

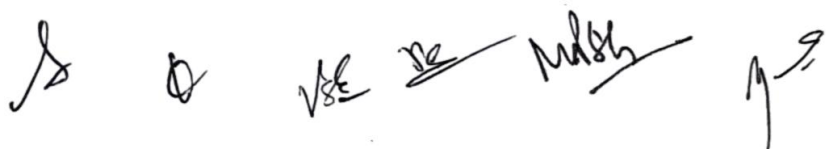
Syllabus for Ph D Entrance Test
Department of Zoology

PART – A: Research Methodology

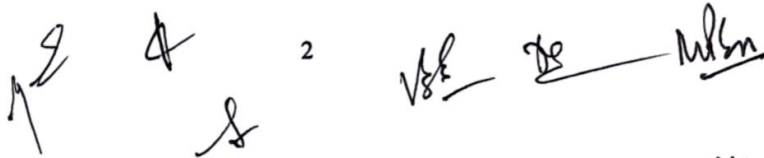
Unit	Subject Area	Number of questions
I	Principles and uses of Flame Photometry, Spectrophotometer, Spectrofluorophotometer, Atomic absorption, Spectrophotometry, Separation and identification of bio-molecules by chromatography - Paper and Thin layer chromatography (TLC), Gas Liquid chromatography (GLC), Column chromatography, Ion exchange chromatography, Gel exclusion chromatography, High Performance Liquid chromatography (HPLC), Affinity chromatography, Principles of differential and density centrifugation, Microbial techniques – Media preparation and sterilization, Inoculation and growth monitoring, Use of fermentations, Microbial assays, Microscopy – Electron microscope. Methods of tissue culture, Chemical basis of fixation, Block formation and Microtomy	20
II	Methods used in bio-chemical estimations of Protein, Carbohydrate, Lipid, Amino acids, Nucleic acid, Kinetics of amylase activity, Determination of LC ₅₀ , UCL, LCL, Slope of toxicants against different pests, Methods used in determination of alkalinity, dissolved oxygen, carbon-di-oxide, COD, BOD.	20
III	Test of significance: t-test, Analysis of variance, Chi square test.	10

PART – B: Zoology

Unit	Subject Area	Number of questions
I	Nutrition and reproduction in Protozoa; parasitism in helminthes; Adaptive radiation in Polychaeta; Origin of Metazoa; Polymorphism in Coelenterata. Organization and affinities of Onychophora, Parasitism and Larval forms in Crustacea, Adaptive radiation in Mollusca, Torsion in gastropods, Larval forms in Echinodermata. Origin of chordate, General organization and affinities of Holocephali, Crossopterygii and Dipnoi, Origin of Tetrapoda, Neoteny in Amphibia, Adaptive radiation in Eutheria.	5
II	Law of Mass action, Free energy, Kinetics of enzyme reaction, Enzyme inhibition- Competitive and Non-competitive inhibitors of enzymes, Allosteric enzymes, Vitamins and Co-enzymes, Glycolysis, HMP shunt, B-Oxidation of Fatty acids, Biosynthesis of Amino acids	5



III	Mendelism, Interaction of genes, Cytoplasmic inheritance, Lethal genes, Sex-linked inheritance, Sex-determination, Multiple allelism, Transposable elements in genetic regulation, Molecular Cytogenic Techniques (FISH, GISH, DNA Finger printing, Flow cytometry, Gene therapy, Genetic switches, Regulatory genes.	5
VI	Concept of Ecosystem and their types, Ecological adaptations, Concept of homeostasis, Conservation of Natural Resources, Bio-indicators and prediction of Ecological effects, Ozone depletion, Global warming, Challenges of Climatic Changes, Nuclear Winter.	5
V	Synaptic transmission and Neurotransmitters, Pattern of Nutrition, Origin of Nutritivetypes, Poikilothermy, Chemoreceptors, Photoreceptors, Endocrine organs in Chordates and Non-chordates, Mechanism of hormone action : Second messenger system-Cyclic AMP, Cyclic GMP, Calcium. Osmotic Conformity and regulation, Respiratory pigments, Respiratory adaptation to low oxygen tension, Bio-synthesis of Urea, Cellular basis of immunity.	6
VI	Innate behaviour, Stereotype and acquired behaviour, Learning and memory, Pattern of communication, Social behaviour with respect to insects and Primates, Sexual behaviour, Parental care, Migratory behaviour of fishes and birds.	6
VII	Animal development and morphogenetics, Gametes structure and formation, Nature of egg and their cleavage, Induction and organizer concept, Diversification in early embryonic cells, Cell memory, Cell determination and the concept of positional values, Aging and cellular death (Apoptosis), Embryonic stem cell, Induced Pluripotent Stem Cell.	6
VIII	<i>Trends in Bio-Systematics</i> : Chemotaxonomy, Cytotaxonomy, Molecular taxonomy, Species concepts: Species category, Sub species, Neo-Lamarckism, Neo-Darwinism and Synthetic theory of evolution, Micro/Macro/Mega evolution.	6
X	Prawn culture, Fish culture, Pearl culture, Apiculture, Sericulture, White revolution, Endangered wild animal species, Project Tiger/Crocodile/Elephant.	6



Date 23.4.24
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**Syllabus for Ph D Entrance Test
Environmental Science**

PART – A: Research Methodology

Unit	Subject Area	Number of questions
I	Principles and uses of Flame Photometry, Spectrophotometer, Spectrofluorophotometer, Atomic absorption, Spectrophotometry, Separation and identification of bio-molecules by chromatography - Paper and Thin layer chromatography (TLC), Gas Liquid chromatography (GLC), Column chromatography, Ion exchange chromatography, Gel exclusion chromatography, High Performance Liquid chromatography (HPLC), Affinity chromatography, Principles of differential and density centrifugation, Microscopy – Electron microscope, Lyophilizer, X-ray fluorescence, X-ray diffraction, Electrophoresis, Principles of titrimetry, gravimetry.	20
II	Determination of LC ₅₀ , LC ₁₀ , LC ₉₀ , UCL, LCL, Slope of toxicants against different pests, Methods used in determination of alkalinity, dissolved oxygen, carbon-di-oxide, COD, BOD, Methods used for estimation of acetylcholinesterase (AChE) and alkaline phosphatase in nervous tissue of toxicant treated animals, Methods used for growth and maintenance of bacterial, Methodology of vermiculture/vermicompost formation from waste product.	20-
III	Measurement of central tendencies: Mean, Median and Mode; Test of significance: t-test; Analysis of variance, Chi square test.	10

PART – B: ENVIRONMENTAL SCIENCE

Unit	Subject Area	Number of questions
I	Structural components of Ecosystem, Ecological pyramids of number, biome and energy; Ecotone, Ecotype; Ecological indicators, Edge effect; Structure and composition of atmosphere, hydrosphere, lithosphere and biosphere; Ecological succession; First and second Law of thermodynamics.	5
II	Value of wild life; Field observations; Foot prints; Locomotory patterns in tetrapods; Tiger pug marks; Foot print of other animals; Wild life census methods; Components of wild life habitat; Socio-biology of wild life animals; Indian wild life; Sanctuaries, Bio- sphere reserves; National Parks; Zoos in India; Gene pool; Wild life ecotourism; Special projects for endangered species.	5

III	Fundamentals of Environmental Chemistry; Gibbs energy; Chemical potential; Solubility; Radio-nuclides; Chemical composition of Air; Photo-chemical reactions in the atmosphere; Oxygen and Ozone chemistry of Air pollutants; Photo-chemical smog; Chemistry of Water; Concept of DO, BOD, COD; MIC.	5
IV	Air pollution: Sources of air pollutants and their biological, physical and economical effects, factor affecting air pollution; Greenhouse effect; Ozone depletion; Acid rains; Types of water and thermal pollution; Eutrophication; Terrestrial Pollution, Radioactive pollution, Noise pollution and their control; Air pollution monitoring; Ganga action plan; Physiochemical and Bacteriological sampling and analysis of water quality; Protection and control from radiation; Disposal of radioactive wastage; Control of thermal pollution; Basic concept of Toxicology; Toxicant of health hazards; Bio magnification, Bio indicator, Environmental carcinogens and their impact on health.	5
V	Introduction of environmental impact assessment and their aims and objectives; EIA process; Impact of urbanization; Impact of hydro-electric development/fly ash/sewage/leather tanning/green revolution	5
VI	Evolution, Origin of life and speciation; Ecomark; Environmental education and awareness; Urban/Rural planning for India; Concept and strategies of sustainable developments; Rain water harvesting, water crisis and conservation of water; Current environmental issues in India.	5
VII	Soil/Air microbiology; Microorganisms and diseases; Soil borne diseases; Role of microbes in Oil pollution and Chemical pollution control; Vermiculture, biotechnology and waste management; Vermiculture and crop productivity; Bio-fertilizer technology	5
VIII	Principles of remote sensing; Characteristics of remote sensing system; Airphotography; Photogrametry; GIS; Application of GIS in environmental management.	5
IX	Solar radiation and its spectral characteristics; Fossil classification; Hydrolytic/tidal/wind and Geothermal energy; Principle forest types in India; Fundamentals of Biodiversity; Hotspots of Biodiversity; Significance of Biodiversity to human society; Soil conservation methods; Global water balance; Water resources of India.	5
X	Catastrophic geological hazards: Flood, draught, earth quakes, landslides, Volcanism, avalanche, Predication and perception of hazards; Action plans for earth quakes disaster mitigation; Geographical distribution of earth quake zones; Seismic waves; Time and location of epicenter; Flood mitigation methods in India; Coastal hazards	5

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