

M.Sc. (Final) ZOOLOGY-2006-07

The M.Sc.(Final) examination shall consist of two compulsory papers I and II, common for all the students and two Elective papers- III and IV(out of two streams i.e. I-Molecular Cell Biology Stream and II Organismic Biology stream), i.e. total four theory papers, each of three hours duration. There shall be two practical examinations. The practical-I will be common to all the students and based on paper I & II. The Practical-II will be based on respective elective paper group stream. Each practical examination shall be of ten hours, divided in two days.

COMPULSORY PAPERS : Common for all students (core papers)

	Marks
Paper-I : Comparative Anatomy of Vertebrates and Animal Behaviour	100
Paper-II : Vertabrate Endocrinology, Immunology and Molecular Biology	100
Practical -I	100

ELECTIVE PAPER GROUP-I (Molecular Cell Biology Stream: Cancer Biology, Tumour Immunology, Neurobiology, Genome and Genomics)

Paper-III : Cancer Biology and Tumour

Paper-IV : Neurobiology, Genome and Genomics 100

Practical-II Cancer Biology, Tumour Immunology, Neurobiology, Genome and Genomics 100

ELECTIVE PAPER GROUP-II (Organismic Biology Stream: Aquaculture, Fisheries, Ecotoxicology, Limnology and Ichthyology)

Paper-III Aquaculture, Fisheries and Ecotoxicology 100

Paper-IV Limnology and Ichthyology 100

Practical-II Aquaculture, Fisheries, Ecotoxicology, Limnology and Ichthyology 100

Pattern of question paper in the annual examination and distribution of marks :

Each theory paper in the annual examination shall have three sections i.e. A,B, and C. In section A, total 10 questions will be set in the paper, selecting at least two from each unit. These questions to be answered in a word or so. All questions are compulsory. Each question carries 1 mark, total 10 marks.

In section B, there shall be total 10 questions, selecting two questions from each unit, five questions to be answered by the student selecting at least one from each unit. Answer should be given in approximately 250 words. Each question carries 10 marks.

In section C, 04 descriptive type questions will be set in the examination paper from five units of the syllabus of the paper, selecting not more than one question from a unit. Each question may have two sub divisions. Students are required to answer any two questions approximately in 500 words. Each question is of 20 marks, total 40 marks.

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PAPER - I

COMPARATIVE ANATOMY OF VERTEBRATES AND ANIMAL BEHAVIOUR

Duration : 3 hours

M.M. 100

UNIT - I

- 1 Origin of Protochordata and Chordata.
- 2 Nature and importance of vertebrate morphology.
- 3 Blood circulation in vertebrates (General plan):
 - a. Blood
 - b. Evolution of heart
 - c. Evolution of aortic arches and portal systems
- 4 Respiratory systems :
 - a. Characteristics of respiratory tissue
 - b. Internal and external respiration
 - c. Comparative account of respiratory organs

UNIT - II

- 5 Skeletal system :
 - a. Form, function, body size and skeletal elements of body

- c. Limbs and girdles
- 6 Evolution of urinogenital system in vertebrate series.
- 7 Sense organs :
 - a. Simple receptors
 - b. Organs of olfaction and taste
 - c. Lateral line system
 - d. Electroreceptors
- 8 Nervous system :
 - a. Comparative anatomy of the brain and spinal cord in relation to their functions
 - b. Cranial, peripheral and autonomous nervous system

UNIT - III

- 9 Introduction: Ethology as a branch of Biology.
- 10 Innate behaviour
- 11 Perception of the environment :
 - a. Mechanical
 - b. Electrical
 - c. Chemical

- e. Auditory
- f. Visual

UNIT - IV

- 12 Communication:
 - a. Chemical
 - b. Visual
 - c. Light
 - d. Audio
 - e. Specificity of songs
 - f. Evolution of language (Primates)
- 13 Ecological aspects of behaviour :
 - a. Habitat selection, food selection, optimal foraging theory, anti-predator defense.
 - b. Aggression, homing, territoriality, dispersal.
 - c. Host - parasite relationships

UNIT - V

- 14 Social behaviour :
 - a. Aggregation, schooling in fishes, flocking in birds, herding in mammals
 - b. Ground selection, kin selection, altruism, reciprocal altruism, inclusive fitness

- 15 Reproductive behaviour:
- a. Evolution of sex and reproductive strategies
 - b. Mating system
 - c. Courtship
 - d. Sperm competitions
 - e. Sexual selection
 - f. Parental care

- 16 Biological rhythms :
- a. Circadian and circannual rhythm
 - b. Orientation and navigation
 - c. Migration of birds and mammals

- 17 Learning and memory:
- a. Conditioning
 - b. Habituation
 - c. Insight
 - d. Associative learning
 - e. Reasoning

REFERENCE BOOKS (LATEST EDITIONS) :

- 1 Alexander, R.M. The Chordata. Cambridge unit Press, London.
- 2 Bonington F.W. The Biology of Hemichordata

- 3 Bourne, G.H. : The Structure and Functions of nervous tissue. Academic Press, New York
- 4 Carter, G.S. Structure and Habit in Vertebrate Evolution - Sedgwick and Jackson, London.
- 5 Eccles, JC, The understanding of the brain. McGraw Hill Co., New York and London
- 6 Kingsley, JS, Outlines of Comparative Autonomy of Vertebrates. Central Book Depot, Allahabad.
- 7 Kent, C.G. Comparative Anatomy of Vertebrates.
- 8 Malcom Jollie, Chordata Morphology. East-West Press Pvt. Ltd., New Delhi.
- 9 Milton Hilderbrand. Analysis of Vertebrate Structure. IV Ed. John Wiley and Sons Inc., New York.
- 10 Monielli, A.R. The chordates. Cambridge University Press, London.
- 11 Smith, H.S. Evolution of Chordata Structure. Hold Rinehart and Winstoin Inc., New York.
- 12 Sedgwick, A.A Students Text Book of Zoology, Vol.II.
- 13 Tansley, K. Vision in Vertebrate. Chapman and Hall Ltd., London.
- 14 Torrey, T.W. Morphogenesis of Vertebrates. John

- 15 Walters, H.E. and Sayles, L.D. Biology of Vertebrates. MacMillan and Co., New York
- 16 Wolstenholmf, E.W. and Knight, J. (Ed.). Taste and Smell in Vertebrates, J&A Churchill, London.
- 17 Romer, A.S. Vertebrate Body, IIIrd Ed., W.B. Saunders Co., Philadelphia.
- 18 Young, J.Z. Life of vertebrates. The Oxford University Press, London.
- 19 Young, J.Z. Life of mammals, Oxford University Press, London.
- 20 Colbert, E.H. Evolution of the vertebrates, John Wiley and Sons Inc., New York.
- 21 Romer, A.S. Vertebrate Paleontology, 3rd Edn. University of Chicago Press, Chicago.
- 22 Clark, W.E. History of the Primates IV Edn. University of Chicago Press, Chicago.
- 23 Weichert, C.K. and Presch, W. Elements of chordate anatomy, 4th Edn. McGraw Hill Book Co., New York.
- 24 Messers, H.M. An introduction of vertebrates anatomy.
- 25 Montagna. W. Comprative anatomy. John Wiley
- 26 De Deer, S.G. Embryos and Ancestors. Clarendon Press, Oxford.
- 27 Andrews, S.M. Problems in Vertebrate Evolution. Academic Press, New York.
- 28 Waterman, A.J. Chordata Structure and function. Macmillan Co., New York.
- 29 Joysey, K.A. and T.S. Kemp. Vertebrate evolution. Oliver and Boyd, Edinbrough.
- 30 Lovtrup, S. The Phylogeny of vertebrate, John Wiley and Sons, London
- 31 Barbiur, T. Reptiles and Amphibians : Their habits and adaptations. Hongton Miffin Co., New York
- 32 Kingsely Noble, G. The biology of the Amphibia. Dover Publications, New York
- 33 Smyth. Amphibia and their ways. The McMillan Co., New York
- 34 Andrevos, S.M.Miles, R.S. and Walker, A.D. Problems in vertebrate evolution. Academic Press, New York.