

ZOO-402

[Attempt any two]

Unit I

Q1. Give a detailed account of the principle, applications and types of Light Microscope.

Q2. Give a detailed note on electron microscopy.

Unit II

Q3. Give a detailed account of the principle, applications of PAGE and Agarose Electrophoresis.

OR

Give a detailed note on Spectrophotometry.

Q4. Write short notes on any two:

- a) Freezing techniques
- b) Flow Cytometry
- c) Affinity Chromatography

Unit III

Q5. Write short notes on:

- a) Tracer techniques in biology
- b) Types of radiations and their properties

Q6. Write short notes on:

- a) Autoradiography
- b) Geiger Muller counter and Scintillation Counter

Unit IV

Q7. Write short notes on:

- a) Southern and Northern Blotting Technique
- b) Sequencing of Nucleic Acid

Q8. Write short notes on any two:

- a) Hybridoma technology
- b) Techniques and properties of cell culture

M.Sc. (Semester IV)

**M.Sc. Semester Fourth Zoology
Assignment 2024
Elective– Environmental Toxicology
Third Paper – Applied Aspects of Toxicology**

Attempt any two questions

Unit I

Q1. Write a detailed account on food ingredients and contaminants
OR

Write short notes on the following

- a) Food and colour additives
- b) Food, drug & cosmetics Act & its importance.

Unit II

- c) Q2. Write an account on Analytical role in general toxicology
OR
Give a detailed account on toxicological investigation of a poison death.

Unit III

Q3. Give a detailed account on Occupational diseases.
OR

Write short notes on the following

- a) Toxicological Evaluation of Occupational agents
- b) Workplace, exposures, and standards in occupational toxicology

Unit IV

Q4. Give a detailed account on Environmental Impact Assessment.
OR
Explain the role of toxicology in wildlife and animal welfare.

M.Sc. (Semester IV)

Assignment
M.Sc. Semester Fourth April, 2024
(Faculty of Science)
Zoology
Elective Paper
Paper IV – Biomonitoring & Bioremediation

Unit-I

Q1. Write short notes (any two)-

- A. Biofertilizers
- B. Microbial and Antimicrobial pesticides
- C. Biopesticides

Q.2 .Give detail account on vermi-composting and its application.

Unit-II

Q3. Give detail account on Role of micro organism in Bio degradation.

Q.4 Write short notes (any two)-

- A. Biomagnification
- B. Xenobiotic compounds
- C. Bioaccumulation

Unit III

Q5. Write short notes on (any two)-

- A. Toxicology of Pesticides
- B. Biomonitoring
- C. Bioindicators

Q.6 Write a detail account on types and Biological Effects of radioactive Substances on animals.

Unit-IV

Q7. Write short notes on (any two)-

- A. Bioremediation Technologies
- B. Bioremediation of Marine Oil pollutants
- C. Monitoring the efficacy of bioremediation

Q.8 Give a detail account on Microorganisms in Bioremediation and their role in

bioremediation.

M.Sc. (Semester IV)

M Sc. Fourth Semester Assignment –April, 2024
Subject-Zoology
Elective Paper- Cell and molecular biology April, 2024
Paper-III Cellular Mechanics

Unit I

Q1 .What is the difference between apoptosis and necrosis? Describe the mechanism of apoptosis in detail.

Q2 .Describe types of caspases in detail in intrinsic and extrinsic pathways.

Unit II

Q3 .Describe in detail about various stages of development of cancer

Q4 .Write short notes on (any two)

- a. Properties of cancer cell
- b. Tumour suppressor cells
- c. Oncogenes

Unit III

Q 5. Explain role of telomerase in aging

Q 6.Describe the biology of Ageing

Unit IV

Q 7.What are stem cells.? Describe in detail applications of stem cells in medical science .

Q 8.Write short notes (any two)

- a. Embryonic stem cells
- b. Somatic cell nuclear transfer
- c. Proliferation of differentiated cells

M.Sc. (Semester IV)

M.Sc. -Semester-IV

Assignment Zoology, April-2024

**Elective Paper- Cell and molecular biology
Paper IV-Molecular Immunology**

Unit I

Q1. Discuss innate and adaptive immunity in detail.

Q2. Write short note on:

- i. Organs of immune system
- ii. Cells involved in immune response

Unit II

Q3. What are the various factors which influence the process of immunogenicity?

Q4. Describe the structure and functions of different immunoglobulin isotypes.

Unit-III

Q5. Describe various antigen-antibody reactions with suitable examples.

Q.6 Describe major histocompatibility complex (MHC) and explain how it participates in immune responsiveness.

Unit-IV

Q7. Explain the structure, function and properties of various cytokines.

Q.8 Write short notes on:

- i. Immune system in health and disease
- ii Role of antigen presenting cell in immune response