ZOOLOGY

1) **ZOOLOGY - Diversity of Living World:**
What is life?; Nature, Scope & meaning of zoology; Branches of Zoology; Need for classification- Zoos as tools for classification; 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 biodiversity, methods of conservation, IUCN Red data books, Conservation of wild life in India-Legislation, Preservation, Organizations, Threatened species.

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. (make it a little more elaborative)

3) **ANIMAL DIVERSITY-I: INVERTEBRATE PHYLA:**
General Characters - (Strictly restrict to 8 salient features only Classification up to Classes with two or three examples - Brief account only). Porifera; Cnidaria; Ctenophora; Platyhelminthes; Nematoda
Annelida (Include Earthworm as a type study strictly adhering to NCERT text book); Arthropoda; Mollusca; Echinodermata; Hemichordata.

4) **ANIMAL DIVERSITY-II: PHYLUM : CHORDATA**
General Characters – (Strictly restrict to 8 points only 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 strictly adhering to NCERT text book), Class: Reptilia, Class: Aves, Class: Mammalia.

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.

6) **BIOLOGY & 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, Tobacco, Drugs and Alcohol absuse (TDA).

7) **TYPE STUDY OF PERIPLANETA AMERICANA:**
Habitat and habits; External features; Locomotion, Digestive system; Respiratory system; Circulatory system Excretory system; Nervous system - sense organs, structure of ommatidium; Reproductive system.

8) **ECOLOGY & ENVIRONMENT:**
What is Ecology, and importance of Ecology.
Organisms and Environment: Ecology, population, communities, habitat, niche, biome and ecosphere (definitions only); Ecosystem: Elementary aspects only, Abiotic factors- Light, Temperature & Water (Biological effects only) Ecological adaptations; Population interactions; Ecosystems: Types, Components, Lake ecosystem; Food chains, Food web, Productivity and Energy flow in Ecosystem, Ecological pyramids - Pyramids of numbers, biomass and energy; Nutritient cycling - Carbon, Nitrogen & Phosphorous cycles (Brief account); Population attributes: Growth, Natality and Mortality, Age distribution, Population regulation, Environmental issues.

9) **HUMAN ANATOMY AND PHYSIOLOGY-I:**
Digestion and absorption: Alimentary canal and digestive glands; Physiology of digestion and gastrointestinal hormones; Peristalsis, digestion, absorption and assimilation of proteins, carbohydrates and fats, egestion, Calorific value of proteins, carbohydrates and fats (for box item- not to be evaluated); Disorders of digestive system, indigestion, constipation, vomiting, jaundice, diarrhea.
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 movements, Respiratory volumes; Respiratory disorders: Asthma, Emphysema, Bronchitis, Pneunomia, Occupational respiratory disorders - Asbestosis, Silicosis, Siderosis, Black Lung Disease in coal mine workers.

10) **HUMAN ANATOMY AND PHYSIOLOGY-II:**
Body Fluids and Circulation: Covered in I year composition of lymph and functions; Clotting of blood; Human circulatory system - structure of human heart and blood vessels; Cardiac cycle, cardiac output, double circulation, circulatory pathways, Portal

circulation and coronary circulation; regulation of cardiac activity; Disorders of circulatory system: Hypertension, coronary artery disease, angina pectoris, heart failure.

Excretory products and their elimination: Modes of excretion - Ammonotelism, Ureotelism, Uricotelism, Excretory organs; Human excretory system - structure of kidney and nephron; Urine formation, 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, glomerular nephritis, dialysis using artificial kidney, and kidney transplantation.

11) **HUMAN ANATOMY AND PHYSIOLOGY-III:**

Muscular and Skeletal system: Skeletal muscle - ultra structure; Contractile proteins & Mechanism of muscle contraction, muscle fatigue, types of muscle fibres, Skeletal system and its functions; Joints. (to be dealt with relevance to practical syllabus); Disorders of the muscular and skeletal system: myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout, Rigor Mortis.

Neural control and co-ordination: Nervous system in human beings - Central nervous system, Peripheral nervous system and Somatic and autonomic neural system; Generation and conduction of nerve impulse; Reflex action; Sensory perception; Sense organs; Brief description of other receptors; Elementary structure and functioning of eye and ear, disorders of human neural system.

12) **HUMAN ANATOMY AND PHYSIOLOGY-IV:**

Endocrine system and chemical co-ordination Endocrine glands and hormones; Human endocrine system - Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, Thymus gland, Adrenal, Pancreas, Gonads; Mechanism of hormone action (Elementary idea only), hormones of kidney, heart and gastrointestinal tract, 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. (Diseases & disorders to be dealt in brief).

Immune system: Basic concepts of Immunology - Types of Immunity - Innate Immunity, Acquired Immunity, Active and Passive Immunity, Cell mediated Immunity and Humoral Immunity, Cells of immune system, organs of immune system, soluble mediators of immunity and immunological disorders.

13) **HUMAN REPRODUCTION:**

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

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 - IVFET, ZIFT, GIFT (elementary idea for general awareness).

14) GENETICS:

Heredity and variation: Mendel's laws of inheritance with reference to Drosophila. (Drosophila melanogaster Grey, Black body colour; Long, Vestigial wings), Pleiotropy; Multiple alleles: Inheritance of blood groups and Rh-factor; Codominance (Blood groups as example) Elementary idea of polygenic inheritance; Skin colour in humans. Sex determination - in humans, birds, Fumea moth, Genic balance theory of sex determination in Drosophila melanogaster and honey bees, Sex linked inheritance - Haemophilia, Colour blindness; Mendelian disorders in humans: Thalassemia, Haemophilia, Sickle celled anaemia, cystiefibrosis PKU, Alkaptonuria; Chromosomal disorders – Down's syndrome, Turner's syndrome and Klinefelter syndrome; Human Genome Project and DNA Finger Printing.

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 Bistonbitularia), Mutation Theory of Hugo De Vries; Modern synthetic theory of Evolution.

Hardy Weinberg law, Evolutionary forces, Types of Natural Selection; Gene flow and genetic drift; Human evolution; Speciation - Allopatric, sympatric; Reproductive isolation.

16) APPLIED BIOLOGY:

Beekeeping, Animal Husbandry: Fishery management, Poultry management, Dairy management; Animal breeding, Bio-medical Technology: Diagnostic Imaging (X-ray, CTscan, MRI), ECG, EEG, Application of Biotechnology in health: Human insulin and vaccine production; Gene Therapy; Transgenic animals; ELISA; Vaccines, MABs, Cancer biology, stem cells.

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