



**Ph.D. Entrance Examination**

**Subject: Zoology**

**Syllabus**

**Ecology**

Characteristics –Natality, Mortality, Density, and age distribution, population control, life-tables, Food chains, Food webs and Ecological pyramids. Air pollution, Water pollution and Oil pollution. Noise pollution and Thermal pollution, Pond as a Ecosystem, energy flow and ecological succession. Habitats – Terrestrial – Aquatic – Marine, Fresh water and estuary, Environmental resources- renewable and non renewable resources. Forest resources- Protection – Chipko movement- A forestation. Wild life management- Wild life sanctuaries and National Parks.

**Endocrinology:**

General Principles of Endocrinology What are hormones, types of release, Techniques for Studying Endocrinolog, Thyroid Hormones

**Animal physiology & developmental biology and immunology**

Nutrition –types, Enzymes – Enzyme action, Coenzymes, Digestion in man. Respiration – Respiratory pigments, role in transport of O<sub>2</sub> and CO<sub>2</sub> in man. Circulation - blood composition, origin and conduction of heart beat in an – blood pressure, Heart diseases– heart attack.

**Cell & Molecular biology**

Prokaryotic and eukaryotic cells –Ultrastructure and Organization. Plasma membrane–Ultra structure–Chemical compositon and functions of modifications of plasma membrane. Endoplasmic reticulum: Morphology, Ultra structure, chemical composition and functions. Golgi complex: Ultra structure, chemical composition and functions.

mitosis, meiosis and cell cycle. Cell - Chemical nature and macromolecular protein structure and function; membrane architecture, membrane associated process, ATP synthesis and photosynthesis, Sub-cellular organelles - mitochondria, chloroplast, DNA replication - prokaryotic and eukaryotic DNA replication - Mechanisms of

DNA replication - Enzymes and accessory proteins involved in DNA replication - Bacterial genetic system - transformation, conjugation and transduction, Transcription & Translation

### **Immunology & recombinant DNA technology**

Historical perspectives - overview of immune system, innate and acquired immunity, immune - systematic structure and organization.

Antigen and antigenicity, Immunoglobulins - structure, complements, antigen - antibody interaction - monoclonal antibodies.

History of Recombinant DNA Technology. Isolation and Quantification of DNA and RNA. Host controlled Restriction –Modification system, Restriction Endonucleases. Cutting and joining of DNA molecules *in vitro*. Phosphatases, Ligases and Polymerases. Vectors: Plasmid, Bacteriophage, Cosmids, Phagemid and other (SV 40) Virus vectors. Expression Vectors.

### **INVERTEBRATA & CHORDATA**

Phylum Porifera: General characters- Type study- Ascon- Cellular structure, Phylum Platyhelminthes: General Characters- Classification- Type study- Liver fluke- Structure and Reproduction, Type Study: Amphioxus- external characters, digestive, excretory, respiratory, and circulatory systems, Class : Amphibia :General characters and classification -Type Study : Frog –External characters

### **MICROBIOLOGY AND BIOCHEMISTRY**

Classification of microorganisms- General characteristics of Bacteria, Virus, Yeast. Bacteria- Morphology, Bacterial cell structure, Motility, Nutrition and Reproduction. Virus-discovery- Morphology, Classification, phages and life cycle. Yeast-Morphology, cell structure, Multiplication, phages and cycle.

### **Genetics**

DNA as genetic material, Structure and types of DNA and RNA, Genetic code, Protein synthesis Transcription and translation

**DNA Replication and Gene Structure**

DNA replication, Cis-trans complementation test, Fine structure analysis of r II region of T4 by Benzer.

**Mutation**

Evidence for spontaneous nature of mutation, Molecular basis of mutation- Types of mutation, Types of bacterial mutants and their isolation, Mutagenic agents- Physical and chemical, Mutation rate and Ames test.