

M. Sc. ZOOLOGY (SEMESTER-I)
SESSION: 2018-19
PAPER I (BIOSYSTEMATICS, TAXONOMY AND BIODIVERSITY)

MAX. M-80

NUMBER OF UNITS: IV

UNIT-I

1. Definition and basic concepts of biosystematics and taxonomy.
 - 1.1 Historical resume of systematics.
 - 1.2 Importance and applications of biosystematics in biology
2. Trends in biosystematics concepts of different conventional and newer aspects
 - 2.1 Chemotaxonomy
 - 2.2 Cytotaxonomy
 - 2.3 Molecular taxonomy

UNIT-II

3. Dimensions of speciation and taxonomic characters
 - 3.1 Mechanisms of speciation in panmictic and apomictic species
 - 3.2 Species concepts and species category.
 - 3.3 Theories of biological classification.
 - 3.4 Taxonomic characters and different kinds.

UNIT-III

4. Procedure keys in taxonomy.
 - 4.1 Taxonomic procedures-taxonomic collections, preservation, curation
 - 4.2 Taxonomic keys-different kinds of taxonomic keys, their merits and demerits.
 - 4.3 Process of typification and different Zoological types.
 - 4.4 International code of Zoological Nomenclature (ICZN)

UNIT-IV

5. Biodiversity
 - 5.1 Types of Biodiversity
 - 5.2 Hot spots of Biodiversity
 - 5.3 Threats to Biodiversity
 - 5.4 Conservation of Biodiversity
6. Evaluation of biodiversity indices
 - 6.1 Shannon-Weiner index.

M. Sc. ZOOLOGY (SEMESTER-I)
SESSION: 2018-19
PAPER II (GENERAL PHYSIOLOGY AND ENDOCRINOLOGY)

MAX. M-80

NUMBER OF UNITS: IV

UNIT-I

1. Digestion
 - 1.1 Nutrition
 - 1.2 Histology and function of digestive tract
 - 1.3 Digestive juices [i Saliva ii Gastric juice iii Pancreatic juice iv Bile juice v Succus entericus] Composition, function and mechanism of various digestive juice
 - 1.4 Mechanism and physiology of digestion
 - 1.5 Mechanism of absorption
2. Circulation of body fluid and its regulation
 - 2.1 Structure of heart and properties of cardiac muscle
 - 2.2 Structure, function, synthesis and composition of blood
 - 2.3 Blood group, cardiac cycle and blood fibrinization and defibrinization
3. Gas exchange and physiology of respiratory tract
 - 3.1 Structure of respiratory tract
 - 3.2 Breathing physiology and aerodynamic pulmonary volume
 - 3.3 Transport of gases [Oxygen and carbondioxide]

UNIT-II

3. Nervous System
 - 3.1 Histological structure of neurons and neuroglia and physiological properties of nerve fibre
 - 3.2 Neurotrophins, cerebrospinal fluid and its function
 - 3.3 Mechanism of conduction of nerve impulses in non medullated and medullated nerve fibres
 - 3.4 Synapse- structure, properties and its re uptake mechanism
 - 3.5 Neurotransmitters- classification, receptors function and metabolism
4. Muscle function and movements
 - 4.1 Anatomy, structure and properties of muscle
 - 4.2 Theories and physiology of muscle contraction mechanism
 - 4.3 Changes during muscle contraction 1. Mechanical 2. Chemical 3. Thermal 4. Electrical
 - 4.4 Enzyme uses in muscle contraction mechanism
5. Sensory transduction
 - 5.1 Auditory receptors
 - 5.2 Chemoreceptors, taste and smell
 - 5.3 Vision and photo receptors

UNIT III

- 6. Patterns of nitrogen excretion and its physiology
 - 6.1 Excretory substance and physiology of liver for excretion
 - 6.2 Excretory physiology of kidney and micturition
 - 6.3 Regulation of acid-base balance [Acidemia and alkalaemia]
 - 6.4 Detoxication
- 7. Thermoregulation and Cold Tolerance
 - 7.1 Heat balance and exchange
 - 7.2 Endotherms Vs Ectotherms
 - 7.3 Torpor, hibernation and aestivation
 - 7.4 Pyrexia and hypothermia
- 8. Aims and scope of endocrinology
 - 8.1 Discovery of hormones
 - 8.2 Experimental methods of hormone research
 - 8.3 Classification of endocrine glands and hormones

UNIT-IV

- 9.1 Structure and functions of endocrine glands (Pituitary, pineal, pancreas, adrenal, thyroid etc.)
- 9.2 Biosynthesis of hormones (adrenal, thyroid and gonadal)
- 9.3 Releasing mechanism, transport mechanism and metabolism of Hormones
- 9.4 Receptors and action mechanism of hormones
- 9.5 Neurohormone [releasing stimulating factor of hypothalamus and endorphin]

M. Sc. ZOOLOGY (SEMESTER-I)
SESSION: 2018-19
PAPER III (STRUCTURE AND FUNCTION OF INVERTEBRATES)

MAX. M-80

NUMBER OF UNITS: IV

UNIT-I

1. Organization of coelom
 - 1.1 Acoelomates and Pseudocoelomates
 - 1.2 Coelomates: Protostomia and Deuterostomia.
2. Locomotion
 - 2.1 Flagellar and ciliary movement in Protozoa.
 - 2.2 Hydrostatic movement in Coelenterata, Annelida and Echinodermata.

UNIT-II

3. Nutrition and Digestion
 - 3.1 Patterns of feeding and digestion in Protozoa
 - 3.2 Filter feeding in polychaeta.
4. Respiration
 - 4.1 Organs of respiration Gills, lungs and trachea.
 - 4.2 Respiratory pigments.

UNIT-III

5. Excretion
 - 5.1 Organs of excretion.
 - 5.2 Excretion and osmoregulation
6. Nervous System
 - 6.1 Primitive nervous system: Coelenterata and Echinodermata.
 - 6.2 Advanced Nervous system: Annelida, Arthropoda (Crustacea and insecta) and Mollusca (Cephalopoda)

UNIT-IV

7. Invertebrate larvae
 - 7.1 Larval forms of free-living and parasitic invertebrates
8. Minor Phyla
 - 8.1 Organization and general characters of (Ctenophore, Rotifera, Ectoprocta, Endoprocta)

M.SC. ZOOLOGY (SEMESTER-I)
SESSION: 2018-19
PAPER IV (MOLECULAR BIOLOGY AND BIOTECHNOLOGY)

MAX. M-80

NUMBER OF UNITS: IV

UNIT-I

1. Biomembranes
Molecular composition and arrangement
Transport across membrane
2. Structure and function
Mitochondria
Golgi complex
Lysosome
Ribosome

UNIT-II

3. DNA replication
4. Transcription
5. Translation
 - 5.1 Genetic code
 - 5.2 Mechanisms of initiation, elongation and termination
 - 5.3 Regulation of translation

UNIT-III

6. Genome organization
 - 6.1 Chromosomal organization: morphological and structural types.
7. Molecular mapping of genome
 - 7.1 Genetic and physical maps
 - 7.2 Polymerase Chain Reaction (PCR) and blotting techniques
 - 7.3 Introduction to Human Genome.

UNIT-IV

8. Transgenic animals and knock-outs
 - 8.1 Production and applications
 - 8.2 Embryonic stem cells
9. Application of genetic engineering
 - 9.1 Medicine
 - 9.2 Agriculture
 - 9.3 Industry

M. Sc. ZOOLOGY (SEMESTER-I)

SESSION: 2018-19

Practical- I

I. Biosystematics and Taxonomy

1. Study of biodiversity among various invertebrates and vertebrates (Listing of all the animals found in and around your house and also try to find out their Zoological names).
2. Collection of various insect species.
3. Visits to a local animal park or zoo to identify and study the captive fauna and preparation of report.
4. Study of adaptive characteristics of various invertebrates and vertebrates in different climate.
5. Taxonomic key formation and conversion.
6. Study of biodiversity in grassland and pond water by using Shannon -Weiner index
7. Other exercise related to theory paper

II. General physiology and endocrinology

1. Estimation of RBC, hemoglobin, hematocrit/PVC, blood group and Rh factor blood clotting time.
2. Determine the blood pressure of man.
3. Determination of urea, glucose and ketone bodies in urine.
4. Demonstration of osmosis.
5. Alternate methods of dissection and exposure of major endocrine glands in an experimental animals.
6. Study of histology of endocrine glands in different animal types through permanent slides and microtomy.
7. Other exercise related to theory paper.

Scheme of Practical Examination:

- | | |
|---|-------------------|
| 1. Experiments based biodiversity. | 15 marks |
| 2. Taxonomic key formation/conversion | 10 marks |
| 3. Experiments based on physiology & endocrinology. | |
| a. Blood analysis | 15 marks. |
| b. Urine analysis | 10 marks |
| 4. Alternate methods of dissection and exposure of major endocrine glands | 10 marks |
| 5. Comment on adaptive characteristics Spot 1-5 | 10 marks |
| 6. Slide Preparation (microtomy, Two Slides) | 10 marks |
| 7. Viva-voce | 10 marks |
| 8. Sessional | 10 marks |
| Total Marks | 100 marks. |

M. Sc. ZOOLOGY (SEMESTER-I) SESSION: 2018-19

Practical- II

III. Structure and function of invertebrates

1. Identification, classification and study of distinguishing features of important representatives from various groups (Protozoa to Hemichordata).
2. Study of permanent prepared slides (from Protozoa to Hemichordata).
3. Alternate methods of dissection; Reproductive, Excretory, nervous and haemocoelomic systems of leech.
4. Alternate methods of dissection Reproductive system of cockroach; general anatomy, nervous and reproductive systems of grasshopper; nervous system of crab; nervous and reproductive systems of scorpion.
5. Alternate methods of dissection of Nervous system of Mytilus, Sepia and Aplysia, general anatomy of Aplysia.
6. Alternate methods of dissection for Study of sections of the arm of a starfish; general anatomy of a Holothurian; Aristotle's lantern of a sea urchin complete as well as disarticulated parts of the Aristotle's lantern.
7. Permanent preparations of different materials to be provided for study.
8. Wonder invertebrates
9. Other exercise related to theory paper.

IV. Molecular biology and Biotechnology

1. Isolation of DNA/RNA
2. Study of mitochondria from buccal epithelium by staining with supravital stains.
3. Culture of amoeba, paramecium, euglena.
4. Study of cell division mitosis/meiosis by squash and smear preparation of root tip and cockroach/grasshopper testis.
5. Study of giant chromosome in the salivary gland of Chironomous larvae or Drosophila. .
6. Study of Barr body and human chromosome.
7. Culture and study of drosophila.
8. Preparation of culture media and culture of bacteria.
9. Other exercises related to theory paper.

Scheme of Practical Examination:

- | | |
|--|-----------|
| 1. Major Alternate methods of dissection | 12 marks. |
| 2. Minor Alternate methods of dissection | 08 marks. |
| 3. Identification & Comment on Spot 1-10 | 20 Marks |
| 4. Experiment on molecular biology | 20 marks. |
| 5. Culture Experiment | 20 marks. |
| 6. Viva-voce | 10 marks |
| 7. Sessional | 10 marks. |

Total Marks

100 marks.

APPROVED BY THE BOARD OF STUDIES

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Ms. Dharmika Agrawal (CR)	M.Sc. III sem.	

M. Sc. ZOOLOGY (Semester I)

Theory

Part A

		Marks			
No	Title	Theory	Test	Seminar	Total
Paper I	Biosystematics, taxonomy and biodiversity	80	10	10	100
Paper II	General physiology and endocrinology	80	10	10	100
Paper III	Structure and function of invertebrates	80	10	10	100
Paper IV	Molecular biology and biotechnology	80	10	10	100

Practical

Part B

	Practical	Marks
Practical I	Based on paper I and II	100
Practical II	Based on paper III and IV	100

M. Sc. ZOOLOGY (Semester II)

Theory

Part A

		Marks			
No	Title	Theory	Test	Seminar	Total
Paper I	Quantitative biology and computer application	80	10	10	100
Paper II	Gamete biology and Development biology	80	10	10	100
Paper III	Population genetics and evolution	80	10	10	100
Paper IV	Tools and techniques in biology	80	10	10	100

Practical

Part B

	Practical	Marks
Practical I	Based on paper I and II	100
Practical II	Based on paper III and IV	100

M. Sc. ZOOLOGY (Semester III)

Theory

Part A

		Marks			
No	Title	Theory	Test	Seminar	Total
Paper I	Comparative anatomy of vertebrates	80	10	10	100
Paper II	Biological chemistry	80	10	10	100
Paper III	Environmental biology and population ecology	80	10	10	100
Paper IV	Animal behaviour	80	10	10	100

Practical

Part B

	Practical	Marks
Practical I	Based on paper I and II	100
Practical II	Based on paper III and IV	100

M. Sc. ZOOLOGY (Semester IV)

Theory

Part A

		Marks			
No	Title	Theory	Test	Seminar	Total
Paper I	Environmental physiology	80	10	10	100
Paper II	Immunology and parasitism	80	10	10	100
Paper III	Ichthyology	80	10	10	100
Paper IV	Aquaculture and fisheries	80	10	10	100

Practical

Part B

	Practical	Marks
Practical I	Based on paper I and II	100
Practical II	Based on paper III and IV	100