Biology

Unit : 1 Physiology of Plants

-Cell as a functional unit, Composition of protoplasm; water relations; Absorption and conduction (Diffusion, osmosis, plasmolysis, permeability, water potential, absorption)

-Theories of ascent of sap - root pressure, suction force transpiration - importance.
Factors affecting rate o transpiration; mechanism of stomatal opening and closing; (Potassium ion theory); factors affecting movement of guard cells.

-Mineral absorption - functions of mineral elements; essential major elements and trace elements; deficiency symphoms of elements; theories of translocation; translocation of solutes; Nitrogen metabolism, Nitrogen metabolism with emphasis on biological nitrogen fixation.

-Photosynthesis - signifcance; site of photosynthesis (functional importance of chlorophyll structure) photochemical and bio synthetic phases. Electron transport system;

-Photo phosphorylation (cyclic and noncyclic)
C3 and C4 metabolic pathway; photo respiration, factors affecting - photosynthesis; mode of nutrition (Autotrophic, heterotrophic, saprophytic, parasitic and insectivorous plants) chemosynthetic nutrition.

Unit : 2 Physiology of Animals

-Nutrition and its types; nutrients food and vitamins; digestive system of invertebrate (Cockroach)

-Digestive system and digestion process in humans (ingestion, digestion, absorption, assimilation, formation of faecal matter, defecation) (Intra cellular and extra cellular); role of enzymes and hormones in digestion.

-Malnutrition and under nutrition; disorder related to nutrition. Gaseous exchange in animals (Earthworm, Cockroach)

- Respiration in humans; respiratory organs; mechanism of respiration.

- Breathing and its regulation; transport of gases through blood; common respiratory disorders, prevention and cure.
Circulation of body Fluids - Open circulatory system in coc kroach; closed circulatory system in humans; Blood and its composition and beating process; pulmonary and systemic circulation; Heart beat and pulse; rhythmicity of heart, beat.
Blood related disorders - Hypertention, atheroma, and arteriosclerosis; ECG - Pace maker; lymphatic system; immunity, immune system.

-Elimination of nitrogenous excretory substances - Amnotelism, Ureotelism, Urecotelism Excretory system of cockroach and humans Composition and formation of urine.

- Role of kidney in osmoregulation, Kidney failure; dialysis, Kidney-transplantation, Role of ADH, role of skin and lungs.

Locomotion and movements -
- Human skeleton, axial and appendicular, Cranium and cage bones; Joints and their types Bone, Cartilage and their disorders (Carthritis, osteoporosis) Mechanism of muscle contraction. Nervous system of Cockroach and humans.

- Human nervous system; structure and function of brain and spinalcord, conduction of nerve impulse; reflex action; Sensory organs - -structure and function of eye, ear, nose, tongue. Human endocrine system - Hormones and their functions; hormonal regulation and diseases; hormones as neurotransmitters and regulators; Hypothelamo - hypophysial axis, feed back controls.

Unit : 3 Reproduction, Growth and Development

-Modes of reproduction in flowering plants; vegetative propagation (natural and artificial); significance of vegetative progagation; sexual reproduction; development of. male and female gametophyte, Pollination (types and factors); Double fertilization, incompatibility, embryo development, parthenogenesis and parthenocarpy.

-Characters of plant growth, growth regulators (phytohormones) Auxins, Gibberellins, Cytokinins, ethylene, ABA, Seed germination - mechanism and factors; role of growth regulators in domancy of seeds; senescence, abscission. Plant movement, geotropism, phototropism, turgor growth movements, (tropics, nastic, and nutation) Flowering, Photoperiodism, -Vernalization

-Sexual and asexual reproduction in animals in general. Male and female reproductive system of humans; reproductive cycle in human, oogenesis, fertilization - physical and chemical events.

Embryonic development up to three germinal layers and their derivatives. Embryonic membranes, General aspect of placenta.

-Cellular growth Growth rate, growth map, growth - regulation and hormones; Mechanism and types of- regeneration. Ageing - cellular and extra cellular changes;principles of ageing.

Unit : 4 Ecology and Environment

-Organism and their environment; factors - Air, Water, Soil, temperature, light, biota; range of tolerance; ecological adaptations

-Levels of organisation - Structure and functions, productivity, energy flow, ecological efficiencies; decomposition and nutrient cycling; major biomes - forests, grass lands and deserts.
ecological succession - types and mechanism; Natural resources types and resources.
Environment pollution - kinds, sources and abatement of air, water soil and noise pollution.

-Global environmental changes, green-house effects; global warming; sea level rise and ozone layer depletion. Living resources
- Terrestrial, marine and other aquatic resources; biodiversity - benefits and evaluation, threats.
Endangered species, extinctions, conservation of biodiversity (biosphere reserves and other protected areas) National and international efforts both governmental and non governmental; environmental ethics and legislation.

Unit : 5 Biology and Human Welfare

-Population, environment and development; Population growth and factors (Vitality, mortality, immigration, emigration, age and sex ratio)

-Impact of population growth; Reproductive health; common problems of adolescence; social and moral implications; mental and addictive disorders; population as a resource.

-Food production, Hybridization, improved varieties, biofertilizers plant tissue culture and its applications; crop and animal diseases; biopesticides; genetically modified food; biowar; biopiracy, biopatent, biotechnology and sustainable agriculture.

-Recent research in vaccines, organ transplantation, immune disorders; modern techniques in diseases diagnosis; AIDS, STD, Cancer (types, causes, diagnosis, remedy) Biotechnology in therapeutics - hormones, interferon and immuno modulations.