

Syllabus for Ph.D. Entrance Examination in **Environmental Sciences - 2022**

Note : Ph.D. Entrance examination shall comprise of 100 marks and contain Two Sections of 50 marks each. The examination shall be of 3 hrs. duration.

Section-A : Academic Component (Objective Type) - Each question shall carry 01 mark.

Environmental Chemistry and Ecotoxicology

Atmospheric chemistry, Chemistry of water, Chemistry of toxicants, Concept of ecotoxicology, Routes and kinetics of toxicant uptake, Biological indicators of toxicants

Basics of Earth Sciences and Climatology

Interior of Earth, Geomorphological processes, Geomorphological systems, Climatology: basics and temperature distribution, atmospheric pressure and wind systems, climatic classification and weather forecasting, major climates of the world, applied climatology

Concepts of Ecology and Ecosystem

Introduction to ecology and ecosystem, Biogeochemical cycle and productivity, Principles of limiting factors, Biotic community-Principles and concepts, Population characteristics and dynamics, Population regulation structure and interaction

Remote Sensing and GIS

Introduction to remote sensing and RS systems, Aerial photography and photogrammetry, Microwave and thermal remote sensing, Image interpretation, Geographical information system (GIS) and global positioning system (GPS)

Aquatic Environment

Aquatic environment: basics, lentic environment- lakes and wetlands, lotic environment-streams and rivers, groundwater hydrology, estuarine and marine environment

Environmental Impact Assessment and Management

Basic concepts of environmental impact assessment, prediction and assessment of impacts on water environment, air environment, noise environment, socio-economic and cultural environment, biological environment, life cycle assessment, eco labelling, environmental auditing, sustainable development, environmental education, ecotourism, land use planning, watershed management, rainwater harvesting, wasteland reclamation.



Environmental Pollution

Air pollution, noise pollution, terrestrial pollution, water pollution, environmental pollution control technologies.

Environmental Microbiology and Contaminant Remediation

Microbial environment, food microbiology, industrial microbiology, Bioremediation- overview and processes involved, bioremediation technologies, phytotechnologies for contaminant remediation

Climate Change: Science and Policies

Understanding climate change, climate change: vulnerabilities and impacts, limiting climate change: adaptation and mitigation, policy framework on climate change, climate change and india's concerns

Natural Resources: Conservation and Management

Forest resources, soil and minerals, wildlife and wildlife habitats, status and distribution of wildlife in India, natural resources conservation strategies and management.

Environmental Law

Introduction to environmental laws, pollution abatement and law, environment protection and law, laws pertaining to natural resource conservation, environmental protection rules and judicial activism,

Environmental Biotechnology

Role of environmental biotechnology for pollution control, wastewater treatment systems, biofuels, bio-insecticides, biotechnology for re-forestation, biotechniques for air pollution abatement, biofertilizers, vermitechnology, bioplastics.

Disaster Management

Disaster: introduction, disaster management cycle, man-made disasters, biological disasters, chemical disasters, nuclear disasters, desertification, natural disasters (earthquake, volcanic eruptions, landslides, snow avalanches, cyclones, floods, drought, heat and cold waves, tsunami), disaster response, risk and vulnerability assessment, disaster preparedness, disaster mitigation, recovery.

Environmental Health Hazards & Sanitation

Environment and health, determinants of health, health education and health situation in India, disease transmission, environmental hazards with reference to occupational hazards, communicable diseases (diarrhoea and dysentery, cholera, typhoid, tuberculosis, nosocomial infections, zoonotic infections).



Section-B: Research Aptitude Component (Descriptive Type) - Each question shall carry 10 marks.

Basic Statistics

Computation of Mean and Standard Deviation, Z-test, t-test (testing the significance of population mean, difference between two mean and paired t-test), Analysis of Variance (One way classification), Analysis of Variance (Two way classification), Principles of experimental design (CRD & RBD)

Environmental Monitoring - I

Principles and applications of remote sensing, Principles and applications of Geographical Information System (GIS), Methods for quantification of phytodiversity and diversity indices, EIA methodologies, Isolation of microorganisms from environmental samples

Environmental Monitoring - II

Sampling and Analysis of physical parameters of Air, Analysis of Chemical Parameters of Air, Analysis of Biological Parameters of Air, Measurement of Noise and Indices, Air Quality Standards and index

Environmental Monitoring - III

Sampling and Analysis of physical parameters of water, Analysis of Chemical Parameters of Water, Analysis of Biological Parameters of Water, Sedimentation, coagulation, filtration and Redox potential, Water Quality Standard and Index

Instrumentation for Environmental Analysis

Principles, Construction and Applications of light microscopy, Principles, Construction and Applications of Spectrophotometry, Principles, Construction and Applications of Atomic Absorption Spectrophotometer, Principles, Construction and Applications of HPLC, Principles, Construction and Applications of Gas Chromatography.

