

M. Phil / Ph.D., THEORY EXAMINATIONS

PAPER – 1 METHODOLOGY

1. **Histology and histochemical techniques:** Principles of vital staining techniques, techniques of fixing-embedding, sectioning, staining of fixed material, histochemical techniques for analysis of organic compounds such as carbohydrates, fats, proteins and nucleic acids.
2. **Spectrophotometer:** atomic absorption spectroscopy techniques and their applications.
3. **Chromatography techniques:** Principles and applications. TLC, GLC, HPLC.
4. **Electrophoresis techniques:** Principles, and applications. SDS-PAGE and Agarose gel electrophoresis.
5. **Centrifugation techniques:** Clinical centrifuge, high speed centrifuge and ultra centrifuge.
6. **Culture techniques:** Tissue, organ culture, and cell culture. Different types of media used in cell culture.
7. **Water pollution monitoring techniques and toxicology:** BOD, COD, Biomonitoring, environmental impact assessment, LC₅₀ and LD₅₀.
8. **Statistical applications in Biological research:** Averages, standard deviation, standard error, analysis of variance, regression, correlation co-efficient, chi-square test, student't'-test.
9. **Computers Applications:** History of computers, classification of computers, computer generations. Word processing and presentation software: MS-WORD, MS-Power point, MS-Excel. Internet concepts: internet access tools, Web searching, e-mail, File transfer protocol (FTP)

MODEL OF QUESTION PAPER

Time: 3hrs

Max. Marks – 100

Eight essay questions have to be set within the frame work of the above syllabus. Student has to answer any five questions. All questions carry equal marks.

M. Phil / Ph.D., THEORY EXAMINATIONS

PAPER – II ENVIRONMENTAL BIOLOGY

SYLLABUS

1. **Introduction to Toxicology:** Scope of toxicology- Sources of toxic compounds; Environmental movement of toxicants- Absorption of toxicants through biological membranes.
2. **Pesticide Pollution:** Classification and mode of action of Organochlorides, Organophosphates, Organocarbomates and Pyrethroids; Bio accumulation, distribution, degradation and elimination of Pesticides.
3. Physiological and Biochemical hazards of pesticides in animals- Occupational exposure to pesticides and Detoxification mechanisms.
4. **Classification of Fishes:** Objectives of classification, Method of classification, Major groups of Living Fishes.
5. **Reproduction:** Sexual dimorphism, Sexual reversal and hermaphroditism, Types of spawning, Spawning cycle and periodicity, Factors responsible for spawning, structure of gonads, Types of fish egg and fecundity, Effect of toxicants on reproductive endocrinology of Fishes.
6. **Endocrine disruption in Fishes:** Pituitary, Islets of langer hans, chromaffin tissue and Pineal gland. Effect of pesticides and other toxicants on endocrine system in fishes.
7. **Metabolism of Proteins and Lipids:** Amino acid deamination. Transamination. Urea cycle, break down of amino acids, amino acid bio-synthesis
8. **Rat anatomy and physiology:** Nervous system. Circulatory system. Endocrine and urinogenital systems

MODEL OF QUESTION PAPER

Time: 3hrs

Max. Marks – 100

Eight essay questions have to be set within the frame work of the above syllabus. With 50% choice (student has to answer four questions). Each question carries 25 marks.

M. Phil / Ph.D., THEORY EXAMINATIONS

PAPER – II ENVIRONMENTAL BIOLOGY AND APPLIED ZOOLOGY

SYLLABUS

1. Sources of heavy metal pollution in aquatic ecosystem-mode of metal up take by aquatic organisms-methods of evaluation of toxicity-detoxification mechanisms-impact of metal toxicity on the productivity of aquatic fauna with special reference to fishes.
2. Morphology of anatomy of insect-use full insects-life cycle of silk worm-pathogenesis prevention and control- harmful insects-pest surveillance-chemical and biological control of pests.
3. Types of immunity-primary and secondary lymphoid organs-types and properties of immunoglobulins-antigen-antibody interactions-role of complements in immune response.
4. Structural organization and histomorphology of the organs of fishes, bivalves and insects with special reference to their function.
5. Cellular respiration-glycolysis-glycogenolysis-gluconeogenesis-TCA-cycle-electron transport system-oxidative phosphorylation.
6. Classification of amino acids-polypeptides-protein and their characteristic features-classification of proteins-protein biosynthesis-general catabolism of amino acids.
7. Classifications of lipids-oxidation of fatty acids-ketogenesis-biosynthesis of triglycerides-catabolism of cholesterol-role of liver in lipid metabolism.
8. Liver functions and their tests-test based on secretion, excretion, conjugation and carbohydrate, protein and lipid metabolisms-influence of hormones on liver functions

MODEL OF QUESTION PAPER

Time: 3hrs

Max. Marks – 100

The question paper setter is requested to set EIGHT essay questions within the frame work of the syllabus given above (one question from each chapter), of which the student has to answer any FOUR questions out of eight. Each question carries 25 marks.