Biology (जीवविज्ञान)

[Pre+ Mains Topics]

Biology

Section:- (A)- **BOTANY**

(1) Plant Diversity-

(a) Classification (Taxonomy) of plants.

(b) Study of habits and habitats, Structure and reproduction of the followings-

(i) Algae

(ii) Bryophyta

(iii) Pteridophyta

(iv) Gymnosperms

(v) Angiosperm with the following families- Cruciferae, Compositae, Malvaceae, Liliacae and Solanaceae.

(2) Angiosperms- Morphology and Morphological Modifications in roots, stem, leaves etc. Histology, growth, reproduction and development.

(3) Plant Physiology-

(i) Water Relations-Transpiration, Translocation.

(ii) Photocynthesis.

(iii) Respiration and metabolism.

(iv) Plant Nutrition (Nutrients, Nitrogen fixation).

(v) Plant growth regulators (Phytohormones).

(vi) Flowering and Stress Physiology

(vii) Plant growth and movements.

(4) Microbiology- (i) Viruses, Phytoplasma, Archaebacteria, Eubacteria.

(ii) Fungi (general characteristics, classification growth and reproduction, life cycle).

(iii) Economic importance of Micro-organisms.

(5) Economic Botany-

(i) Medicinal and Aromatic Plants.

(ii) Food Plants.

(iii) Forage and Fodder Plants.

(iv) Fibre Crops.

(v) Fruit and Vegetable Plants.

(vi) Ethnobotany.

(vii) Ornamental Plants.

(viii) Oil Yielding Plants.

(ix) Timber Plants.

(6) Plant Pathology

(i) Causes, effects, control and cure of various Plant diseases.

(ii) Biological Control of Various Plant weeds, diseases and parasites.

(7) Ecology and Environment-

(i) Concept of Ecology and Environment

(ii) Various Habitats & Ecological Niches.

(iii) Ecosystem- Structure and function, Ecosystems stability, carrying capacity, Food-chain, Food -web, Energy flow, Ecological Pyramids, Biomes.

(iv) Population, biotic community.

(v) Bio-geo-Chemical Cycles.

(vi) Ecological Succession.

(vii) Natural Resources and their conservation.

(viii) Biodiversity and its conservation (In-situ and Ex-situ).

(ix) Environmental Pollution- Causes and its ill effects. Air, Water and Soil Pollution. Radioactive pollution, Noise Pollution, Ozone depletion , Acid rain, Eutrophication, Biological magnification, Ocean pollution, Ocean acidification, Control and prevention of various environmental Pollutions. Climate change, global warming and green- house effect, Environmental management. Renewable energy sources, food Security. for rising

Zoology

(1) Animal Diversity-

(1) Animal Diversity-

(i) Animal Taxonomy with characteristic features.

(2) Non-Chordates-

(i) Classification of Non-chordate phyla.

(ii) Morphology, Anatomy, Nutrition, Respiration and reproduction of the following Non-chordates- Amoeba, Sycon Hydra, Ascaris, Cockroach, Pila and Star-fish.

(iii) Parasitic protozoa

(iv) Parasitic adaptation in Helminths.

(v) Economic importance of insects.

(3) Chordates-

(i) Classification of chordates and various-classes of chordates with characteristic features and examples.

(ii) Aquatic adaptation in fishes.

(iii) Origin and evolution of terrestrial chordates.

(iv) Flying adaptations in birds.
(v)Phylogeny of prototheria, Metatheria and eutheria.
(4) Anatomy of — Frog, Pigeon and Rabbit.
(5) Animal Histology- Study of various tissues.
(6) Animal Physiology and Biochemistry-
(i) Nutrition and Digestion.
(ii) Respiration and metabolism.
(iii) Circulation-blood Heart. & Circulatory system.
(iv) Osmo regulation and Excretion.
(v) Movement and locomotion.
(vi) Nervous co-ordination and integration. Sense Organs.
(vii) Chemical co-ordination (Hormones and pheromones).
(viii) Immune system.
(7) Animal Embryology-
(i) Gametogenesis
(ii) Fertilization in lower and higher animals.
(iii) Types of Eggs and cleavage.
(iv) Organogenesis.
(v) Development of Frog and Metamorphosis.
(vi) Foetal membranes in Birds.
(vii) Placenta in mammals. Regeneration.
(viii) Human reproduction and reproductive physiology.
(8) Cell Biology (Cytology and Molecular Biology)
(i) Prokaryotic and eukaryotic cells- their structure and properties.
(ii) Cell division (mitosis and meiosis).
(iii) Structure and functions of various cell organelles.
(iv) Chromosome structure and their behavior during cell division.
(v) Nucleic acids-Molecular structure of DNA and RNA.
DNA 'as genetic material
DNA replication and repair.
(vi) Genetic: code central dogma, protein synthesis and Gene expression.

(9) Sr. Genetics-

(i) Mendel's laws of inheritance.
(ii) Co-dominance- and incomplete dominance and interaction of Genes.
(iii) Chrosomal theory of inheritance.
(iv) Linkage and crossing over.
(v) Sex-determination.
(vi) Multiple gene inheritance and polypody.
(vii) Human genetic disorders.
(viii) Mutation.

(10) Biotechnology-

(i) Concepts, principles and scope of Biotechnology.
(ii) Tools and techniques in Biotechnology.
(iii) Recombinant DNA technology and its applications in human welfare.
(iv) Tissue culture, somatic hybridization.
(v) Genetically modified Organisms, GM. crops (Risk and concerns), Gene Bank and ethical concerns.

(11) Organic Evolution-

(i) concept and principles of evolution.
(ii) Origin of life.
(iii) Theories of evolution (Lamark, Darwin).
(iv) Evidences for evolution.
(v) Neo-Darwinism and synthetic theory of evolution.
(vi) Variations.
(vii) Human evolution.