SUBJECT: ZOOLOGY

UNIT-1: ZOOLOGY - Diversity of Living World:

What is life?; Nature, Scope & meaning of zoology; Branches of Zoology; Need for classification- Zoos as tools for study of taxonomy; Basic principles of Classification: Biological system of classification- (Phylogenetic classification only); Levels or Hierarchy of classification; Nomenclature - Bi &Trinominal; Species concept; Kingdom Animalia; Biodiversity- Meaning and distribution, (Genetic diversity, Species diversity, Ecosystem diversity alpha,beta and gama), other attributes of biodiversity, role of biodiversity, threats to biodiveristy, methods of conservation, IUCN Red data books, Conservation of wild life in India -Legislation, Preservation, Organisations, Threatened species.

UNIT-2: STRUCTURAL ORGANIZATION IN ANIMALS:

Levels of organization, Multicellularity: Diploblastic & Triploblastic conditions; Asymmetry,Symmetry: Radial symmetry, and Bilateral symmetry (Brief account giving one example for each type from the representative phyla); Acoelomates, Pseudocoelomates and Eucoelomates: Schizo&Entero coelomates (Brief account of formation of coelom); Tissues: Epithelial, Connective, Muscular and Nervous tissues.

UNIT-3: ANIMAL DIVERSITY-I: INVERTEBRATE PHYLA:

General Characters –Classification up to Classes with two or three examples – (Brief account only). Porifera; Cnidaria; Ctenophora; Platyhelminthes; Nematoda; Annelida (Include Earthworm as a type study adhering to NCERT text book); Arthropoda; Mollusca; Echinodermata; Hemichordata.

UNIT-4: ANIMAL DIVERSITY-II: PHYLUM: CHORDATA:

General Characters – Classification up to Classes - (Brief account only) with two or three examples). Phylum : Chordata; Sub phylum: Urochordata; Sub phylum: Cephalochordata; Sub phylum : Vertebrata; Super class: Agnatha, Class Cyclostomata; Super class: Gnathostomata, Super class pisces, Class: Chondricthyes, Class: Osteichthyes; Tetrapoda, Class: Amphibia (Include Frog as a type study adhering to NCERT text book), Class: Reptilia, Class: Aves, Class: Mammalia.

UNIT-5: LOCOMOTION & REPRODUCTION IN PROTOZOA:

Locomotion: Definition, types of locomotor structures pseudopodia (basic idea of pseudopodia without going into different types), flagella & cilia (Brief account giving two examples each); Flagellar& Ciliary movement- Effective & Recovery strokes in Euglena, Synchronal &Metachronal movements in Paramecium; Reproduction: Definition, types. Asexual Reproduction: Transeverse binary fission in Paramecium & Longitudinal binary fission in Euglena. Multiple fission, Sexual Reproduction.

UNIT-6: BIOLOGY IN HUMAN WELFARE:

Parasitism and parasitic adaptation; Health and disease: introduction (follow NCERT); Life cycle,

Pathogenecity, Treatment & Prevention (Brief account only) 1. *Entamoeba histolytica*2. *Plasmodium vivax* 3. *Ascaris lumbricoides* 4. *Wuchereria bancrofti*; Brief account of pathogenecity, treatment & prevention of Typhoid, Pneumonia, Common cold, & Ring worm; Drugs and Alcohol abuse.

UNIT-7: Type Study Periplaneta Americana (Cockroach): Habitat and Habit, External features, Locomotion, Digestive System, Circulatory System, Respiratory System, Excretory System, Nervous System and Sense Organs Structure of Ommatidium, Reproductive System.

UNIT-8: ECOLOGY & ENVIRONMENT:

Organisms and Environment: Ecology, Population, Communities, Habitat, Niche, Biome and Ecosphere (definitions only); Ecosystem : Elementary aspects only: Abiotic factors - Light, Temperature, Water, Soil and Pressure (Biological effects only), Ecological adaptations Population interactions. Ecosystems – Types, Components, Lake Ecosystem, Food Chains, Food Web, Productivity and Energy Flow in Ecosystem, Ecological Pyramids – Pyramid of numbers Biomass and energy. Nutrient Cycles – Carbon, Nitrogen and Phosphorous Cycles (brief account), Population attributes: Growth, Natality and Mortality, Age distribution, Population regulation. Environmental Issues: Air Pollution and its control, Noise Pollution, Water Pollution and its control, Soil Pollution, Greenhouse effect and Global Warming, Ozone Depletion in the Stratosphere, Degradation by improper resource utilization and maintenance.

UNIT-9: HUMAN ANATOMY AND PHYSIOLOGY-I:

Digestion and absorption: Alimentary canal and Digestive glands: Role of digestive enzymes and gastrointestinal hormones: Peristalsis, digestion, absorption and proteins, carbohydrates and fats, egestion, Calorific value of proteins, carbohydrates and fats (for box item – not to be evaluated): Nutritional disorders: Protein Energy Malnutrion (PEM), indigestion, constipation, vomiting, Jaundice, Diarrhoea, Kwashiorkor.

Breathing and Respiration: Respiratory organs in animals; Respiratory system in humans; Mechanism of breathing and its regulation in humans - Exchange of gases, transport of gases and regulation of respiration, Respiratory volumes; Respiratory disorders: Asthma, Emphysema, bronchitis pneumonia, Occupational respiratory disorders - Asbestosis, Silicosis, Siderosis, Black Lung Disease in coal miners.

UNIT-10: HUMAN ANATOMY AND PHYSIOLOGY-II:

10-A) Body Fluids and Circulation: Lymphatic system, Clotting of blood; Human circulatory system - structure of human heart and blood vessels; Cardiac cycle, Cardiac output, double circulation, regulation of cardiac activity; Disorders of circulatory system: Hypertension, coronary artery disease, angina pectoris, heart failure.

10-B) Excretory products and their elimination: Modes of excretion- Ammonotelism, Ureotelism, Uricotelism, Human excretory system - structure of kidney and nephron; Urine formation, mechanism of concentration of the filterate osmoregulation; Regulation of kidney function -Renin-Angiotensin - Aldosterone system, Atrial Natriuretic Factor, ADH and diabetes insipidus; Role of other organs in excretion; Disorders: Uraemia, renal failure, renal calculi, nephritis, dialysis using artificial kidney.

UNIT-11: HUMAN ANATOMY AND PHYSIOLOGY-III:

11-A) Muscular and Skeletal system: Skeletal muscle - ultra structure; Contractile proteins & muscle contraction, muscle fatigue, coricycle types of muscle fibers. The Skelton : Axial Skelton, appendicular skelton, types of joints, structure of synovial joint Skeletal system, and its functions: Joints, Disorders of the muscular and skeletal system: myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout, Rigor mortis.

11-B) Neural control and co-ordination: Human Neural System : Central nervous system – Brain, Spinal Cord, Peripheral nervous system – Cranial nerves and spinal nerves, somatic neural system, autonomic neural system, generation and conduction of nerve impulse; synaptic transmission, Reflex action and reflex arc. Sensory reception and processing, the eye and mechanism of vision. The ear and mechanism of hearing, disorders of human neural system.

UNIT-12: HUMAN ANATOMY AND PHYSIOLOGY-IV:

12-A) Endocrine system and chemical co-ordination: Endocrine glands and hormones; Human endocrine system - Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, thymus, Adrenal, Pancreas, Gonads; Mechanism of hormone action elementary idea only, Role of hormones as messengers and regulators; Hypo and Hyper activity and related disorders: Common disorders - Dwarfism, acromegaly, cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease, Cushing's syndrome.

12-B) Immune system: Basic concepts of Immunology – Lines of Immunity, Cells of Immune Systems, Organs of Immune System, Soluble Mediators of Immunity, antigens, types of Immunity - Innate Immunity, Acquired Immunity, Active and Passive Immunity, Cell mediated Immunity and Humoral Immunity, Vaccination or Immunization, Immunological Disorders, HIV and AIDS, Hypersensitivity disorders, auto immune disorders and graft rejections.

UNIT-13: HUMAN REPRODUCTION:

13-A) Human Reproductive System: Male and female reproductive systems; Microscopic anatomy of testis & ovary; Gametogenesis, Spermatogenesis & Oogenesis; Menstrual cycle; Fertilization, Embryo development upto blastocyst formation, Implantation gastrulation organogenesis; Pregnancy, placenta formation, Parturition, Lactation (elementary idea) .

13-B) Reproductive Health: Need for reproductive health and prevention of sexually transmitted diseases (STD); Birth control - Need and methods, contraception, and medical termination of pregnancy (MTP); Amniocentesis; infertility and assisted reproductive technologies - IVF-ET, ZIFT, GIFT, AI, ICSI, surrogacy (elementary idea for general awareness).

UNIT-14: GENETICS:

Heredity and variations. Mendel's laws of inheritance with reference to *Drosophila*(*Drosophila melanogaster*- Grey, Black body colour; Long, Vestigial wings), Pleiotrophy, Multiple alleles and inheritance blood groups, Rh-factor, Codominance (Blood groups as example), elementary idea of polygenic inheritance, skin colour in humans, sex- determination- in humans, birds, *Fumea*, genic balance theory of sex determination, Haplodiploidy in honey bees; Sex linked inheritance- Haemophilia and colorblindness, Mendelian disorders in humans- Thalassemia, Haemophilia, Sickle cell anaemia, cystic fibrosis, Phenylketonuria, Alkaptonuria; Chromosomal disorders- Down syndrome, Turner's syndrome, Klinefelter's syndrome; Genome, Human genome project, and DNA finger printing.

UNIT-15: ORGANIC EVOLUTION:

Origin of Life, Biological evolution and Evidences for biological evolution (Palaeontological, comparative anatomical, embryological and molecular evidences): Theories of evolution: Lamarckism (in brief), Darwin's theory of Evolution – Natural Selection with example (Kettlewell's experiments on Biston betularia), Mutation Theory of Hugo de Vries: Modern synthetic theory of Evolution – Hardy – Weinberg Law: Types of Natural Selection: Gene flow and genetic drift: Variations (mutations and genetic recombination): Adaptive radiation – vix., Darwin's finches and adaptive radiation in marsupials: Human evolutions: Speciation – Allopatric, sympatric: Reproductive isolation.

UNIT-16: APPLIED BIOLOGY:

Animal Husbandry: Pisciculture, Poultry management Apiculture (beekeeping) fishery, Dairy management: Animal breeding: Bio-Medical Technology, Diagnostic Imaging X-ray, CT scan, MRI, ECG, EEG, ELISA, Application of Biotechnology in health; Human insulin, and vaccine production; Gene Therapy; Transgenic animals; Vaccines, MABs, Cancer biology, stem cells.