

**SYLLABUS**  
**FOR**  
**Ph.D ENTRANCE TEST – ZOOLOGY**

**(As per Ph.D. ordinance 11)**

~~2023~~ - 2024

**SCHOOL OF STUDIES IN ZOOLOGY AND BIOTECHNOLOGY**  
**VIKRAM UNIVERSITY, UJJAIN**

## Scheme of Examination

The question paper of the entrance test will have two sections A & B, each consisting of 50 objective type compulsory questions. Each question will carry 1 mark. The candidate must score minimum 50% marks in the entrance test to qualify for the interview. (45% for SC/ST/OBC/PW)

Ques

Ans

Ans - 20

**Vikram University, Ujjain**  
**School of Studies in Zoology & Biotechnology,**  
**Syllabus for M.Phil/Ph.D Entrance Test, Session ~~2022~~ 4**

**Section A: Research Methodology**

**UNIT - 1**

1. Hypothesis testing
2. Analysis for frequencies, Analysis for variance.
3. Correlation, regression
4. Non-parametric tests.
5. **Computer and its components:** Basic concepts of computer, its components, block diagram of computer, characteristics of computer, classification of computer and Types of computer (Digital mainframe, micro, mini and super computer)
6. **Computer virus:** Definition, name, types and effects of some computer viruses.
7. **Computer antivirus:** Definition, name, types and effects of some computer antiviruses.
8. **Internet:** Concept of World Wide Web, WWW browsers, Client server architecture, Protocols, Emails, Browsing on internet, applications of internet, applications of internet in the field of research

**UNIT - 2**

1. Photometry: Basic principle of colorimetry, Instrument and application.
2. UV- visible spectrophotometry: Principle, instrument and applications.
3. IR- spectrophotometry: Principle, instrument and applications.
4. Atomic absorption Spectroscopy: Principle, instrument and applications.
5. Mass Spectroscopy: Principle and application.
6. Fluorescence Spectroscopy: Principle, instrumentation and applications.

**UNIT - 3**

1. Chromatography: Paper and Thin Layer Chromatography.
2. Gel filtration Chromatography and Ion Exchange Chromatography..
3. Gas-liquid chromatography and HPLC.
4. Electrophoresis: Paper electrophoresis, Agarose and Polyacrylamide Gel electrophoresis.
5. SDS - PAGE electrophoresis.
6. Isoelectric Focusing.

**UNIT - 4**

1. X-ray crystallography.
2. NMR: Principle, Instrument and applications.
3. Nephelometry and Turbidimetry, Principle and application.
4. Centrifugation: Principle, Instrument and applications.
5. Ultrasonication: Principle, Instrument and applications.
6. Microtomy, types, principles and applications.

**UNIT - 5**

1. Microscopy: Light, Phase contrast and fluorescence Microscopes.
2. Electron Microscopy
3. Newer Technique in Microscopy: Confocal Microscopy.
4. Radioactivity: Liquid, Scintillation Counter and Solid Scintillation counters.
5. Radio Immuno Assay (RIA)
6. Autoradiography: Principle and applications.

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## Section -B: ZOOLOGY

### UNIT-1

1. Definition and basic concepts of biosystematics.
2. Taxonomic categories and hierarchy categories.
3. Concepts of population genetics, Hardy – Weinberg law of genetic equilibrium.
4. Origin of metazoan.
5. Importance of larval forms in Invertebrates.
6. Economic importance of Insects.
7. Physiology of digestion, excretion & reproduction in Vertebrates.
8. Biology & affinities of Minor Phyla.

### UNIT-II

1. Evolution of vertebrates and adaptation in vertebrates.
2. Adaptive radiation in vertebrates.
3. Origin, evolution general organization of Ostracoderms and cyclostomes.
4. Multiple ovulation and embryo transfer technology : *in vitro* oocytes maturation, super ovulation.
5. Hypothalamic Nuclei and their physiological function.
6. Surgical techniques- castration, ovariectomy, vasectomy, tubectomy and laprotomy.
7. Eicosanoids and hormone action.
8. Chemical nature of hormone.

### UNIT-III

1. Principle of biodiversity and causes for the loss of biodiversity.
2. Biodiversity conservation methods.
3. National Parks and Sanctuaries.
4. Project Tiger.
5. Project Gir lion and Crocodile breeding project.
6. Biospheres reserve.
7. Kinds of environmental pollution and their control methods.
8. Radioactive compounds and their impact on the environment.

### UNIT-IV

1. Gene regulation in Prokaryotes & Eukaryotes.
2. Transcription & Translation general process.
3. DNA- Molecular structure, replication, damage and repair.
4. Genomics: Structural and Function, Human Genome Project.
5. Different types of RNA and their significance.
6. Cytogenetic of human chromosomes, Prenatal diagnosis & genetic screening, genetic counseling & Human gene therapy.
7. Enzymes: Terminology and classification.
8. Mechanism and Regulation of Enzyme Action.

### UNIT-V

1. Organ and cells of the immune system- Primary and secondary lymphoid organs.
2. Component of innate and acquired immunity.
3. Comparative study of photoreception.
4. Adaptations: Levels of adaptations, significance of body size.
5. Fresh water environment.
6. Environmental limiting factors.
7. Inter and intra-specific relationships.
8. Mutualism, evolution of plant pollinator interaction.

 