DEPARTMENT OF ZOOLOGY

QUESTION BANK

Paper - I: ANIMAL DIVERSITY - BIOLOGY OF NON-CHORDATES

Unit-I (Taxonomy, Protozoa)

- ✓ Binominal nomenclature
- ✓ Trinomial nomenclature
- ✓ Holozoic nutrition
- ✓ Elphidium structure
- ✓ Amoeboid locomotion
- \checkmark Write about the Robert Whittaker five kingdom classification.
- \checkmark Write about the general characters and classification of protozoa.
- ✓ Write about different modes of locomotion in protozoa.
- ✓ Describe the life history cycle of Elphidium.

Unit-II (Porifera, Coelenterata, Ctenophora)

- Calcarea
- Rhagon type
- ✤ Megascleres
- Microscleres
- Spicules
- Spicule formation
- Anthozoa
- Hydrozoa
- Polyp
- Medusa
- ✤ Ctenophora affinities
- Write about the general characters and classification of porifera.

- Write an essay on types of canal systems in sponges.
- Write about the general characters and classification of Cnidaria.
- Describe the life history of Obelia.
- Describe the polymorphism in Cnidaria.
- ✤ Write about the Corals and Coral Reefs
- Write about the general characters and classification of ctenophora.

Unit-III (Platyhelminthes, Nematihelminthes)

- ➤ Turbellaria
- ➢ Trematoda
- ➢ Cestode
- Miracidium larva
- ➢ Redia larva
- Cercaria larva
- > Phasmids
- > Write about the general characters and classification of Platyhelminthes.
- > Write about the reproductive system of Fasciola hepatica.
- > Give an account of the parasitic adaptations in helminthes.
- > Write about the general characters and classification nematihelminthes.
- > Describe the life cycle of Ascaris.

Unit-IV (Annelida, Arthropoda)

- ✓ Polychaeta
- ✓ Hirudinea
- ✓ Coelomoducts
- ✓ Economic importance of vermicompost
- ✓ Crustacea
- ✓ Nauplius larva
- ✓ Peripatus affinities
- ✓ Social life in termites

- ✓ Social life in honeybees
- ✓ Prawn cephalic appendages
- \checkmark Write about the general characters and classification of Annelida.
- \checkmark Describe the digestive system of leech.
- \checkmark Describe the reproductive system of leech.
- \checkmark Write about the different phages in the preparation of vermicompost.
- \checkmark Write about the general characters and classification of Arthropoda.
- \checkmark Describe the respiratory system of Prawn.
- ✓ Describe the Circulatory system of Prawn.
- \checkmark Write about the vision in Arthropoda.
- ✓ Write an essay on metamorphosis in Insects.

Unit-V (Mollusca, Echinodermata & Hemichordata)

- > Osphradium
- > Gastropoda
- > Auricularia larva
- > Doliolaria larva
- Bipinnaria
- Balanoglossus structure
- Scaphopoda
- > Write about the general characters and classification of Mollusca.
- > Write about the pearl formation in Mollusca.
- > Write about the sense organs in Mollusca.
- > Write an essay on Torsion in Gastropods
- > Write about the general characters and classification of Echinodermata.
- > Describe the water vascular system of asterias.
- > Give an account of larval forms in Echinodermata.
- > Write about the general characters and classification of Hemichordata.
- > Describe the structure and affinities of Balanoglossus.

Paper - II: ANIMAL DIVERSITY - BIOLOGY OF CHORDATES

Unit-I (PROTOCHORDATES)

- > Fundamental Chordate characters
- ➢ Agnatha
- > Urochordata
- ➢ Cephalochordate
- > Retrogressive metamorphosis
- > Write about the general characters and classification of Chordata.
- > Describe the structure and life history of Herdmania.
- Write about the general characters of Cephalochordata and write about its affinities.

Unit-II (CYCLOSTOMES & PISCES)

- Petromyzon
- Myxine
- Scroll valve.
- Catadromous migration
- Anadromous migration
- Placoid scales
- Dipnoi
- Ampulla of lorenzini
- ✤ Give a comparative account of Petromyzon & Myxine.
- Write about the general characters and classification of Pisces.
- Describe the digestive system of Scoliodon.
- Describe the respiratory system of Scoliodon.
- Describe the structure & functioning of heart of Scoliodon.
- Describe the structure of Scoliodon brain.
- ✤ Write an essay on Migration of Fishes.

Unit-III (Amphibia, Reptilia)

- Apoda
- > Urodele
- > Anura
- > Chelonia
- Rhyncocephalia
- > Neurotoxin
- ➢ Haemotoxin
- > Write about the general characters and classification of Amphibia.
- > Describe the digestive system of Amphibia.
- > Describe the respiratory system of frog.
- > Describe the structure of the heart of frog.
- > Write about the general characters and classification of Reptilia.
- > Describe the brain of calotes.
- > Explain the key for identification of poisonous & nonpoisonous snakes.
- > Write about the skull in reptiles.

Unit-IV (Aves)

- ✓ Archeopteryx
- \checkmark Neornithes
- ✓ Syrinx
- ✓ Air sacs
- \checkmark Write about the general characters and classification of Aves.
- \checkmark Describe the digestive system of Pigeon.
- ✓ Describe the respiratory system of Pigeon.
- ✓ Write an essay on Migration in Birds.
- ✓ Write about the flight modifications/adaptations in Birds.

Unit-V (Mammalia)

- Prototheria
- Metatheria
- Eutheria
- Structure of tooth
- Write about the general characters and classification of mammals.
- Explain the comparison of prototherians, metatherians & eutherians.
- Write an essay on dentition in Mammals.

Paper – III: CELL BIOLOGY, GENETICS, MOLECULAR BIOLOGY & EVOLUTION

Unit-I (Cell Biology)

- Prokaryotic cell
- ➤ Eukaryotic cell
- > Structure of TMV
- Structure of Bacteriophage
- > Viroid
- ≻ Mycoplasma
- Lamp brush chromosomes
- Polytene chromosomes
- > Explain the differences between prokaryotic and eukaryotic cells.
- > Describe the ultrastructure of animal cells.
- > Write about the structure & functions of plasma membrane.
- > Write about the structure & functions of Endoplasmic reticulum.
- > Write about the structure & functions of Golgi complex.
- > Write about the structure & functions of Mitochondria.
- > Write about the structure & functions of Ribosomes.
- > Describe the structure & types of Chromosomes.

Unit-II (GENETICS-I)

- ✓ Incomplete Dominance
- ✓ Lethal genes
- ✓ Co-dominance
- ✓ Rh blood groups
- ✓ Sex influenced inheritance.
- ✓ Free martin
- ✓ Gynandromorphs
- \checkmark Explain the Mendel laws of inheritance through his experiments.

✓ Write about gene interactions.

 \checkmark What are polygenes? Explain the polygenic inheritance with human skin colour.

 \checkmark What are multiple alleles? Describe multiple alleles with the help of ABO blood groups in man.

 \checkmark Write about the Sex determination in different animals.

Unit-III (Genetics-II)

- ✓ Haemophilia
- ✓ Colour blindness
- ✓ Klinefelter syndrome
- ✓ Turners' syndrome
- ✓ Down syndrome
- ✓ Edwards syndrome
- ✓ Patau's syndrome
- ✓ Mutations
- ✓ Proteomics
- ✓ Write about chromosomal mutations.
- ✓ Give an account on Human Karyotyping.
- \checkmark Write about the basics of Genomics and Proteomics.

Unit-IV (MOLECULAR BIOLOGY)

- ✤ Central Dogma
- DNA replication
- Semi conservative method
- * Conservative method
- * Dispersive method
- * Transcription
- Translation
- Operon concept

- ✤ Give an account on DNA replication.
- Write about the Transcription.
- Write about the Translation.
- ♦ Write about the gene expression in Prokaryotes.
- Write about the gene expression in eukaryotes.

Unit-V (Evolution)

- ✓ Biogenesis theory
- ✓ Urey & Miller's experiment
- ✓ Use & Disuse theory.
- ✓ Germplasm theory
- ✓ Mutation Theory
- ✓ Genetic drift
- \checkmark Modern synthetic theory of evolution
- ✓ Directional selection
- ✓ Allopatric speciation
- ✓ Sympatric speciation
- \checkmark Give an account of the origin of life.
- ✓ Write about Lamarckism.
- ✓ Write about Darwinism.
- ✓ Explain the Hardy-Weinberg Equilibrium with examples.
- \checkmark Write about the isolation mechanisms.
- \checkmark Discuss the role of different patterns of natural selections.
- \checkmark Write about the speciation.

Paper-IV: ANIMAL PHYSIOLOGY, CELLULAR METABOLISM & EMBRYOLOGY

UNIT-I (ANIMAL PHYSIOLOGY-I)

- Digestion of Carbohydrates
- * Digestion of proteins
- * Digestion of lipids
- Assimilation
- Chloride shift
- * Oxygen dissociation curve
- Mechanism of breathing
- ✤ Cardiac cycle
- Counter current mechanism
- * Define the digestion and write about the process of digestion.
- ✤ Write about the transport of Oxygen.
- Write about the transport of Carbon dioxide.
- * Describe the structure and function of the Mammalian heart.
- Describe the structure and function of Nephron.

UNIT-II (ANIMAL PHYSIOLOGY-II)

- Resting potential
- > Action potential
- > Saltatory conduction
- > Ultrastructure of skeletal muscle
- > Cori cycle
- > Thyroid gland
- Parathyroid gland
- ➢ Pancreas
- > Hormonal control of Mammalian gamete formation.
- > Give an account on generation and conduction of nerve impulse.

> Describe the ultrastructure of skeletal muscles and explain the sliding filament theory.

- > Give an account on Pituitary gland.
- > Describe the adrenal gland.
- > Give an account on menstruation cycle.

UNIT-III & IV (CELLULAR METABOLISM - BIOMOLECULES)

- ✓ Glycogenesis
- ✓ Structure of glucose
- ✓ Glycogenolysis
- ✓ Gluconeogenesis
- ✓ Lock and key Hypothesis
- ✓ Fatty acid oxidation
- ✓ Trans-amination
- ✓ De-amination
- ✓ Urea cycle
- ✓ Give an account on glycolysis.
- ✓ Give an account on Krebs cycle.
- \checkmark Write about the electron transport system.
- \checkmark Write about the B-Oxidation of palmictic acid.
- \checkmark What is metabolism? Explain the metabolism of proteins.

UNIT-V (EMBRYOLOGY)

- Types of Eggs
- ✤ Cleavage
- ✤ Fate-Map
- ✤ Give an account on oogenesis.
- Give an account on spermatogenesis.
- * What is fertilization? Write the process of fertilization.
- Describe the development of frog up to gastrulation process.

PAPER-V (IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY)

UNIT-I (OVERVIEW OF IMMUNE SYSTEM)

- Immune defensive lines
- Lymphocytes
- ✤ Phagocytes
- ✤ Auxiliary cells
- Thymus gland
- ✤ Bursa of Fabricius
- Spleen
- Immunization schedule
- * What is immunity? Write about the types of immunity.
- ✤ Write about the vaccines.
- ♦ Write about the cells of the immune system.
- ✤ Write about the primary lymphoid organs.
- Write about the secondary lymphoid organs.

UNIT-II (ANTIGENS, ANTIBODIES, MHC & HYPERSENSITIVITY)

- ✓ Properties of Antigens
- ✓ Epitope
- ✓ Paratope
- ✓ Haptene
- ✓ Adjuvants
- ✓ Human leukocyte antigen complex
- ✓ Agglutination
- ✓ Functions of MHC
- \checkmark Give a detailed account on Antigens.
- \checkmark Describe the structure of Antibody.
- \checkmark Write about the different types of Antibodies.
- \checkmark Write the structure and functions of Major Histocompatibility.

✓ Write about the Hypersensitivity

UNIT-III (TECHNIQUES)

- Natural media
- > Artificial medium
- ➤ Cell lines
- > Cryopreservation
- > Monoclonal antibodies
- > The role of stem cells in preventing Parkinson's disease.
- > The role of stem cells in preventing diabetes

> What is animal cell culture? Write about the material required for animal cell culture.

- > Write about the methods of animal cell culture.
- > Explain the methodology involved in Organ culture.

> What are stem cells? Write about the roles of stem cells in the prevention of diseases?

- > Write about hybridoma technology.
- > Write about the production & applications of Monoclonal Antibodies.

UNIT-IV (APPLICATIONS OF ANIMAL BIOTECHNOLOGY)

- ✓ pBR 322
- ✓ Classification of plasmids
- ✓ Bacteriophage
- ✓ Cosmids
- ✓ Restriction endonucleases
- ✓ Transgenic fish
- ✓ Transgenic sheep
- ✓ Cloning
- ✓ Embryo transfer
- ✓ Describe the various steps involved in rDNA technology.

- ✓ Describe briefly different techniques of Gene transfer.
- ✓ What are transgenic animals? Write about it.
- ✓ Write about Invitro-fertilization.
- ✓ Write about Artificial Insemination.

UNIT-V (PCR, BLOTTING TECHNIQUES, DNA FINGERPRINTING, DOWN STREAM PROCESSING, POLYPLOIDY IN FISHES)

- RFLPs
- VNTRs
- Fed-batch fermentation
- * Batch fermentation
- Polyploidy in fishes
- Monoculture in fishes
- \diamond Describe the steps involved in PCR technology.
- * Write the applicative role of various methods of DNA sequencing.
- * Explain in detail about the steps in Southern blotting technique.
- Write about the Northern & Western Blotting techniques.
- $\boldsymbol{\diamond}$ Describe the steps involved in DNA fingerprinting.
- Explain the downstream processing of fermentation.