


## 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 <sub>50</sub> , 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, <i>B</i> -Oxidation of Fatty acids, Biosynthesis of Amino acids	5

  
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III	Mendalism, 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

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