SECTION – A

(Common for all candidates)

Total Marks: 50

Ph.D. Entrance Examination Syllabus (Research Methodology)

Unit	Content
1	**Basics of Research:** Research: Meaning, Objective, Characteristics, Steps of research, Methods of research, Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical.
2	**Research Problem and Research Design:** Introduction to Research Problem, Necessity of Defining the Problem, Selecting the Problem, Techniques Involved in Defining a Problem, Meaning and Types of Research Design, Important Concepts Relating to Research Design
3	**Sampling Design:** Census and sample survey, Implications of a Sample Design, Steps in sampling Design, Criteria of Selecting a Sampling Procedure, Characteristics of a Good Sample Design, Different Types of sample Designs, How to Select a Random Sample?, Random Sample from an Infinite Universe, Complex Random Sampling Designs
4	**Data Collection and Analysis:** Methods of Data Collection- Observation, Interview, Questionnaires, Schedules, Survey and Experimental. Selection of Appropriate Method for Data Collection, Different Techniques of Sampling such as Probability and Non-Probability, Basic Statistical Methods of Data Analysis such as Frequency distribution, Measures of central tendency, Measures of Dispersion, Coefficient of variation, correlation and regression.
5	**Research Ethics and Morals:** Environmental impacts and Ethical issues, Commercialisation, Copy right, Royalty, Intellectual property rights and Patent law, Plagiarism, Citation, Referencing style and acknowledgement.

SECTION – B

Total Marks: 50

Ph.D. Entrance Examination Syllabus (Environment Science)

Gravimetric analysis, titrimetric analysis and instrumental analysis:

Significance of pH, Solids, Acidity, Aklanity, COD, DO, BOD, Hardness, Sulphate, Fluoride, Chloride, Turbidity, spectrophotometry, colorimetry, chromatography.

Water supply & sewage system:

Design of water distributions system, design of sewage collection system, sources of water & it's quality.

Water& Wastewater treatment:

Primary, secondary &tertiary treatment, screens, grit chamber, coagulation, flocculation, sedimentation, biological treatments of wastewater (aerobic &anaerobic), adsorption, disinfection, filtration, water softening, reverse osmosis, ion exchange method, sludge treatment & disposal.

Air pollution:

Sources & effects of air pollutants, criteria air pollutants, effects of meteorological parameters on ambient air quality, thermal inversion, control of particulates, Ambient Air quality Standards & limits.

Noise Pollution:

Noise as a pollutant, measurement of noise, units of expressions, effects of noise, permissible limits.

Environmental Impact Assessment & Legislation:

Sustainable Development, EIA as a four step activity, Need for EIA, EIA Notification 2006 & its requirement, EPA 1986, Water Act 1974, Air Act 1986 Hazardous Waste Management Rules, Environmental Audit.

Industrial Water Pollution:

Principles of water pollution control-Reduction of strength & volume, Neutralization, Equalization, Discharge standards, Effluent Standards, Stream Standards, Effluent Quality and treatment flow sheet for dairy industry, textile process house and distillery.

Municipal solid waste management:

Municipal solid waste characteristic, Quantities, composition and generation, engineered system for solid waste management, secured landfill site, energy recovery.