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Biology

Part – I (Knowledge of subject concerned : secondary level)

1. Taxonomy :

Definition of life, Biodiversity, Need for classification, concept of species and taxonomical hierarchy, Binominal nomenclature, Tools for study of taxonomy – Museums, Zoos, Herbaria, Botanical gardens.

Classification of Living organism, five kingdom system.

Salient features and classification of plants (major groups upto class). Life cycle of Algae, Fungi, Bryophytes, Pteridophyta, Gymnosperm and Angiosperm.

2. Structural organization in Animals and Plants :

Animal Tissue : Types, Origin, Location, Structure and functions.

Plant tissue : Anatomy of root, stem, and leaves of monocots and dicots

Morphology, anatomy and functions of Morphological types Inflorescence, flower and fruits.

3. Cell Structure and Functions :

Concept of Cell Theory; Structure of Prokaryotic and Eukaryotic cell; Plant and Animal cell; Structure, properties and functions of cell surface - cell process, cell organelles-structure and function; Chromosomes – Structure, types, aberrations.

Chemical constituents of living cells : Biomolecules - Structure and functions of proteins, carbohydrates, lipids, nucleic acids;

Enzymes – Types, properties and enzyme action.

Cell cycle; cell division - mitosis, meiosis and their significance.

4. Animal Physiology :

Digestion and absorption,

Breathing and Respiration,

Body fluids and circulation,

Excretory product and their elimination,

Locomotion and movement,

Neural control and coordination,

Chemical coordination and regulation,

Reproduction.

5. Reproduction in Plants :

Vegetative, Asexual and Sexual Reproduction. Structure of flower, Pollination, Fertilization, Development of embryo.

6. Genetics and Evolution:

Mendelian Inheritance: chromosome Theory of Inheritance

Sex determination in human beings.

Linkage and crossing over.

Origin of life – theories and evidence.

7. Biology and Human Welfare :

Basic concepts of immunology, vaccines, Pathogens, Parasites, Cancer, AIDS

8. Ecology and Environment:

Organism and its environment. Population and ecological adaptations

Environmental factors (climatic, edaphic and biotic)

Ecosystems- components, types, energy flow; Food chain, food web.

Part – II (Knowledge of subject concerned : Graduation Level)

1. Taxonomy :

Salient features and classification of non chordata and chordata upto order level with examples.

Symmetry, coelom, metamerism, arthropodization.

Floral variations in Ranunculaceae, Apiaceae, Asteraceae and Poaceae.

2. Biology and Human welfare :

Economic importance of protozoa, Helminthes, molluscs and insects.

Plant utilization- cereals (wheat, Rice),

Fiber yielding plants (cotton, Jute),

Vegetable oils (Groundnut, Mustard),

Spices (Coriander, Fenugreek and cumin),

Medicinal Plants (Commiphora , withania)

Beverages (Tea, Coffee)

3. Biotechnology and its Applications :

Definition, scope and application; Recombinants DNA technology;

Transgenic animals and plants

Application in Health and Agriculture

Tissue culture-methods and application

4. Environmental biology :

Plant and animal succession.

Biogeochemical cycles: Carbon, Nitrogen, Phosphorus .

Environmental Pollution, Air, Water and Noise and Soil Pollution.

5. Structure (External Internal), Reproduction and life cycle of the following

Amoeba, Obelia, Taenia, Ascaris, Pheretima , Periplanata, Rana, Rabbit.

6. Embryology :

Gametogenesis, Spermatogenesis and Oogenesis, Fertilization, Cleavage, Blastula, Gastrula-Morphogenetic movement, Fate maps, embryonic induction, Metamorphosis of frog. Regeneration, Amphibian limb regeneration.

Extra-embryonic membranes in chick, placenta in mammals.

Endocrine control of ovulation, pregnancy, parturition and lactation.

7. Plant physiology :-

Water relations, Transpiration, Photosynthesis, Respiration, Growth, Mineral Nutrition, Plant movements, Nitrogen and Lipid Metabolism.

8. Biostatistics : Mean, Mode, Median, Standard deviation, Tabular and graphical representation of data-table, histogram, Pie diagram, bar diagram, line graph.

Part – III (Knowledge of subject concerned : Post graduation level)

1. Technique in Biology :

Electrophoresis, Centrifugation, Chromatography, Colorimetry, Spectrophotometry, ELISA.

2. Microscopy : Principle of light, Phase contrast and Electron microscope.

3. Ethology :

A brief account of types of behavioral of animals - Feeding , Learning, Instinctive, Motivated, Social and Reproductive.

4. Biogeography and Wild life conservation : Endemism, Hot spots, Plant and Animal distribution with special reference to Rajasthan. Wild life conservation. Biosphere reserves, wild life sanctuaries and National Parks.

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