

M. Sc. ZOOLOGY (SEMESTER- III)

Session 2018-19

PAPER- I (COMPARATIVE ANATOMY OF VERTEBRATES)

Max. M.– 80

NUMBER OF UNITS: IV

UNIT-I

1. Origin of Chordates
 - 1.1 Amphibians, Reptiles, Birds and Mammals.
2. Classification of Vertebrates
 - 2.1 Amphibians
 - 2.2 Reptiles
 - 2.3 Birds
 - 2.4 Mammals.

UNIT-II

3. Vertebrate integument and its derivatives.
 - 3.1 General structure and functions of Integument.
 - 3.2 Structure and functions of glands, scales, horns, claws, nails, hoof, feather and hair.
4. Skeletal system in vertebrates.
 - 4.1 Comparative account of (i) Jaw suspensorium, (ii) Limbs and Girdles.

UNIT-III

5. Respiration in Vertebrates.
 - 5.1 Comparative account of respiratory organs (structure and functions).
6. Circulation in Vertebrates.
 - 6.1 Structure and function of blood.
 - 6.2 Evolution of heart.
 - 6.3 Evolution of aortic arches.

UNIT-IV

7. Nervous System – Central, Peripheral and Autonomic.
8. Sense organs.
 - 8.1 Comparative account of Sensory Receptors.
9. Evolution of Urinogenital system in vertebrates.

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PAPER II (BIOLOGICAL CHEMISTRY)

Max. M.– 80

NUMBER OF UNITS: IV

UNIT-I

1. Properties of Proteins
 - 1.1 Structure and properties of amino acids.
 - 1.2 Classification of proteins.
 - 1.3 Structure of proteins.
 - 1.4 Biological Functions of Proteins.
 - 1.5 Protein Metabolism.

UNIT-II

2. Carbohydrates
 - 2.1 Classification of carbohydrates.
 - 2.2 Structure and Functions of Carbohydrates.
 - 2.3 Carbohydrate metabolism.
 - 2.4 Utilization of Krebs cycle
3. Lipid
 - 3.1 Lipid structure and functions
 - 3.2 Lipid metabolism.

UNIT-III

4. Vitamins
 - 4.1 Water and Fat soluble vitamins,
 - 4.2 Chemistry, occurrence and physiological role.
5. Enzymes
 - 5.1 Classification and nomenclature.
 - 5.2 Mechanism of action
 - 5.3 Regulation of enzyme activity and functions of Co-enzymes.

UNIT-IV

6. Nucleic acid
 - 6.1 Chemistry of DNA.
 - 6.2 Chemistry of RNA.
 - 6.3 Biological importance of nucleic acids.
 - 6.4 Nucleoproteins.
 - 6.5 Metabolism of nucleic acids.

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PAPER- III (ENVIRONMENTAL BIOLOGY AND POPULATION
ECOLOGY)

Max. M.– 80

NUMBER OF UNITS: IV

UNIT- I

1. Ecology
 - 1.1 Definition, concept and scope of ecology.
2. Structure and components of ecosystem.
3. Types and functions of ecosystem.
4. Ecological modeling.

UNIT-II

5. Limiting factors
 - 5.1 Energy flow, food chain, food web and trophic levels, ecological pyramids.
 - 5.2 Ecological succession
 - 5.3 Biogeochemical cycles: water cycle, carbon, oxygen and nitrogen cycles.

UNIT-III

6. Population dynamics
 - 6.1 Dynamics of population growth.
 - 6.2 Factors that increase or decrease population.
7. Community dynamics
 - 7.1 Characteristics and composition
 - 7.2 Development and classification of communities.

UNIT-IV

8. Renewable and non-renewable resources: Forest, water and mineral resources.
9. Conservation of energy sources.
10. National Parks, Wild life sanctuaries and biosphere reserves.

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PAPER- IV (ANIMAL BEHAVIOUR)

Max. M. – 80

NUMBER OF UNITS: IV

UNIT- I

1. Historical perspectives- Ethology
2. Behavioural patterns
3. Innate behaviour
4. Biological rhythms
 - 4.1 Types of biological rhythm
 - 4.2 Biological clock

UNIT- II

5. Communications
 - 5.1 Auditory
 - 5.2 Visual
 - 5.3 Chemical
6. Learning and Memory
 - 6.1 Conditioning
 - 6.2 Habituation
7. Reasoning
8. Reproductive behaviour.

UNIT-III

9. Orientation
10. Echolocation in bats
11. Bird migration and navigation.
12. Fish migration.
13. Neural and hormonal control of behaviour

UNIT-IV

14. Hormonal effect on behavioural patterns.
15. Social behaviour
 - 15.1 Social organization in insects and primates
 - 15.2 Schooling in fishes and Flocking in birds
 - 15.3 Homing, territoriality, dispersal
 - 15.4 Altruism
 - 15.5 Host–parasite relation

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Practical- I

I. Comparative anatomy of Vertebrates

1. Identification, classification and study of distinguishing features of important representatives, museum specimens and slides (Protochordates and Chordates)
2. Comparative studies of integumentary, skeleton and reproductive system of major vertebrate classes.
3. Alternate methods of dissections: fowl/snake cranial nerves
4. Wonder vertebrates
5. Other exercise related to theory paper.

II. Biological chemistry

1. Identification of protein, carbohydrate and lipids in various tissues.
2. Estimation of Carbohydrate (Glycogen, Glucose) and Total Proteins.
3. Determination of serum proteins through paper electrophoresis.
4. Paper chromatography using amino acids from purified samples.
5. Comparison of RBC and WBC number in different groups of vertebrate.
6. Demonstration of action of salivary enzyme amylase.
7. Other exercise related to theory paper.

Scheme of Practical Examination:

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|---|-------------------|
| 1. Alternate methods of major dissection | 12 marks. |
| 2. Alternate methods of minor dissection | 08 marks. |
| 3. Exercises based on Biochemistry. | 40 marks. |
| 4. Identification and Comments on spots 1 to 10 | 20 marks |
| 5. Viva-voce | 10 marks |
| 6. Sessional | 10 marks. |
| Total Marks | 100 marks. |

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Practical- II

III. Environmental Biology, Population ecology

1. Study of biotic community in a pond/grassland ecosystem.
2. Study of population growth rate (curve) in protozoan culture.
3. Population dynamics of *Tribolium* sp.
4. Study of biogeochemical cycles by way of models.
5. Visit to some natural habitats and man made habitats to study the human impact on environment.
6. Water analysis for fresh and waste water (Dissolve oxygen and chloride).
7. Other exercises related to theory paper.

IV. Animal Behaviour

1. To study the phototactic response in earthworm or grain/pulse pest.
2. To study the geotaxis behaviour of earthworm.
3. To study the food preference and cleaning behaviour of housefly.
4. To study the food preference in tribolium or grain/pulse pests.
5. To study the web construction and habituation in spider.
6. Estimation of body temperature and pulse rate on daily time scale.
7. Estimate the time perception among various individuals at two different time points on daily time scale.
8. Determination of effect of time on schooling behaviour in fish.
9. Toxicological response of fish opercular and surfacing activity.

Scheme of Practical Examination:

- | | |
|--|-------------------|
| 1. Exercise based on Population ecology | 20 marks. |
| 2. Exercise based on Environmental biology | 20 marks |
| 3. Exercise based on Animal behaviour | 20 marks. |
| 4. Exercise based on Biorhythm | 20 Marks |
| 5. Viva-voce | 10 marks. |
| 6. sessional | 10 marks. |
| Total Marks | 100 marks. |

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