MAGADH UNIVERSITY
BODH GAYA

SYLLABUS
OF
PRE- Ph. D. REGISTRATION
ENTRANCE TEST

2014 onwards

FACULTY OF SCIENCES

Price Rs. 100/-

groups, Frobenious theorem and simple properties, composition series and J - H theorem, Ideals, quotient rings, Isomorphism theorems. Principal Ideal domain, Unique Factorization domain, Field extensions, Galois theory.

5. **Theory of Relativity** : Classical theory of Relativity, Lorentz Transformations. Notion of mass, momentum, energy and their transformation formulae, Equivalence of mass and energy, Minkowski space, Phenomenon of aberration, Drag coefficient and Doppler effect, General theory of Relativity, Energy momentum Tensor, Field equations, Motion of a free particle in a weak static field, Electromagnetic theory, Behaviour of Maxwell's equation under Lorentz Transformation, Einstein's law in gravitational field of an isolated particle, Schwarzchild solutions of Einstein's equation, Planetary orbit, Red shift, Deflection of light.

ENVIRONMENTAL SCIENCES

PAPER - I

Time - 3 Hours Full Marks-100

General awareness (consisting of objective type questions only) paper setters divide question in 5 sub headings, each consisting of 20 marks such as - Fill up the blanks. Multiple choice, True & False, Reasoning and matching the column A & B Assertion

Reasoning Type. This paper will cover General Awareness of the subject as prescribe in Paper - II.

PAPER - II

Time - 3 Hours Full Marks-100

This Paper shall be divided into two groups. Group A and Group B. Each group will carry 50 marks and will have 10 Units each and there will be two questions from each Unit. A candidate is required to attempt 5 descriptive type questions selecting atleast two from one group.

Group 'A'

Unit - 1 : Definition, principles and scope of Environmental Science. Introduction of Ecology. Ecosystem. The concept of ecosystem and its structural and functional components (biotic and abotic) Energy flow, Biogeochemical cycles (Carbon, Nitrogen, Sulphur and Phoshorus).

Unit - II : Aerial adaptations birds, colouration and mimicry in animals, migration in birds, Biological clock, Origin of life, Fossils, Fossils History of Man.

Unit - III : Fundamentals of Environmental Chemistry - Stoichimetry, Acid-base reactions in water, PH of a solution, Buffer solution, Buffering in water systems, the carbonate system. Solubility product, Solubility of gases in water, Entropy and Gibbs free energy.

Unit - IV : Structure and Physico chemical properties of water. Sedimentation, coagulation, filtration and Redox potential. Hydrological cycle concept of DO, BOD and COD. Inorganic and organic components of soil. Nitrogen path ways. NPK in soil, significance of C.N. ratio.

Unit - V : Introduction of microbiology, Roles of microbes in water pollution microbiology. Microbiology of Drinking water treatments. Limnological study of fresh water bodies (Lentic and lotic).

Unit - VI : Environmental biotechnology, application of Genetic Engineering (a) for human welfare and (b) for environmental management.

Unit - VIII : Principles of remote sensing and its application in Environmental Sciences. Application of GIs Environmental Management.

Unit - IX : (a) Elementary Statistic, Mean, mode median, central deviation, simple correlation and regression, rank correlate, chi square (x^2) test and t-test.

(b) Introduction and history of computer. Characteristic of computer, computer application, General computers and evolution of PC.

Unit - X : Principles of analytical methods - Principles and application of Light Microscope and Electron Microscope. Principles and application of

calorimeter, spectro photometer, Atomic absorption spectro photo meter, Principles and application of gas and liquid chromatography GIC, HPLC, Flame photometry.

Group - 'B'

Unit - I : Particles ions and radicals in atmosphere, Thermo-chemical and photo chemical reactions in the atmosphere, Acid rain photo chemical Smog. Green house effect.

Unit - II : Toxic chemicals in air and water, Bio chemical aspects of Arsenic, Cadmium, Lad, Carbon Monoxide, Ozone and PAN pesticides, MIC, Carcinogens in the air.

Unit - III : Principles of pollution abatement. Basis and necessity for standards - Non points and points pollution problems. Global, National and Regional aspects of pollution abatement.

Unit - IV : Pollution abatement with reference to air, water, soil and noise.

Unit - V : Forest and Environment, conservation and Management of forest, wild life conservation and management Biodiversity and its conservation.

Unit - VI : Conservation and Management of land, soil and water. Biosphere reserves, sanctuaries. National Parks, Conservation Projects (Tiger, Deer, Crocodile). Zoo-geographical regions of the

world-their boundaries and climatic conditions. Conservation of energy - Renewable and non-renewable energy sources and their conservation.

Unit - VII : Introduction to Environmental Impact Analysis (EIA). Environmental impact statement and Environmental Management of India Impact Assessment methodologies.

Unit - VIII : Sources and generation of solid wastes, their characterization, chemical composition and classification. Different methods of disposal and management of solid wastes.

Unit - IX : Environmental Education and Awareness. Global Environmental problems - ozone depletion global warning and climate change.

Current Environmental issues in India - Narmada Dam, Tehri Dam, Almetti Dam. Soil Erosion, Rain water harvesting. Wet lands conservation.

Unit - X : Strategies in pollution control - International Conferences and International Agencies.

The Environment (Protection) Act, 1986 and Rules 1986. Recent legislations on Environmental protection in India.