ZOOLOGY : B. Sc. I

FIRST PAPER

(A) PROTOZOA, PORIFERA AND COELENTERATA

General classification of the non-chordate phyla upto classes. The structure , habits & post-embryonic development including larval forms of the non –chordate type and the special against each phylum mentioned below:

Protozoa : ***Euglena, Paramecium, Monocystis, Leishmania*** **;** Protozoa and human diseases.

Porifera : ***Sycon*** **;** Canal system in Porifera.

Coelenterata: ***Obelia, Aurelia*** **;** general characters and affinities of ctenophora**;** polymorphism in coelenterata**;** Coral reef formation

(B)PHYSIOLOGY

Physiological processes in mammals with special references to man **;** physiology of circulation, digestion, respiration, Excretion and reproduction, mechanism of muscle contraction, nerve impulse and reflex action, endocrine system functions of various glands and their secretion.

SECOND PAPER

(A) PLATYHELMINTHES, ACSHELMINTHES AND ANNELIDA

Platyhelminthes: ***Schistosoma, Echinicoccus;*** host-parasite relationship; parasitic adaptation in platyhelminthes.

Aschelminthes : ***Wuchereria brancrofti*****;** plant parasitic nematodes.

Annelida: ***Neries, Hirudinaria,*** segmental organs; sense organs

(B) BIOCHEMISTRY

Characteristics , classification and nature of proteins, carbohydrate and lipids; glycolysis, Kreb's cycle, oxidative phosphorylation, gluconeogenesis, cori cycle, fatty acid spiral; urea cycle; Enzyme nature, properties , classification, co-enzymes prosthetic group, nature of action of enzymes with special reference to induced fit theory; Vitamin classification, importance and sources of vitamins.

THIRD PAPER

(A) ARTHOPODA, MOLLUSCA, ECHINODERMATA & HEMICHORDATA

ARTHOPODA: ***Palaemon*****;** general characters and affinities of peripatus; insect **metamorphosis.**

MOLLUSCA: ***Pila, Unio,*** torsion and detorsion.

ECHINODERMATA: ***Asterias;*** water vascular system in echinodermata.

HEMICHORDATA: ***Balanoglossus;*** affinities of hemichordata.

(C) TAXONOMY AND EVOLUTION

TAXONOMY

Principles of systematics and taxonomy, Biological species concept, Evolutionary history of taxonomy, taxonomic practice, objective of classification ; theories of classification , grouping and ranking, diversity of individuals, principles of hierarchy, population taxonomy, information erterival, taxonomic attributes, kinds of variation, opportunities and difficulties.

EVOLUTION

Origin of life, synthetic theory of evolution , natural selection, mutation, migration, genetic drift, mimicry, isolation, speciation.

ZOOLOGY : B. Sc. II

FIRST PAPER

(A) PROTOCHORDATES, ANIMAL DISTRIBUTION AND ECOLOGY

(A) PROTOCHORDATES

Protochordates; Urochordates and cephalochordata General characters , anatomy, history and classification upto orders, post-embryonic development of Amphioxus and Ascidian, interrelationship of protochordata.

(B) ANIMAL DISTRIBUTION

Geological and geographical distribution of animals; nature, age and importance of animal fossils of different geological strata, zoo-geographical regions of the world with their faunal characteristics with special reference to mammals, factors influencing large scale animal distribution, barriers and dispersal.

(C) ECOLOGY

Definition and scope of ecology concept of structure and function of ecosystem, ecological environmental factors and limiting factors, trophic levels, energy flow and concept of pyramids, population dynamics, biogeochemical cycles, environmental pollution, adaptation of animals in deserts and fresh waters, wild life conservation.

SECOND PAPER

(A) VERTEBRATA

Agnatha: General characters and classification.

Gnathostoma :. General characters, classification and comparative anatomy of the integumentary, skeletal, circulatory, digestive, respiratory, nervous and urinogenital systems with special references *to Scoliodon, Rana, Varanus, Columba* and *Lepus.*

(B) SPECIAL TOPICS

Migration in fishes

Parental care, origin and evolution of Amphibia.

Sphenodon as living fossil.

Biting mechanism of poisonous snakes; snake venom and antivenom.

Flight adaptation of birds.

Aquatic mammals.

THIRD PAPER

GENETICS AND CELL BIOLOGY

(A) **GENETICS**: Mendals law of inheritance, linkage, crossing over and chromosome mapping, human chromosome and human chromosomal abnormalities, sex linkage and sex determination in *Drosophila* and man, sex chromatin bodies, dosage compensation and Lyon's hypothesis, blood group and haemoglobin genetics in man, inborn errors of metabolism in man, DNA and RNA structure, evidences that nucleic acid are the genetic material– transformation in *Pneumococcus*, Hershey–Chase experiment, RNA as genetic material in small viruses; replication of DNA-Messelson and Stahl's experiment, DNA polymerase and in vitro DNA synthesis, transcription and translation of genetic information including post transcriptional changes in RNA ; genetic code, mutation–spontaneous versus induced mutation, molecular basis of mutation; introductory experimental outline of a gene cloning experiment

(B) CELL BIOLOGY

Principles of fixation, staining and autoradiography; fundamentals of TEM and SEM ; cell cycle, mitosis and meiosis; nucleus, nuclear membrane and nucleolus, structure and chemical composition of eukaryotic chromosomes, nucleosome structure; polytene and lampbrush chromosome, structure and function of plasma membrane, golgi apparatus, mitochondria, lysosome, endoplasmic reticulum and ribosomes cilia, flagella, microtubules and microfilaments

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ZOOLOGY : B. Sc. III

FIRST PAPER

MOLECULAR BIOLOGY AND GENETIC ENGINEERING

(A) MOLECULAR BIOLOGY

Eukaryotic genome organisation, unique and repetitive DNA sequence. Recombination and chromosome mapping in bacteria and virus.

Molecular basis of gene regulation in prokaryotes.

Inducible repressible systems.

Immune System:

Cellular components of the immune system.

Immunoglobulin.

The major histocompatibility complex

The immune system & disease.

Somatic cell genetics:

Heterokaryon and cell hybrids.

Gene regulation in heterokaryons and somatic cells

Somatic hybridization studies in malignancy

Transposons

(B) GENETIC ENGINEERING

Scope of genetic engineering

Restriction enzyme and their use in gene cloning

Nucleotide sequencing isolation and analysis of mRNA and cDNA probes and their synthesis .

In vitro synthesis of recombinant DNA and gene cloning techniques

Noncoding intervening sequences within eukaryotic genes

Application of recombinant DNA technology in biology, medicine, industry and agriculture

Potential hazards of recombinant DNA technology

Microinjection gene into animal oocytes eggs and embryos.

SECOND PAPER

(A) ECONOMIC ZOOLOGY

Economic importance of different groups of animals in general with exception of protozoa, nematoda and arthropoda which will be dealt in appropriate places:

Protozoa: Protozoan parasitic disease of man and domestic animals with special references to zoonotic significance of *Entamoeba histilytica*, **Plasmodium**

Protozoa and soil fertitity.

Platyhelminthes: Life cycle and zoonotic significance of *Diphyllobothrium latum*

Aschelminthes: Life cycle and zoonotic significance of *Dracunculus medinesis.*

Arthropoda: Life cycle and zoonotic significance of representative ticks and mites.

Beneficial and harmful insects.

Plant and stored grain pests and role of insecticides in their control.

Interrelationship of mosquito with malaria, yellow fever, dengue, encephalitis and dermatobia, their prevention and control.

Biological control of insects.

Aquaculture: its basic concept, management and economics(including pearl fishery)

(B) ENVIRONMENTAL BIOLOGY

Environmental pollution : Defination and sources of pollution, different types of pollution such as air, water, soil and noise pollution and their global, regionak and local aspects.

Air pollution: Nature of pollutants, their sources and effects on human, plants and animals and thier control.

Water pollution: sources , consequences and control.

Soil pollution: source, nature and harmful effects, socio-economic aspects of environmental degration , Natural calamities(floods, famines, drought, storms, gale volcanic eruption etc.) Deforestation and overgrazing etc, basic concept of soil science, soil erosion.

Environmental hazards of radiation, general principles of radiation biology, introduction, general principles and history of toxicology, toxicants and industrial effluents, Absorption, distribution and excretion of toxicants and their undesirable effects, biological factors affecting toxicity, Ectotoxicology.

Environmental health: animal in relation to human health, water in relation to human disease . urbanization stress and health, behaviour patterns of health and disease, Basic concept of wild life management , basic concepts of Environmental monitoring.

THIRD PAPER

DEVELOPMENTAL BIOLOGY AND ETHOLOGY

(A) DEVELOPMENTAL BIOLOGY

Asexual Reproduction: The morphogenetic process and stages (blastemma, blastogenesis and blastozoids) , the kinds (fission, budding, gemmule formation) and comparison between blastogenesis and embriogenesis.

Sexual Reproduction: Gametogenesis (Spermatogenesis and oogenesis), maturation of gamets, vitellogenesis, Parthenogenesis.

Metamorphosis: The morphogenetic process and causation in amphibia and insects, tissue reactivity and induction process, factors controlling moulting in insects.

Regeneration : Regeneration :The morphogenetic processes ion regenaration, ability of regeneration in different groups of animals, amphibian limb regeneration regeneration in Hydra, histology of regeneration process(metaplasia) field, polarity and gradient factors influencing regeneration (stimulation, supression)

Metamorphosis: The morphogenetic process and causation in amphibia and insects, tissue reactivity and induction process, factors controlling moulting in insects.

Growth and Ageing : Concept of growth, degrowth and cell death, mechanism of growth, growth curves and their interpretation, types of cell growth, ageing.

Miscellaneous: The Biogenetic law, teratogenesis, chromosomal engineering and its practical implication

(B) ETHOLOGY

Concept of Ethology Oytlines of innate and learened behaviour, imprinting and fixed action patterns.

Method used in ethological studies

Fighting Behaviour: How animals marks their territories and defend them perform threat display and indulge in physical combat.

Social Behaviour : Advantage of being social, how animals establish social hierarchies, communicate, mating group.

Antipredator behaviour: How animals defeat their predators by fleeing, fighting, protective armours, Camoflauge, Warning Signals, Chemical defence, Startle Display

Courtship Displays and courtship behaviour.

Nesting behaviour : How animals construct a protective home in which to rear to young.

Migratory Behaviour of fish

Migratory Behaviour of birds and navigation