

Environmental Science

PART-I

Life Sciences

(Basic Biology and Natural Resources)

Basic Biology

Introduction to biology, branches, scope and importance from environmental point of view. What is life?

The evolution of life on earth: Origin of life - Microbes, Plants and Animals, fossils and sediments distribution and pattern of life in past, Paleontological evidences, Mass extinction

Life forms on Earth (all forms of plants and animals), Life in Water, Life on Land, Microbial life in air water and soils, microbes and diseases, decomposing soil microbes, marine biology

Taxonomic principles: History, aims, objectives, hierarchy and kingdoms, identification and nomenclature

Classification of plants and animals based on form-relationship, species concept, organization of living things, microbial classification, Ecological Classification Systems, Collection and Herbarium, Preservation, flora, fauna, preservation of insects

Ecological adaptation under various environmental conditions, Hydrophytes, Xerophytes, Halophytes, Mesophytes, Epiphytes

Distribution of life on earth and factors responsible for present day distribution. Continental drift.

Natural Resources

Introduction, scope and importance of natural resources, biotic and abiotic resources Renewable and non-renewable natural resources and their limitations

Renewable resources: Forest and wildlife resources, forest wealth of India, animal resources, livestock and fisheries

Food Resources: World food problems, agricultural resources, agricultural potential of India, effects of modern agriculture

Non-renewable resources: Fossil fuels – coal, oil and natural gas, Consequences of rapid consumption of fossil fuels

Fresh and marine Water resources: global distribution of fresh water and its limits, The sources of fresh water for terrestrial life, fresh water resources of India, mans water requirement, floods and droughts

Soil and Mineral resources: global status, mineral resources of India, metals and minerals

Energy resources: Global energy consumption, energy needs, conventional and non-conventional energy sources, alternative energy sources, energy resources of India

Environmental Chemistry

Chemistry of atmosphere, Chemical reactions involved in atmosphere, chemistry in ozone depletion, chemical reactions of global warming

Chemistry of water, unusual physical properties, changes in water properties by addition of solute, hydrogen bonding, gases present in water, basic reversible and irreversible reactions in water, sources of cations and anions in water, changes in water properties by addition of solute

Stichiometry, Gibb's energy, chemical potential, chemical equilibria, acid-base reactions, solubility product, carbonate system

Chemistry of carcinogenic compounds and their effects on human body

Surfactants: Cationic, anionic and non-ionic detergents, modified detergents

Pesticides: Classification, degradation, analysis, pollution due to pesticides and DDT problems

Lead and its compounds: Physical and chemical Properties, behaviour, human exposure, absorption, influence. Mercury and its compounds: Physical and chemical Properties, behaviour, human exposure, absorption, influence.

Hydrocarbons: Chemistry of hydrocarbon decay, environmental effects, effects on macro and microorganism.

Destruction of some hazardous substances: acid halide, anhydrides, cyanides and cyanogens bromides, chromium, aflotoxins, halogenated compounds

Basic Geosciences

Atmosphere: Evolution, structure and chemical composition of atmosphere

Temperature measurement and controls, Environmental lapse rate, dry and wet adiabatic lapse rate, inversion of temperature and atmospheric stability

Atmospheric pressure and winds, factors affecting on wind, Forms of condensation, precipitation, hydrological cycle

Internal structure of earth, Geological evolution, plate tectonic, formation of lithosphere. Continental and oceanic crust formation

Types of rocks, Rock cycle, basic minerals of rock, clay minerals, mineral chemistry

Soil and its formation, weathering processes, soil profiles, physical and chemical properties of soil, composition of soil. Macro and micro plant nutrients in soil, Soil classification, Soils of India.