

DEPARTMENT OF ZOOLOGY

PORTIONS COMPLETED AS ON 14th MARCH 2020

**ZOOLOGY: II SEMESTER
PAPER-II : NON CHORDATA PART – II**

UNIT-I: PHYLUM ARTHROPODA

- 1.1 General characters and classification upto classes with suitable examples.
- 1.2 Body wall: Structure and significance.
- 1.3 Respiratory organs: Gills, book gills, trachea and book lungs.
- 1.4 Sense organs: Structure of Simple eye and Compound eye.
- 1.5 Metamorphosis: Definition, types and neuro-endocrine control of metamorphosis in insects.

Type study: Prawn (*Penaeus*) - Morphology, appendages- structure and function; Its concept of serial homology, reproductive system and life cycle.
- 1.6
- 1.7 Type study: Peripatus - Unique features

UNIT-II: PHYLUM MOLLUSCA

- 2.1 General characters and classification upto classes with suitable examples.
- 2.2 Type Study: Unio - Morphology, Ultra structure of the shell, Digestive, Circulatory, Respiratory and Reproductive systems, Life history.

UNIT-VI: ECONOMIC ZOOLOGY

- 6.2** Apiculture: Indigenous and Modern methods
Economic importance of bee wax and honey.
- 6.3** Prawn Culture: Fresh water and marine water prawn culture,
preservation and processing of prawn
- 6.4** Pearl culture, Chank and Lime industries. Economic importance of molluscs.

ZOOLOGY: II SEMESTER PRACTICAL-II: NON CHORDATA PART – II

1. Arthropoda: Specimens of Peripatus, Centipede, Limulus, Spider
2. Arthropoda: Specimens: Termite- Queen.
Slides of Crustacean larvae (W.M) - Nauplius, Zoea, Mysis
3. Arthropoda: Permanent slides of Mouth parts of Honey Bee, Mosquito (Male and Female), Butterfly and Housefly.
4. Mollusca: Specimens of Chiton, Mytilus, Sepia and Aplysia.
Slide of Glochidium larva
5. Mollusca: Shells of Pila, Nautilus, Patella, Cypraea, Dentalium and Cuttle bone.
6. Echinodermata: Specimens of Sea star, Brittle star, Sea cucumber and Sea lily.
Slides of Bipinnaria, Ophiopluteus and Echinopluteus larvae
7. Hemichordata: Specimen of Balanoglossus,
Permanent slides of T.S of Balanoglossus through Proboscis and Tornaria larva (W.M).
8. Dissection (Visuals):
 - a) Cockroach: 1. Mouth Parts 2. Nervous system

ZOOLOGY: IV SEMESTER
PAPER-IV: CHORDATA-II, COMPARATIVE ANATOMY AND ORGANIC
EVOLUTION

UNIT – I: AVES

- 1.1 General characters and classification with characters upto sub-classes
- 1.2 Archaeopteryx as a connecting link
- 1.3 Flight adaptations in birds.

UNIT-II: MAMMALIA

- 2.1 General characters and classification up to sub classes
(Prototheria, Metatheria and Eutheria) with suitable examples.
- 2.2 Interesting features of Mammalian Orders :
Insectivora, Carnivora, Chiroptera, Cetacea, Proboscidae,
Ungulata- Perissodactyla and Artidactyla and
Primates- Platyrrhini and Catarrhini with suitable examples.
- 2.3 Mammalian dentition and evolution of molar tooth.

UNIT-III: COMPARATIVE ANATOMY

- 3.1 Integuments and its derivatives in fishes (cartilaginous and bony),
Amphibians eg. Frog, Reptiles eg. Lizard, Birds eg. Pigeon and
Mammal eg. Rabbit
- 3.2 Evolution of heart - Shark, Frog, lizard, Pigeon and Rabbit
- 3.3 Evolution of brain: Shark, Frog, Lizard, Pigeon and Rabbit.

UNIT-IV: ORGANIC EVOLUTION

- 4.1 Chemical evolution of Life: Contributions of Oparin and Haldane, Stanley
Miller's experiment.
- 4.2 Theories of Evolution: Lamarkism, Darwinism,

- 4.3 Isolating mechanisms: Introduction, Geographical isolation; Reproductive isolation; Prezygotic/Premating Isolation – Ecological, Seasonal, Ethological, Mechanical, Physiological and Gametic mortality isolation; Post zygotic isolation/Post mating isolation – Cytological, Zygotic mortality, Hybrid inviability, Hybrid sterility isolation
Speciation:- Introduction, Types- Phyletic, Allopatric and Sympatric
- 4.4 Evidences of organic evolution:
- a) Morphology and comparative anatomy- Homologous structures, Analogous structures, Atavism and Adaptive radiations in mammals
 - b) Embryological evidences
 - c) Physiological and serological evidences

IV SEMESTER B.Sc ZOOLOGY PRACTICAL

PAPER-IV : CHORDATA – II, COMPARATIVE ANATOMY AND ORGANIC EVOLUTION

1. AVES –
Endoskeleton – Skull, Mandible, Synsacrum, Sternum, Pectoral girdle, Pelvic girdle.
 - a) Beak and feet modifications- Duck, King fisher, Parrot, Wood pecker, Eagle/Vulture
2. MAMMALIA –
 - (a) Specimens- Mongoose, Squirrel, Bat, Pangolin,
 - (b) Dentition- Lower jaw of Rabbit, Cat, Man and Horse.
3. COMPARATIVE ANATOMY –
Comparative study of Skin of Vertebrates- Fish, Frog and Rat.
 - (a) Comparative study of Heart of Vertebrates- Fish (Shark), Amphibian (Frog), Bird (Hen/ Pigeon) and Mammal (Rat/Rabbit).
 - (b) Comparative study of Brain of Vertebrates-Fish (Shark), Amphibian (Frog), Bird (Hen/ Pigeon) and Mammal (Rat/Rabbit).
4. ORGANIC EVOLUTION –
 - i) Study of Homologous Organs:
 - (a) Forelimb of frog and Bird
 - (b) Mouth parts of Cockroach and Mosquito.

III B.Sc. ZOOLOGY: VI SEMESTER

PAPER-VII: DEVELOPMENTAL BIOLOGY, ENVIRONMENTAL BIOLOGY AND ANIMAL BEHAVIOUR (ETHOLOGY)

THEORY :

UNIT-I: DEVELOPMENTAL BIOLOGY

1. Egg types- Based on amount and distribution of yolk with examples:
 - (a) Alecithal
 - (b) Microlecithal
 - (c) Mesolecithal
 - (d) Macrolecithal
 - (e) Isolecithal
 - (f) Telolecithal
 - (g) Centrolecithal

2. Cleavage:
Planes of cleavage- Meridional, Vertical, Equatorial and Latitudinal plane..
Pattern of cleavage- Radial type, Biradial, Spiral, Bilateral, Determinate and Indeterminate cleavage with examples, Influence of yolk in cleavage.

3. Blastulation:
Comparative account with reference to Amphioxus and Frog.

4. Fate maps:
Presumptive organ forming areas and fate maps in Frog and chick

5. Gastrulation:
Introduction, Gastrulation in Amphioxus

UNIT-II: ENVIRONMENTAL BIOLOGY

1. Fundamentals of Ecology:
 - a) Introduction, Scope and sub-divisions of Ecology
 - b) Concept of Habitat: Micro and Macro-habitat
 - c) Concept of Ecological Niche: Spatial, Trophic and Multidimensional
 - d) Abiotic factors: Light, Temperature and Soil.

2. Energy flow in the Ecosystem: Laws of thermodynamics
3. Concept of Productivity
4. Population Ecology:
Population attributes- Density, Natality, Mortality, Age distribution, Growth, Dispersion and Biotic Potential
5. Community Ecology:
Intra and Interspecific Interactions-
Negative (Antibiosis, Competition, Parasitism and Predatism)
Positive (Commensalism, Proto Co-operation and Mutualism)

UNIT-III: ANIMAL BEHAVIOUR (ETHOLOGY)

1. Stereotyped and Acquired behaviour:
 - a) Kinesis, Taxis, Reflexes, Instincts and Motivations with suitable examples
 - b) Acquired behavior:
Learning- Imprinting and Habituation,
Trial and Error learning.
2. Migratory behaviour:
Fish migration and Bird migration
3. Communication in Animals:
Types of Communication, Dances of Honey bees.
Eco-location or Sonar in Bat, Releaser Aggression and Bioluminescence
4. Parental Care:
Fishes (Tilapia and Seahorse), Amphibians(Ichthyophis and Alytus) and Mammals (Kangaroo)
5. Biological rhythm- Circadian rhythms, diagnostic features of biological clock.

III B.Sc. ZOOLOGY: VI SEMESTER PRACTICAL SYLLABUS

PAPER-VII: DEVELOPMENTAL BIOLOGY, ENVIRONMENTAL BIOLOGY AND ANIMAL BEHAVIOUR (ETHOLOGY)

1. DEVELOPMENTAL BIOLOGY

- a) Types of Eggs:
Alecithal (Eg. Mammalian egg)
Centrolecithal (Eg. Egg of Silkworm)
Macrolecithal (Eg. Hen's egg)
- b) Early development of Frog:
Cleavage, Blastula, Gastrula with yolk plug stage and Neurula
Development of Chick:
- c) 18 hrs, 24 hrs, 36 hrs, 48 hrs

2. ECOLOGY EXPERIMENT

- a) Estimation of dissolved oxygen in water samples.
- b) Estimation of Salinity in water samples

3. ECOLOGICAL ADAPTATIONS

- a) Tubicolous worms: Chaetopterus
- b) Burrowing (fussorial) form: Amphioxus
- c) Sedentary form: Balanus
- d) i. Passive fliers: Exocoetus
ii. Active fliers: Bird
- e) Animal associations:
 - i. Polymorphic forms: Physalia
 - ii. Facultative mutualism: Hermit crab and Sea anemone

III B.Sc. ZOOLOGY: VI SEMESTER

PAPER-VIII: CELL BIOLOGY, IMMUNOLOGY AND GENETICS

UNIT-I: CELL BIOLOGY AND IMMUNOLOGY

- 1. Ultra structure of an animal cell**
 - a) Plasma membrane- Structure - Fluid mosaic model by Singer and Nicolson, Chemical composition, Functions- Permeability
Transport: Passive transport (Diffusion and Osmosis) and Active transport, Exocytosis, Endocytosis ,Phagocytosis and Pinocytosis.
 - b) Morphology of nucleus.
- 3. Biology of Cancer**

Introduction, Types, General properties of Cancer cells, Carcinogens, Prevention and regulation
- 4. Immunology**

Introduction, Brief account of lymphatic system, B and T lymphocytes, Immune response
Transplantation, Surgery, Rejection of graft, Immuno suppressors

UNIT-II: GENETICS

- 1. Deviation from Mendelism**
 - a) Multiple allelism (Ex: Inheritance of ABO and MN Blood groups)
Rh factor and its inheritance (Gene complex and Multiple allele theories) Rh factor Incompatability- Erythroblastosis foetalis
 - b) Interaction of genes:
Concept and Example: Inheritance of comb shape in poultry
 - c) Sex- linkage: Concept and types

X- linked Inheritance: Eye colour in Drosophila, Colourblindness and Haemophilia [Inheritance and construction of pedigree charts]
Y- linked Inheritance: Hypertrichosis in Man.
 - d) Cytoplasmic Inheritance: Kappa particles in Paramecium

2. **Sex Determination and Chromosomal Aberrations**
 Chromosomal basis of sex determination: Types with examples
 - a) Genic balance theory, Gynandromorphs and Free Martins.
 Chromosomal aberrations:
 - b) Structural (Duplication, Deletion, Inversion and Translocation)
 Numerical (Aneuploidy, Euploidy and Polyploidy)
 Allosomal syndromes: Non-disjunction of sex chromosomes in Man
 Turner's syndrome and Klinefelter's syndrome.
 Autosomal syndromes: Down's syndrome, Edward's syndrome and Cri-du-chat syndrome.
3. **Concept of Gene**
 - a) Classic concept of gene: Cistron, Recon, Muton
 Operon Concept: Inducible Operon (Ex: Lac Operon)

III B.Sc. ZOOLOGY: VI SEMESTER PRACTICAL SYLLABUS

PAPER-VIII: CELL BIOLOGY, IMMUNOLOGY AND GENETICS

1. CELL BIOLOGY:

- a) Occular Micrometry- Measurement of Cells using Micrometer.

2. GENETICS:

a) Solving problems in Genetics:

- (i) Monohybrid
- (ii) Dihybrid
- (iii) Incomplete Dominance
- (iv) Sex Linkage
- (v) Blood Groups in man

b) Syndrome spotteres:

- (i) Klinefelter's syndrome
- (ii) Turner's syndrome
- (iii) Down's syndrome
- (iv) Cri- du-chat syndrome

c) Drosophila mutant identification:

- Identification of normal male and female
 Mutants- Body and Eye colour