ZOOLOGY


The examination shall comprise three theory papers and a practical test

Paper I  Lower Non-chordata and Organic Evolution  33 marks
Paper II  Higher Non-Chordata and Ecology        33 Marks
Paper III Cell Biology and Genetics             34 Marks
               Practical                        50 marks
               Total                             150 marks

Candidate must obtain minimum pass marks in theory and practical examinations separately

Paper I : Lower Non-chordata (Protozoa to Helminthes) and Evolution

Section A : Lower Non-Corddata

• General survey and outline classification (upto orders only) of Protozoa, Porifera, Cnidaria (Coelenterata), Platyhelminthes and Nematoda
• Nutrition and locomotion in Protozoa
• Parasitism in Protozoa and Human diseases
• Canal system and skeleton in Porifera
• Polymorphism and colony formation in Coelenterata
• Parasitic adaptations in helminthes
• Helminthes and Human diseases
• Classification, habit, habitat, structure, reproduction and life history of the following types: Plasmodium, Paramecium, Sycon, Obelia, Fasciola and Taenia & Ancylostoma.

Section B : Organic Evolution

• Origin of Life
• Evidences of organic evolution
• Theories of evolution (Lamarckism/NeoLamarckisms/Darwinism/NeoDarwinism/mutation theory and synthetic theory)
• Evolution through ages and geological time Scale
• Zoogeographical realms and their characteristic fauna.

Paper II : Higher Non-chordata (Anelida to Echinodermata) and Ecology

Section A : Higher Non-Chordata

General characters and outline classification (Upto orders only) of Annelida, Arthropoda, Mollusca and Echinodermata.
Classification, habit habitat, structure, reproduction and life history of the following types Hirudinaria, Palaemon, Pila, L'nio (Lamellidens) and Asterias & Balanoglossus

Section B : Ecology

Organisms and their environment - Abiotic (temperature, light and moisture) and biotic (mutualism, commensalism, predation, parasitism, etc.) factors.

Concept of ecosystem - types, components, energy flow, food chains and trophic levels, and food web.

Elementary knowledge of biogeo-chemical cycles (Water, carbon, nitrogen, phosphorus, etc.)

Biomes (Fresh water and terrestrial)

Paper III. Cell Biology Adaptation - Aquatic, Volant & Desert, and Genetics

Section A : Cell Biology

Basic concepts of microscopy - light microscope, phase contrast microscope and electron microscope.

Ultrastructure of prokaryotic and eukaryotic cell.

Ultrastructure, chemistry and functions of cell organelles (Plasma membrane, Mitochondrion, Golgi complex, Endoplasmic reticulum, Ribosome
Cell cycle, its regulation and cell divisions - mitosis and meiosis

Section B: Genetics

Structure and types of chromosomes

Linkage and crossing over

Chromosomal and gene mutations

DNA as genetic material - structure and replication

RNA structure and its role in protein synthesis

Human genetics - Karyotype, autosomal and sex chromosomal disorders, multiple births, sex linked inheritance

Blood group and its inheritance

Practical Syllabus of B.Sc. (I) Same as existing & there is not change.

ZOLOGY


The examination shall comprise three papers and a practical test.

Paper I Protochordata, Cyclostomata and Developmental Biology 33 marks

Paper II Vertebrate Zoology 33 marks
M.J.P. ROHILKHAND UNIVERSITY, B.Sc. I, II & III Exams

Paper III: Mammalian Physiology and Biochemistry 34 marks

Practical 50 marks

Total 150 Marks

Candidates must obtain minimum pass marks in theory and practical examinations separately.

Paper I: Protochordata, Cyclostomata Developmental Biology

Section A: Protochordata and Cyclostomata

General characters and outline classification (upto orders only) of Protochordata

Habit, habitat, structure, development, lifehistory and affinities of:

Urochordata: Herdmania

Cephalochordata: Amphioxus (Branchiostoma)

Cyclostomata: Habit, habitat and external features of Petromyzon and Myxine

Comparison of Petromyzon and Myxine

Section B. Developmental Biology

Basic concepts of gametes and gametogenesis
Types of eggs and fertilization.


Development of extraembryonic membranes in chick

Placentation in mammals

Note: Answr FIVE questions of which question No. 1 is compulsory which shall be of multiple choice questions. THREE questions are to be asked from each section. Answer at least One question from each section.

Paper II: Vertebrate Zoology

General characters and outline classification (upto orders only) of Craniata and the classification, habits, structure and life history of the following types:

Pisces: Scoliodon (Dogfish)

Reptilia: Uromastix

Aves: Columba (Pigeon)

Parental care in Amphibia

Identification of poisonous and non-poisonous snakes

Biting mechanism in snakes.

Snake venom and antivenin
Adaptive radiation, general characteristics and affinities of Prototheria, Metatheria and Eutheria

Comparative Study of integument, cefalimentary canal, Heart, Brain & Urinogenital system of Vertebrates.

Note: Answer Five questions of which questions No. 1 is compulsory which shall be of multiple choice questions.

Paper III: Mammalian Physiology and Biochemistry

Section A: Mammalian Physiology

Nutrition: Nutritional requirements, physiology of digestion, absorption and assimilation, role of hormones in digestion.

Respiration: Mechanism and regulation of breathing, transport of oxygen and carbon dioxide, respiratory disorders.

Blood and circulation: Structure of blood and its clotting, cardiac cycle, heart beat and its regulation, rhythmicity of heart beat, arteriosclerosis, ECG and pacemaker.

Excretion and osmoregulation, Nitrogenous waste products, nephron & urine formation, role of kidney in osmoregulation kidney failure and dialysis.

Structure and mechanism of muscle contraction.

Nervous system: Conduction of nerve impulse, reflex action.
Endocrine coordination: Hormones and functions of major endocrine glands (Pituitary, thyroid, parathyroid, thymus, adrenal cortex and medulla, pancreas, etc.)

Sex hormones and menstrual cycle

Section B: Biochemistry

Metabolism: Protein, Carbohydrates liquids

Structure, classification Chemistry and properties of carbohydrates, lipids & protein.

Hydrogen ion concentration and buffering mechanism

Enzymes classification, Chemistry, properties, nomenclature and mechanism of enzyme action

Practical Syllabus of B.Sc. (II) same as existing & There is no change.

ZOONOLOGY

B.Sc. part III (2004 - 2005)

The examination shall comprise three theory papers and a practical test.

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<th>Paper</th>
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<td>Paper I</td>
<td>Environmental Biology and Toxicology</td>
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<tr>
<td>Paper II</td>
<td>Economic Zoology, Biostatistics and Animal</td>
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<td>Behaviour</td>
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Paper III: Microbiology, Molecular Biology and Biotechnology 34 marks

Practical 50 marks

Total 150 marks

Candidates must obtain minimum pass marks in theory and practical examinations separately

Paper I: Environmental Biology and Toxicology

Section A: Environmental Biology

Ecosystem: Types and dynamics, trophic structure, energy flow and biological amplification, Ecological pyramids.

Community: Basic structure, species diversity, dominance, distribution and succession

Population: Human population growth and control through family planning.

Environmental Pollution: Air, water, land, noise, thermal and pesticide pollution

Wild life conservation: Causes for wildlife depletion, chief endangered animal species, sanctuaries and national parks.

Section B: Toxicology

Survey of environmental toxicants (heavy metals, pesticides, food additives, fertilizers and automobile emissions) and their biological ill-effects on
human beings.

Dose response relationship: Graded, quantal and cumulative responses

Outline of toxicological testing method.

Principal idea of mortality tests (LC50/LD50) and safety margins/limits, acute subacute and caronic testing of local and systemic effects (reproductive, teratogenic and carcinogenic)

Translocation of chemicals: Membrane barriers, storage depots, biotransformation sites, mixed multifunction oxidases, selective toxicity, biotransformation and their applications

Outline of antidotal procedure.

Paper II: Economic Zoology, Biostatistics and Animal Behaviour

Section A: Economic Zoology

Classification, life history, damage and control of following insect pests: vegetable - red pumpkin beetle, stored grain - rice weevil; wheat - army worm; paddy - rice bug; sugar-cane sugarcane white fly, cotton - spotted bollworm; fruit - banana weevil & plant Parasitic nematodes

Methods of pest control: natural and applied (physical, chemical and biological control)

Brief outline of pisciculture, poultry and dairy farming
General survey of important edible freshwater fishes of Uttar Pradesh

Economic importance of fishes: Preservations, processing and marketing

General features, life-history and useful products of Apis, Bombyx and Tachardia and Termites

Rat menace and its control

Section B: Biostatistics & Animal Behaviour

Biostatistics: -

Statistical terms and symbols

Graphic representation of data

Measures of central tendency: Mean, media and mode

Measures of variability: Mean deviation, variance and standard deviation

Probability: definition, important terms, rules and types of probability

Animal Behaviour: -

The basic concepts of ethology - Motivating, learning, conflict orientation (Taxs)

Biological clock / Kinesis & Language of Honeybee

Animal communication: chemical, visual, auditory, tactile, etc.

Courtship and mating behaviour
Territorial behaviour

Fish and bird migrations

**Paper III: Microbiology, Molecular biology and Biotechnology**

**Section A: Microbiology & Molecular Biology**

The scope of microbiology

Methods of studying microorganisms

Survey and classification of microorganisms

Structure of bacteria and viruses

Microorganisms and human diseases

**Section B: Molecular Biology**

Cells and macromolecules

Nucleic acid structure, physical and chemical properties & Nucleo Protein

DNA damage, repair and recombination

Protein synthesis its regulation.

**Section C: Biotechnology**

Basics of recombinant DNA technology, gene clone

Plasmids and restriction endonucleases
The polymerase chain reaction

Transgenic animals

DNA fingerprinting

The human genome project

Uses of genetic engineering (Medical, Agriculture & Industry)

Immune system, Humoral & Cellular immunity, structure of antibody & Hybridoma technology & AIDS.


1. Major dissection 10 marks
2. Minor dissection 05 marks
3. Permanent preparation 05 marks
4. Cytology preparation 05 marks
5. Spotting (10 spots) 15 marks
6. Viva voce 05 marks
7. Practical record & collection 05 marks

Total 50 marks

Duration of practical will be 4 hours
1. **Major Dissection**:

   Nervous system of grasshopper or cockroach

   Cranial nerves of Labeo or Wallago

2. **Minor Dissection**:

   Mouthparts and sting apparatus of honebee

   Internal ear and Weberian ossicles of Labeo or any other freshwater carp or siluoid fishes.

3. **Permanent preparation**:

   Preparation of ..........paramecium

   Permanent preparation of freshwater arthropods (Cyclops, Daphina, Chironemus larva, etc.)

4. **Cytology preparation**:

   Preparation of slide of mitosis (Onion root tip)

   Preparation of slide meiosis (Grasshopper testis)

   Preparation of giant chromosomes of *Chironomus larva*.

5. **Spotting**:

   Study of freshwater edible fishes

   1. Notopterus notopterus
   2. Catla catla
   3. Labeo rohita
seenghala
9. Channa punctatus 10. Anabas testudineus
11. Mugil corsula 12. Mastacembelus armatus

Study of following permanent slides:
1. Entamoeba 2. Giardia 3. Leishmania

Study of different types of mouthparts:

Study of life cycle of following insects:
1. Honeybee 2. Silkworm 3. Lac insect

Study of following insect pests (at least one from each category):
1. Pests of vegetables:
   (i) Cabbage caterpillar (Pieris brassicae)
2. Pests of store-grain

(i) Rice weevil (Sitophilus oryzae)
(ii) Red flour beetle (Tribolium castaneum)

3. (i) Gundhy bug (Leptocorisa varicornis)
(ii) Rice grasshopper (Hieroglyphus banian)

4. Pests of sugarcane:

(i) Sugarcane leaf hopper (Pyrilla perpusella)
(ii) Sugarcane top borer (Scirpophaga nivella)

5. Pests of cotton

(i) Red cotton bug (Dysdercus koenigii)
(ii) Pink bolloworm (Pectinophora gossypiella)

6. Pests of fruits:

(i) Mango leafhopper (Idiocerus atkinsoni)
(ii) Citrus catepillar (Papilio demoleus)

6. Excursion for the study and collection of some freshwater fishes and insect pests.