

## **PART 4: BIOLOGY (50 Questions)**

### **BOTANY**

#### **Unit 1: Taxonomy of Angiosperm**

- Types of classifications - Artificial, Natural, Phylogenetic - Biosystematics - Binomial Nomenclature - Herbaria and their uses - Bentham and Hooker's classification of plants - Families Malvaceae, Solanaceae - Euphorbiaceae, Musaceae and Economic Importance.

#### **Unit 2: Plant Anatomy**

- Tissues and Tissue System - anatomy of monocot and dicot roots - anatomy of Monocot and dicot stem and anatomy of dicot leaf.

#### **Unit 3: Cell Biology and Genetics**

- Chromosomes - Structure and types - genes recombination of chromosomes mutation - chromosomal aberration - DNA as genetic material - Structure of DNA - replication of DNA - Structure of RNA and its type.

#### **Unit 4: Biotechnology**

- Recombinant DNA Technology - Transgenic plants with genetical traits - plant tissue culture and its application - Protoplasmic fusion

#### **Unit 5: Plant Physiology**

- Photosynthesis - Significance - site of photosynthesis - photochemical and biosynthetic phases - electron transport system - cyclic and non cyclic photophosphorylation - C3 and C4 pathway - photorespiration - factor affecting photosynthesis - fermentation - plant growth - growth regulators - phytohormones - auxin - gibberellins - cytokinins - ethylene.

#### **Unit 6: Biology in Human Welfare**

- Food production - breeding experiments - improved varieties and role of biofertilizer - crop diseases and their control - biopesticides - genetically modified food - sustained agriculture and medicinal plants including microbes.
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## **ZOOLOGY**

#### **Unit I: Human Physiology**

- Nutrition - introduction - carbohydrates - proteins - lipids - vitamins mineral - water - Balanced diet - calorie value - (ICBM standard ) obesity - Hyperglycemia - hypoglycemia - malnutrition. Digestion - enzymes and enzyme action - Bones and Joints (Major types) - Arthritis - Rickets and Osteomalacia - Gout. Muscles - muscle action - muscle tone - Rigor Mortis - aerobic exercises (body building) myasthenia gravis.

- Respiration - Process of pulmonary respiration - inspiration Expiration - Exchange of gases at alveolar level - Circulation - Functioning of heart origin and conduction of heart beat - Artificial pacemaker - coronary blood vessels and its significance - myocardial infarction - Angina pectoria - Atherosclerosis - heart attack - Resuscitation in heart attack (First aid) Blood components-functions-plasma-corporuscles-blood clotting-anticoagulants-Thrombosis-embolism-blood related diseases like polycythemia-Leukemia-Lymph uid.
- Physiological Co ordination System: Brain-functioning of different regions-memory-sleep-strokeAlzheimer's disease-meningitis-Thyroid-parathyroid hormones-insulin and glucagon-Hormones of adrenal cortex and medulla-Reproductive hormones-problems related to secretion, non secretion of hormones.
- Receptor Organs: Eye-Focussing mechanism and photo chemistry of retina-short sightedness-Nyctalopia-Eye infection conjunctivitis-Glaucoma-Ear-Hearing mechanism-Hearing impairments and aids - Noise pollution and its importance skin-melanin functions - Effect of solar radiation / UV Excretion: Ureotelism-urea-Biosynthesis(ornithine cycle) Nephron-ultrafiltration-tubular reabsorption and tubular secretion-Renal failure-Dialysis kidney stone formation kidney transplantation-Diabetes.
- Reproductive System: Brief account of spermatogenesis and oogenesis-menstrual cycle-in vitro fertilization-Birth control

### **Unit 2: Microbiology**

- Introduction-History of medical microbiology-The influence of Pasteur, Koch and Lister-Virology-structure Genetics culture and diseases-AIDS and its control-Bacteriology-structure, Genetics and diseases-protozoan microbiology-Diseases oriented-pathogenicity of micro organism-anti microbial resistance chemotherapy.
- Single cell protein.
- Microbial culture technique and its applications - Strain Isolation and Improvement - Isolation of microbial products.

### **Unit 3: Immunology**

- Innate immunity (Non specic) - anatomical Barriers-Physiological barriers-phagocytic barriers Lymphoidal organs-Thymus- Bursa of Fabricius-Peripheral Lymphoid organs-Lymph nodes- Transplantation immunology-Autoimmune disorders.

### **Unit 4: Modern Genetics and Animal Biotechnology**

- Introduction-scope-Human Genetics Karyotyping Chromosome gene mapping-Recombinant DNA technology and segmenting-genetic diseases-Human genome project-cloning-Transgenic organisms- Genetically modified organism(GMO)-Gene therapy-Animal cell culture and its applications-Stem cell technology-Bioethics of genetic engineering in animals.

### **Unit 5: Environmental Science**

- Human population and explosion-issue-Global Warming Crisis-Green house effect-Ozone layer depletion-waste management-Biodiversity conservation (Biosphere reserve)

### **Unit 6: Applied Biology**

- Livestock and management-Breeds-Farming method-poultry diseases-Economic value Pisciculture-sh farming-Edible shes of Tamil Nadu.

### **Unit 7: Theories of Evolution**

- The Lamarckism-Darwinism-modern concept of natural selection-species of concept-origin of species and isolating mechanism. Extractive metallurgy of sodium, lithium, properties of alkali metals, basic nature of oxides and hydroxides, compounds of alkaline earth metals, compounds of boron. Oxides, carbides, halides and sulphides of carbon group. Oxides-classification-acidic, basic, neutral, peroxide and amphoteric oxides.