RAYALASEEMA UNIVERSITY
ZOOLOGY SYLLABUS FOR IV SEMESTER – 2022-23
PAPER – IV: ANIMAL PHYSIOLOGY, CELLULAR METABOLISM AND EMBRYOLOGY

HOURS: 60 (5X12) **Max. Marks:100**

UNIT I Animal Physiology - I

1.1 Process of digestion and assimilation
1.2 Respiration - Pulmonary ventilation, transport of oxygen and CO2
1.3 Circulation - Structure and functioning of heart, Cardiac cycle
1.4 Excretion - Structure and functions of kidney urine formation, counter current Mechanism

UNIT II Animal Physiology - II

2.1 Nerve impulse transmission - Resting membrane potential, origin and propagation of action Potentials along myelinated and non-myelinated nerve fibers
2.2 Muscle contraction- Ultra structure of muscle, molecular and chemical basis of muscle contraction
2.3 Endocrine glands - Structure, functions of hormones of pituitary and pancreas

UNIT III Cellular Metabolism – I (Biomolecules)

3.1 Carbohydrates - Classification of carbohydrates. Structure of glucose
3.2 Proteins - Classification of proteins. General properties of amino acids
3.3 Lipids - Classification of lipids

UNIT IV Cellular Metabolism – II

4.1Carbohydrate Metabolism - Glycolysis, Krebs cycle, Glycogen metabolism, Gluconeogenesis
4.2 Lipid Metabolism – β-oxidation of palmitic acid
4.3 Protein metabolism-Transamination, Deamination and Urea Cycle

Unit – V Embryology

5.1 Gametogenesis
5.2 Fertilization
5.3 Types of eggs
5.4 Types of cleavages

PRACTICAL SYLLABUS

Periods: 24 **Max. Marks: 50**

I. ANIMAL PHYSIOLOGY

1. Qualitative tests for identification of carbohydrates, proteins and fats
2. Study of activity of salivary amylase under optimum conditions
3. T.S. of duodenum, liver, lung, kidney, spinal cord, bone and cartilage

II. CELLULAR METABOLISM

1. Estimation of total proteins in given solutions by Lowry's method.
2. Estimation of total carbohydrate by Anthrone method.
3. Qualitative tests for identification of ammonia, urea and uric acid
4. Protocol for Isolation of DNA in animal cells

III. EMBRYOLOGY

1. Study of T.S. of testis, ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8 cell stages)

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PAPER – 5: IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY

HOURS: 60 (5X12) **Marks: 100**

Unit – I Immunology – I (Overview of Immune system)

1.1 Introduction to basic concepts in Immunology
1.2 Innate and adaptive immunity,
1.3 Cells of immune system
1.4 Organs of immune system

Unit – II Immunology – II (Antigens, Antibodies, MHC and Hypersensitivity)

2.1 Antigens: Basic properties of antigens, B and T cell epitopes, haptens and adjuvants; Factors influencing immunogenicity
2.2 Antibodies: Structure of antibody, Classes and functions of antibodies
2.3 Hypersensitivity – Classification and Types

Unit – III Techniques

3.1 Animal Cell, Tissue and Organ culture media: Natural and Synthetic media,
3.2 Cell cultures: Establishment of cell culture (primary culture, secondary culture, types of cell lines; Protocols for Primary Cell Culture); Organ culture; Cryopreservation of cultures
3.3 Stem cells: Types of stem cells and applications
3.4 Hybridoma Technology: Production & applications of Monoclonal antibodies (mAb)

Unit-IV Applications of Animal Biotechnology

4.1 Genetic Engineering: Basic concept, Vectors, Restriction Endonucleases and Recombinant DNA technology
4.2 Gene delivery : Microinjection, electroporation, biolistic method (gene gun), liposome and viral-mediated gene delivery
4.3 Manipulation of reproduction in animals: Artificial Insemination, *In vitro* fertilization, super ovulation, Embryo transfer, Embryo cloning

Unit - V

5.1. PCR: Basics of PCR.
5.2 DNA Sequencing: Sanger's method of DNA sequencing- traditional and automated sequencing
5.3 Fermentation: Different types of Fermentation and Downstream processing; Agriculture:

PRACTICAL SYLLABUS

I. IMMUNOLOGY

1. Demonstration of lymphoid organs (as per UGC guidelines)
2. Histological study of spleen, thymus and lymph nodes (through prepared slides)
3. Blood group determination
4. Demonstration of a. ELISA b. Immunoelectrophoresis

II. Animal biotechnology

1. DNA quantification using DPA Method.
2. Techniques: Western Blot, Southern Hybridization, DNA Fingerprinting
3. Separation, Purification of biological compounds by paper, Thin-layer and Column chromatography
4. Cleaning and sterilization of glass and plastic wares for cell culture.
5. Preparation of culture media.