

UNIVERSITY OF KOTA, KOTA  
SEMESTER SCHEME  
ACADEMIC YEAR: 2022-23  
**BACHELOR OF SCIENCE- ZOOLOGY**  
**SEMESTER-V**



**B. Sc. Semester V**

**Z 501** Paper I Evolution

**Z 502** Paper II Animal Physiology and Endocrinology

**Z 503** Practical (Based on Paper I & II)

## **B. Sc. Semester- V**

### **Z-501 Paper-I: Evolution**

#### **UNIT-I**

Origin of life: Definition, Pre-Darwinian theories of evolution; Oparin-Haldane concept of origin of life; Miller- Urey experiment; molecular evolution of RNA, proteins and DNA; characters of coacervates.

#### **UNIT-II**

Micro-evolution: Work and theories of Lamarck, Weisman and Darwin; theory of natural selection of Darwin and Wallace, Neo-Darwinism Industrial melanism, DDT resistance in mosquitoes.

#### **UNIT-III**

Evidences of evolution: Homology, analogy, vestigial organs; palaeontological, embryological, biogeographical and biochemical evidences, adaptive radiations, mimicry.

#### **UNIT-IV**

Genetic basis of evolution and speciation: Hardy-Weinberg law, gene frequency, genetic drift, factors affecting Hardy- Weinberg law, Founder effect, bottle neck effect, Sewall -Wright effect, speciation, role of various isolating mechanisms in speciation.

#### **Unit V**

Macro-evolution: Geological time scale and imperfection of geological record, types of fossils and fossilization, continental drift, extinction, replacement; human evolution.

# Z 502 PAPER-II ANIMAL PHYSIOLOGY AND ENDOCRINOLOGY

## UNIT-I

### 1. Digestion:

- a. Nutrients: Carbohydrates, lipids, proteins, vitamins.
- b. Digestive enzymes and hormones of GIT.
- c. Digestive mechanism: Mechanical and chemical digestion.
- d. Absorption and assimilation of end products of digestion.
- e. Balanced diet, malnutrition (PEM), obesity; endoscopy.

### 2. Respiration:

- a. Aerobic and anaerobic respiration.
- b. Structure of respiratory organs.
- c. Mechanism and regulation of breathing.
- d. Transport of O<sub>2</sub> and CO<sub>2</sub>.
- e. Respiratory disorders: Emphysema, asthma, occupational disorders, spirometry.

## UNIT-II

### 3. Circulation:

- a. Circulatory fluids: Blood, lymph; blood cells; structure of haemoglobin.
- b. Blood circulation through heart, arteries, arterioles, capillaries, venules and veins.
- c. Cardiac cycle and its regulation.
- d. Blood clotting mechanism, blood pressure.
- e. Cardiac disorders, ECG, heart transplantation (an introductory

idea).

#### **4. Excretion:**

- a. Excretory products:  $\text{NH}_3$ , urea, uric acids, amino acids.
- b. Structure of kidney, nephron; mechanism of urine formation; micturition.
- c. Autoregulation, counter-current mechanism, renin-angiotensin system.
- d. Accessory excretory organs: Skin, liver, lungs etc.
- e. Excretory disorders, dialysis, Kidney transplant.

### **UNIT-III**

#### **5. Muscle and Neural Physiology:**

- a. Structure of smooth, skeletal and cardiac muscles; myofibrils.
- b. Isotonic and isometric contraction of muscles, sliding-filament theory of muscle contraction; relaxation of muscle fibres; Properties of muscles (muscle twitch, fatigue, summation, tetanus, rigor mortis), myopathy.
- c. Kinds of neuron, structure of myelinated and nonmyelinated nerve fibres.
- d. Origin and propagation of nerve impulse through different types of neurons and synapse.
- e. Reflex action, types.

#### **6. Sensory Physiology:**

- a. Tactile receptors, pain receptors, thermoreceptors, chemoreceptors.
- b. Structure of human eye; image formation and colour vision.
- c. Eye disorders.
- d. Structure of human ear, mechanism of hearing, kinds of deafness.
- e. EEG, MRI, CT-scan, mental health (epilepsy, neurosis, psychosis).

## **Unit-IV**

### **Endocrinology: Introduction, basics and functions**

1. Glands: Exocrine and endocrine; Secretions: Autocrine and paracrine.
2. Hormones: Chemical nature and properties, role in homeostasis.
3. Structure and functions of major endocrine glands: Pituitary, thyroid, parathyroid, adrenal gland, pancreas; their hormones, role and abnormalities due to hyposecretion and hypersecretion.
4. Structure and functions of minor endocrine glands: Thymus, pineal, GIT, kidney, heart; endocrine glands in insects; their hormones and role.

## **Unit-V**

### **Endocrinology: Role in reproduction**

Hormones from testis, ovary and placenta, their structure and functions.

1. Importance of hormones in sexual differentiation in embryo.
2. Hormonal control of menstrual cycle, implantation, pregnancy, parturition and lactation.
3. Different types of contraceptives, their composition and effects.

### **PRACTICAL EXERCISE (Based on paper I & II)**

#### **1. Exercise in Physiology:**

##### **Major exercise:**

- a. Demonstration of catalase and ptyalin enzyme activity.
- b. Haematocrit value.

- c. RBC counting.
- d. WBC counting.
- e. Differential counting.

**Minor exercise:**

- a. Haemoglobin percentage.
- b. Blood group detection
- c. Structure of Human eye.
- d. Structure of Human ear.
- d. Structure of Myelinated and non-myelinated nerve fibre.

**2. Permanent slide preparation /mounting:**

- a. Preparation of Blood film.
- b. Preparation of smooth, skeletal (striated & non-striated), cardiac musclefibres.

**3. Endocrinology:**

- a. Demonstration of major endocrine glands using models/ charts / computer software.
- b. Study of histological slides of major endocrine glands (pituitary, thyroid, parathyroid, adrenal glands, testes, ovary, placenta, pancreas), kidney, insect endocrine gland

**4. Evolution:**

Study of human evolution through models & charts.

**Skeleton paper and Marking scheme**

**Duration: 4 Hrs.**

**MM 50**

Q1. Major Exercise (Physiology)

06

Q2. Minor Exercise (Physiology)

04

Q3. Slide preparation	05
Q4. Demonstration of major endocrine glands / Human evolution.	10
Q5. Spots. (5 × 3)	15
Q6. Record.	05
Q7. Viva-voce	05

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