

S. S. Jain Subodh PG (Autonomous) College
Assignment, October 2026
Subject Zoology

M.Sc. (Zoo) Sem I

M.Sc. Zoology First Semester
Paper I- Principles of Biosystematics & Taxonomy

Attempt any 4 questions. One question from each unit.

Unit-I

Q1. What do you mean by Biosystematics? Describe its scope and Application?

Q2. Describe in Modern trends in taxonomy in brief.

Unit-II

Q3 Give a detail account on Theories of Biological classification.

Q4. Write short note of following:

- (a) Speciation
- (b) Species concept

Unit-III

Q5. Write a brief account on taxonomic index..

Q6. Explain Interpretation and application of important rules and formation of scientific names of different taxa.

Unit-IV

Q7. What do you mean by Systematics Publications? Describe the different kinds of publications?

Q8. Explain in brief International code of Zoological nomenclature(ICZN).

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Paper II – Structure & Function of Invertebrates

(Attempt any four questions, selecting one question from each unit.)

Unit I

Q1. Write account on Hydrostatic movement in Annelida with suitable diagrams.

OR

Write short Notes on

a) Fate of Blastopore: Protostome and Deuterostome

b) Fate of Blastomere

Unit II

Q2 Explain in detail the Patterns of Feeding and digestion in lower metazoa,

OR

Give a detailed note on Filter feeding in Polychaeta

Unit III

Q3. Write an account on Excretion and Osmoregulation

OR

Describe in detail Advanced Nervous system of Crustacean and insecta with suitable diagram.

Unit IV

Q4. Describe Larval forms of parasites. Write the significance of larval stage.

OR

Define Minor phyla. Explain general character, affinities and significance affinities of Ctenophora, Entoprocta

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Paper III –: Biochemistry

(Attempt any four questions, selecting one question from each unit.)

Unit I

Q1 Describe the structure and classification of proteins. Explain the different levels of protein organization and discuss their biological significance.

Q2 Explain the process of amino acid degradation in detail. Discuss the major pathways involved in the removal of amino groups and the metabolic fate of the carbon skeleton, with suitable examples.

Unit II

Q3 Explain Glycoconjugates with suitable examples.

Q4 Describe the regulation of blood glucose concentration. Explain the roles of glycogenesis, glycogenolysis and gluconeogenesis.

Unit III

Q5 Describe the structure, classification and biological significance of terpenoids and sterols. Discuss their major types, properties and important biological functions with suitable examples.

Q6 Give a detailed account of lipid metabolism

Unit IV

Q7 Describe the kinetics of enzyme-catalyzed reactions alongwith the Michaelis–Menten model.

Q8 Discuss the mechanism of allosteric inhibition in enzymes with suitable examples and its significance in metabolic regulation.

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Paper IV: Essentials of Cytology

(Attempt any four questions, selecting one question from each unit.)

UNIT I

Q. 1: Describe the ultrastructure of prokaryotic and eukaryotic cells in detail.

Q. 2: What is membrane transport? Discuss the mechanisms of simple diffusion, facilitated diffusion, and active transport pumps in detail.

UNIT II

Q.3: Describe the structure, molecular composition, and polymerisation dynamics of microfilaments and intermediate filaments.

Q.4: Explain the mechanism of intracellular transport in eukaryotic cells. Discuss the structural roles of the motor proteins kinesin and dynein.

UNIT III

Q.5: Give a detailed account of cell surface receptors.

Q.6: Write short notes on any two:

- a. MAP Kinase
- b. Post-Translational Modifications
- c. second messenger system

UNIT IV

Q. 7: Describe the sequential events of the eukaryotic cell cycle. Give a detailed comparative account of the stages and significance of mitosis and meiosis.

Q. 8: Explain the role and regulation of cyclins and cyclin-dependent kinases (CDKs) in cell cycle progression. Discuss the mechanism and importance of chromosome remodeling during cell division.

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M.Sc. (Zoo) Sem III

M.Sc. (Zoology) Sem III

Paper I: Biology of Chordates

(Attempt any four questions, selecting one question from each unit.)

Unit I

Q1 Provide a comprehensive account of the evolutionary time scale, describing the major eras and periods and discussing the important evolutionary events that occurred during each period.

Q2 Explain the origin and evolution of Agnatha along with their general morphological and physiological characteristics.

Unit II

Q3 Write a detailed note on adaptive radiation in Amphibia and its evolutionary significance.

Q4 Write a comprehensive account of the skull of reptiles, including its types and important adaptations.

Unit III

Q5 Write a detailed note on flight adaptations

Q6 Give detailed account on origin and evolution of birds

Unit IV

Q7 Discuss the evolution of oviparity and viviparity

Q8 Explain the concepts of exothermy and endothermy and their significance in animals.

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M.Sc. (Zoo) Sem III

Paper II: Genes and Differentiation

(Attempt any four questions, selecting one question from each unit.)

UNIT-1

Q.1 Explain Pattern and type of cleavage with suitable diagram

Q.2 Cell-Cell interaction and cell signalling during early development of embryo

UNIT-2

Q.3 Explain about Homeobox concept in different phylogenetic groups

Q.4 Describe Tetrapod limb development

UNIT-3

Q.5 Describe following topic

(a) Testis determination

(b) Malformation and disruption

Q.6 Explain chromosomal determination in drosophila

UNIT-4

Q.7 Describe following topic

(a) Gene therapy

(b) blood cell formation

Q.8 What is Stem cell and its type, explain in detail hemopoietic stem cell

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M.Sc. (Zoo) Sem III

Paper III – Elective Paper – Basics of Toxicology

Max marks 30

(Attempt any four questions, selecting one question from each unit.)

Unit I

Q1. Give a detailed account on Historical overview & scope of toxicology.

OR

Explain in detail Dose Response & Dose Response curves

Unit II

Q2. Write short notes on

a) Carcinogenesis b) Teratogenesis

OR

Discuss the complete process of toxicokinetics, with special reference to absorption, distribution, metabolism and elimination of toxicants.

Unit III

Q3. Explain Phase I Enzyme Reaction in detail

OR

Explain Phase II Enzyme Reaction in detail

Unit IV

Q4. Define Nephrotoxicity, Explain Renal physiology & function Example of Nephrotoxicants..

OR

Write a detailed account on Reproductive toxicity.

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M.Sc. (Zoo) Sem III

Elective Paper
Second Paper – Environmental Pollution and Legal Framework

Attempt any 4 questions. One question from each unit

Unit-I

Q1 Describe air pollution in detail including its effects on human health.

Q2. Write short notes on-

- A. Temperature inversion
- B. Plume Behavior

Unit-II

Q3. Give detail account on water pollution including water quality parameters.

Q4. Write short notes on-

- A. Species of pollutants
- B. Bioaccumulation

Unit III

Q5. Write effects of noise pollution on plants and human.

Q6. Write short notes on-

- A. Space pollution
- B. Thermal Pollution

Unit IV

Q7. Write short notes on-

- A. Wildlife protection act 1974
- B. Forest conservation act 1980

Q8. Write short notes on-

- A. Biomedical waste rules, 1998
- B. Air act 1981

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M.Sc. (Zoo) Sem III

Elective (Molecular biology of gene)

Attempt any 4 questions. One question from each unit

Unit I

Q.1 Describe base pairing, hydrophobic interactions, ionic interactions, denaturation and renaturation of DNA. Add note on A, B and Z DNA.

Q2. Describe primary structure, secondary structure, unusual secondary structure and G-quadruplex structures of DNA.

Unit II

Q3. Describe various steps of DNA replication in Eukaryotes with help of diagram?

Q4. Write short notes (any two):

- (a) Mechanism of DNA replication
- (b) Excision Repair
- (c) Recombinational repair

UNIT-III

Q5. Explain DNA binding proteins with suitable examples.

Q6. Write short notes (any two):

- a. Leucine zipper proteins
- b. Homeodomain Protein
- c. role of topoisomerase enzyme

Unit IV

Q7. Explain positive and negative regulation, catabolic repression in detail.

Q8. Write short notes (Any two):

- a. Operon Concept
- b. Inducer & Corepressor
- c. regulation of gene expression

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M.Sc. Zoology (Semester III)

Elective Paper IV
Proteomics

Attempt any 4 questions. One question from each unit

UNIT I

Q1. Explain the process of prokaryotic transcription with suitable diagrams.

Q2. Write short notes on any two of the following:

- a. Structure and functions of tRNA
- b. Role of RNA Polymerase in Eukaryotic Transcription
- c. Regulation of Transcription

UNIT II

Q3. Explain the nuclear export of mRNA and discuss the role of RNA stability in gene expression.

Q4. Describe the major inhibitors of RNA synthesis and explain their mechanisms of action.

UNIT III

Q5. Explain the genetic code and discuss its important features.

Q6. Explain eukaryotic translation and compare it with prokaryotic translation.

UNIT IV

Q7. Explain the role of smooth ER in lipid synthesis and describe the export of proteins and lipids from the ER.

Q8. Write short notes on any two of the following:

- a. Bioinformatics databases and explain the basic principles of BLAST and FASTA.
- b. Phylogenetic Tree Analysis
- c. Role of ER in Protein Secretion