

# **Jodhpur National University**

## **M.Phil. Zoology Syllabus**

### **First Semester**

#### **PAPER- I : ADVANCED ENTOMOLOGY & TOXICOLOGY**

Duration : 3 hours

Max. Marks : 100

Note : Eight questions will be set and the candidates will answer any four questions.

1. Taxonomy : Classification of insects upto super family level giving salient features of each order and super family.
2. Integument : Structure, chemical composition, sclerotization.
3. Nutrition: Nutritional requirement of insects, effects of dietary deficiencies, adaptations to liquid diet, digestion of unusual food (leaves, pollen, wood, collagen, silk, keratin and wax), role of micro-organisms (bacteria, protozoa, fungi) in digestion.
4. Respiration : In aquatic insects and endoparasitic insects.
5. Circulation : Composition and functions of haemolymph, types and functions of haemocytes.
6. Excretion: Cryptonephridial system, physiology of excretion.
7. Reproduction : Special mode of reproduction in insects (viviparity, oviparity, parthenogenesis, paedogenesis, poly-embryogeny, hermaphroditism and castration), early development, extra embryonic membranes, blastokinesis, types of larvae, pupae and metamorphosis, diapause.
8. Nervous system: Morphology and modification in nervous system, physiological properties of nervous system.
9. Endocrine system : Endocrine structures, hormonal control of pigmentation, metabolism, heart beat, diapauses, reproduction and metamorphosis.
10. Pest control : Principle methods of pest control, types, chemistry and effect of insecticides, attractants, repellents, chemosterillants, systemic poisons, insecticides of plant origin, use of hormones and phermones as pesticides.

## **PAPER-II : ENDOCRINOLOGY & REPRODUCTIVE BIOLOGY**

Duration : 3 hours

Max. Marks : 100

Note : Eight questions will be set and the candidates will answer any four questions.

1. Hormones of pituitary, thyroid, parathyroid , adrenal and pineal glands.
2. Sex differentiation, sex determination and sexual abnormalities.
3. Reproductive cycle and factors regulating them.
4. Male reproductive system : Development of the testis and male genital ducts, morphology and endocrinology of testis, structure, genesis, maturation and capacitation of mammalian sperm.
5. Female reproductive system : Development of the ovary, oviducts, follicular growth, ovulation and formation of corpus luteum.
6. Physiology of fertilization, implantation, parturition and lactation.
7. Gonadial and gonadotrophic hormones, hypothalamic pituitary gonadial interaction.
8. Effect of hormones on reproductive behaviour.
9. Endocrine glands of annelids, arthropods and molluscs.
10. Mechanism of hormonal action - cellular and molecular aspects.

## **PAPER-III : DEVELOPMENTAL BIOLOGY**

Duration : 3 hours

Max. Marks: 100

Note : Eight questions will be set and the candidates will answer any four questions.

1. History of embryology : Theories of development.
2. Concept of developmental biology : differentiation, morphogenesis, regeneration and aging.
3. Metamorphosis : Morphological, physiological and biochemical changes during metamorphosis in insects, amphibians and their endocrine control.

4. Tissue culture : Culture media, design of laboratory, basic requirements and methods, contributions of cell, tissue and organ culture studies to developmental biology and medicine.
5. Teratology : Developmental anomalies, teratogenic agents, (drugs, chemicals, nutritional deficiencies, infections).
6. Developmental genetics : role of nucleus and cytoplasm in development, nuclear transportation, somatic cell hybridization, effect of maternal genes on development of embryo, differential gene functions.
7. Interactions of cells and tissues in development.
8. Endocrinology of gametogenesis, fertilization , implantaion, delayed implantation, parturition and lactation.
9. Developmental biology and human welfare.

#### **PAPER-IV : CELLBIOLOGY (IIB)**

Duration : 3 hours

Max. Marks: 35

Note : Seven questions will be set in the question paper out of which student will be required to attempt any five questions. Each question carries seven marks.

1. Properties of Cells – Contractibility, Conductivity, secretion, Cell-cell signaling.
2. Plasma membrane structure, permeability and transport.
3. Concept of cell surface-Properties of cell surface, their roles in intercellular interaction in cell fusion and cell aggregation.
4. Structure of DNA and RNA, biosynthesis of Proteins in Prokaryotes and Eukaryotes, Postransaction processing, Protein targeting methods of studying protein.
5. Gene isolation, sequencing, synthesis, amplification, PCR, cloning, molecular probes, CDNA and genomic library, RFLP, RAPD, Chromosome jumping and walking, gene transfer technology.

## **Second Semester**

### **DISSERTATION**

The candidate shall submit the dissertation on problem connected with any one disciplines of his papers.