

ZOOLOGY (CODE NO. 03)

PAPER - I

PART - I

Structure, general organization and Biology of nonchordata and chordata, ecology ethology, economic zoology and Laboratory methods.

1. Non-chordata and chordata

- (1) Classification and relationship of various phyla upto sub-classes.
- (2) Protozoa - Structure , locomotion, nutrition, reproduction; and life history of *Paramecium*, *Monocystis*, *Plasmodium*, *Trypanosoma* and *Amoeba*.
- (3) **Porifera** - Structure, histology, Skeleton, canal system and reproduction in *Sycon*
- (4) **Coelenterata** - Polymorphism, defensive structures and their mechanism; coral reefs and their formation; metagenesis; general features and life history of *Obelia* and *Aurelia*.
- (5) **Platyhelminthes** - Parasitic adaptation; general features and life history of *Fasciola* and *Taenia* and their relation to man.
- (6) **Nemathelminthes** - General features, life history and parasitic adaptation of *Ascaris*; Nemathelminths in relation to man.
- (7) **Annelida** - Coelom and metamerism; general features and life history of *Nereis*, *Pheretima* and *Hirudinaria*.
- (8) **Arthropoda** - External features, organ systems and life history of prawn, scorpion and cockroach. Mouth parts in insects (cockroach, mosquito, housefly, honey bee and butterfly); metamorphosis in insects and its hormonal regulation; social organization in insects (termites and honey bees).
- (9) **Mollusca** - Feeding, respiration, locomotion, general features and life history of *Unio* & *Pila*. Torsion and detorsion in gastropods.

- (10) **Echinodermata** - General features, Feeding, respiration, water vascular system and locomotion of *Asterias*.
- (11) **Protochordata** - Origin of chordates; general features and life history of *Herdmania* and *Branchiostoma*.
- (12) **Pisces** - Scales, respiration, locomotion, migration. Structure and Affinities of Dipnoi.
- (13) **Amphibia** - Parental care, neoteny & paedogenesis.
- (14) **Reptilia** - Poisonous and non poisonous snakes of M.P. - Biting mechanism of snakes.
- (15) **Aves** - Flight adaptation and migration.
Mammalia - Structural peculiarities and phyllogenetic relation of protheria and methatheria
- (16) Comparative functional anatomy of following systems of vertebrates-integument and its derivatives, endoskeleton (limbs and girdles only), digestive system, respiratory system, circulatory system (heart and aortic arches only) urino-genital system, brain and sense organs (eye and ear only).

PART - II

1. Ecology

- (1) Biosphere - Biogeochemical cycles, green-houses effect, ozone layer and its impact; ecological succession.
- (2) Population, characteristics, population dynamics, population stabilization.
- (3) Wild life of India its conservations. Biosphere reserves.
Environmental biodegradation; pollution and its impact on biosphere and its prevention.

2. Ethology

- (1) Behaviour - Learning, instinct, habituation, conditioning, imprinting.

- (2) Role of hormones in drive; role of pheromones in alarm spreading; social behaviour in insects and primates; courtship (Drosophila, 3-spine stickleback and birds).

Biological clock and circadian rhythms.

3. Economic Zoology

- (1) Apiculture, sericulture, lac culture, carp culture, pearl culture, prawn culture.
- (2) Major infectious and communicable diseases (small pox, plague, malaria, tuberculosis, cholera and AIDS) their vectors, pathogens and prevention.

Insects and diseases in relation to man.

4. Laboratory techniques

- (1) Study of pH meter
- (2) Chromatography-(paper and thin layer)
- (3) Microtomy
- (4) Preparation of fixatives, stains and reagents
- (5) Museum keeping & preservation
- (6) Skeleton preparation and taxidermy.

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PAPER - II

**Cell Biololgy, genetics, evolution, systematics, biochemistry,
physiology and embryology**

PART - I

1. Cell Biology

- (1) Structure and function of cell and its organelles(nucleus, plasma membrane, mitochondria, Golgi bodies, endoplasmic reticulum, ribosomes and Lysosomes), cell division (mitosis and meiosis), cell cycle.
- (2) Watson-Crick model of DNA, replication of DNA,
- (3) Protein synthesis.

(4) Cell fusion.

2. Genetics and biotechnology

(1) Genetic code.

(2) Sex chromosomes and sex determination in *Drosophilla*, and man.

(3) Mendel's laws of inheritance, recombination, linkage, and crossing over, multiple alleles, inheritance of blood groups.

(4) Mutations and mutagenesis : radiation and chemical.

(5) Cloning technology, plasmids and cosmids as vectors, transgenics, transposons, DNA sequence cloning and whole animal cloning (Principles and methodology).

(6) Regulation and gene expression in pro-and eu-karyotes.

(7) Congenital diseases in man.

(7) DNA finger-printing.

3. Evolution and systematics

(1) Origin of life

(2) Lamarck and his works.

(3) Darwin and his works.

(4) Sources and nature of organic variation.

(5) Natural selection.

(6) Isolation.

(7) Concept of species and sub-species, principles of classification, zoological nomenclature and international code , cladistics.

(8) Fossils,

(9) Geological eras.

(10) Distribution of animals, zoogeographical realms of the world.

PART - II

1. Biochemistry

- (1) Structure and role of carbohydrates, fats, lipids, proteins, aminoacids, nucleic acids.
- (2) Glycolysis and Krebs cycle, oxidation and reduction, oxidative phosphorylation; energy conservation and release, ATP, cyclic AMP-its structure and role.
- (3) Hormone and their function.
- (4) Enzymes: types and mechanisms of action and co-enzymes.
- (5) Immunoglobulin and immunity.

2. Physiology (with reference to mammals)

- (1) Composition and constituents of blood; its coagulation, factors and mechanism of coagulation; thermo regulation. Blood group and Rh factor in man.
- (2) Oxygen and carbon dioxide transport; haemoglobin : constituents and its role in regulation, of gaseous transport.
- (3) Nutritive requirements; role of salivary glands, liver, pancreas and intestinal glands in digestion and absorption.
- (4) Excretory products; nephron and regulation of urine formation; osmoregulation.
- (5) Types of muscles, mechanism of contraction of skeletal muscles.
- (6) Neuron, nerve impulse-its conduction and synaptic transmission; neurotransmitters.
- (7) Vision, hearing and olfaction in man.
- (8) Mechanism of hormone action.
- (9) Physiology of reproduction, role of hormones in reproduction.

3. Embryology

- (1) Gametogenesis, fertilization, types of eggs, cleavage, development up to gastrulation in Branchiostoma, frog and chick, Metamorphosis in frog, formation and fate of extra embryonic

membranes in chick and mammals. Types and functions of placenta in mammals;

- (2) Paedogenesis and neoteny.
- (3) Growth, regeneration and aging.
- (4) In vitro fertilization; embryo transfer, cloning.