SYLLABUS FOR ENTRANCE EXAMINATIONS

Assistant Environmental Engineer

Section-I: Analytical Ability, Computer Skills and Communication Skills (30 Marks)

Communication skills; Logical, quantitative and visual-spatial reasoning; Computer skills; computer applications and proficiency in using windows; MS office etc.; General knowledge/current affairs.

Section – II: Professional (30 Marks)

Thermodynamics, heat and mass transfer and material balancing: Laws of conservation of mass and energy; degree of freedom, first and second laws of thermodynamics and their applications; Heat & mass transfer and material balancing.

Fluid mechanics and hydraulics: Fluid properties and Bernoulli equation; Pipe flow; Open channel flow; Flow measurement techniques; Pumping systems, pumps and pumping stations; Hydraulic design of water and wastewater treatment plants and air pollution control devices; Aeration and mixing; Surface and ground water hydrology.

Basic chemistry and biology: Solutions; Stoicheometry; Combustion chemistry; Atmospheric chemistry; Water chemistry; Analytical chemistry and instrumental methods of analysis; Environmental biology and microbiology; ecology and natural ecosystems.

Mathematical Science: Measures of central tendency: Mean, Median and Mode, Statistical methods; mean deviation; standard deviations, type of errors, uncertainty, precision and knowledge of statistically evaluation of data.

Number System, fractions, exponents, surds, squares, square root, cube. Introduction to algebra; algebraic identities, polynomials. Mensuration; triangles, circles, sphere, cone, cylinder

Section –III: Environmental technology and management (40 marks)

Human beings, resources, environment and sustainability: land, water, air and climate; Climatic change; Wasteland reclamation; Concept of sustainability; Natural ecosystems and sustainability; Resources and their management: Natural, technological and human; Energy and environment; Human settlements and environment; Agricultural and Industrial systems and environment; Environmental ethics.

Environmental regulations: water act, air act and environmental protection act and the rules and regulations made thereunder; Environmental protection rules;

Municipal solid waste, biomedical and hazardous waste rules; State and central pollution control boards; Environmental clearances and EIA notification; ISO 14000 series of standards.

Environmental monitoring and management: Environmental sampling and analysis; Water quality monitoring and management; Air quality monitoring and management; Stack emissions and tail pipe emissions monitoring.

Environmental systems and management: Sewerage system; Stormwater drainage system; Water supply system; Conventional water treatment plants; Municipal sewage treatment plants; Low cost on-site sanitation systems.

Water and wastewater treatment technologies: preliminary, primary, secondary and tertiary treatment technologies; Coagulation-flocculation; Stoke's law and sedimentation or gravity settling; Filtration (slow sand and rapid gravity) and membrane filtration; Disinfection and chlorination; Ion exchange processes; Adsorption; aerobic and anaerobic processes and their applications in the wastewater treatment. Activated sludge process and its variants; UASB reactors and its variants; Waste stabilization pond systems; Sludge stabilization, thickening, dewatering and drying systems; Incineration; Catalytic convertors; Multiple effect evaporators.

Air pollution control technologies: Stoke's law; Cyclones and multiclones; Wet scrubbers; Bag filters; Electrostatic precipitators; Absorption and adsorption systems.

Environmental management: Waste minimization and pollution prevention programs; Environmental management systems and auditing; Disaster management; Environmental impact assessment and Environmental Management Plans, Solid waste management.