

For the post of Written Recruitment Examination for the post of Postgraduate Assistants in Tamil Nadu Higher Secondary Educational Service.

Syllabus: ZOOLOGY (Subject Code: P07)

Unit-I:

Classification Binomial Nomenclature – Invertebata and Chordata – Structure and life history of pathogenic Protozoan Entamoeba histolytica Plasmodium vivax P.Ovale P.Malariae P.falciparum, Trypanosoma gambiansi; and Leishmania donovani, Structure and life history of Helminth parasites; Taenia solium, Fasciola hepatica Schistosoma Ascaris lumbricoides.

Structure and life history of Amphioxus Balanoglossus Ascidian and their evolutionary significance, vertebrate comparative anatomy; Integument, Brain; Heart and Urinogenital organs. Economically important vertebrates and vertebrate pests. Fishery resources of India.

Unit-II:

Biological Chemistry – Structure of atom valencies molecular and structural formula of biochemical compounds. Isomerism Oxidation and reduction. Redox potential (Eh): RH Determination of EH and PH. Buffers Biologically important properties of water. Energy metabolism of carbohydrates. Lipids proteins and Nucleic Acids. Oxidative Phosphorylation.

Role of major (Na, K, Ca and P) and minor (trace) elements in metabolism enzymes, their nature, classification of enzymes Coenzymes and cofactors, Mechanism of action of enzymes Inhibitions of enzyme actions.

Unit-III: Collection of data-primary and secondary, Methods of Classification and tabulation of data.

Diagrammatic and graphic representation – Rules of constructing diagrams – Types of diagrams – Bar diagram- Pie diagram, graphs-construction of graphs – Types: Frequency distribution – Histograms – Frequency Polygon— Smooth frequency curve-cumulative frequency curve of 'Ogives'. Measures of central value – Average-Median-Mode- Measures of dispersion-Mean deviation-coefficient of variation-variance-Standard deviation and standard error. Correlation Types – Methods of studying correlation co-efficient of correlation – Regression analysis.

Statistical inference – Procedure of testing hypothesis – Standard error test of significance for attributes – Test of significances for large and small samples – Student 't' distribution.

Unit-IV:

Cell and Molecular Biology – Prokaryotic and Eukaryotic cells. Ultra structure, Organisation and functions of cell membrane, Endoplasmic reticulum, golgibody, Lysosome, Mitochondrion; Ribosome structure of DNA, A,B,C and Z forms of D.N.A. Transcription – mRNA tRNA and rRNA and their functions. Synthesis of eukaryotic RNAs Structure and functions of nucleolus, D.N.A. replication D.N.A. repair, Microtubules cilia and flagella carcinogenic agents, Genetic basis of malignant transformation.

Unit-V:

Genetics-Gene Interactions, Multiple alleles, Recombination and its molecular mechanism. Linkage, crossing over, chromosome, mapping. Cytoplasmic genes and their expression. Mitochondrial DNA its transcription code and translation, Population genetics Genetic organisation of a Mendelian population. Hardy-Weinberg Law. Derivation of Hardy – Weinberg equilibrium.

Animal breeding and human genetics – Inbreeding outbreeding Heterosis. Expression of Eukaryotic genes in bacterial cells. Transfer of genes into Eukaryotic cells. Genetic Engineering and its applications in Agriculture Animal Husbandary and Medicine. Inborn errors of metabolism.

Unit-VI:

Physiology – Nutrition – Essential aminoacids, vitamins, minerals and Trace elements required by men. Digestion, Digestive enzymes, digestion, absorption and assimilation of carbohydrates, proteins and lipids.

Intermediary metabolism, Respiration – Transport of respiratory gases by blood. Circulation: Types of heart.

Movement – Types of muscle cells, Ultra structure of muscle cells. Muscle contraction and types of contraction. Osmo-iono regulation: Maintenance of water and electrolyte Balance in equatic and terrestrial vertebrates.

Excretion: Vertebrate kidney and formation of urine. Excretion of nitrogeneous products. Renal regulation of acid-base balance. Thermoregulation: Temperature and rates of bio-logical activities.

Unit-VII:

Sensory physiology: Chemo-reception. Mechano-reception, Thermo-reception, Photoreception. Nervous coordinations: Transmission of impulses in nerve cells. Central Nervous system. Autonomic Nervous System. Memory and learning, Chemical coordination: Endocrine glands and harmones. Endocrine Interrelations. Neure endocrine reflexes. Growth and reproduction: Growth moulting and metamorphosis in crustaceans, Insects and vertebrates. Pheremones in reproduction. Physiology of human reproduction.

Developmental Biology and Immunology-Gametogenesis – Organisation of egg cytoplosm. Fertilisation-Biochemical and Electron-Microscopic studies, Partherogenesis-Cleavage and Metphegenetic movements – Fate maps – presumptive. Organ forming areas – Formation of Primary organ rudiments – Gradients in the determination of organ rudiments – involvement of genes in developmental process – General Metabolism during gastrulation – Integration of gastrulation.

Organizer: Organegensis with reference to heart, eye, brain and kidney.

Cell differentiation – The chemical basis of cell differentiation Selective action of genes in differentiation – Control of differentiation by the intraorganic environment.

Extra embryonic membranes. Placenta-Sex differentiation and godadial hormones, congenital abnormalities in humans Growth, aging and senescence.

Unit-VIII:

ANTIGEES AND ANTIBODIES – Specific and non-specific immune mechanism – Immunity (innate and acquired) – Antigenes – Heptens – Antigenic determinants – Adjuvants. Immunoglobulin molecules as antigenes – allotypes Immune system and lymphoid organs. Macrophages – T-Cell and B Cell Antibodies production Immune response: Humoral and cell mediated immunity – regulation of immune response – Tolerance – Antigen and antibody reaction – Physical and Biological – Vaccination – Allergy – AIDS – Congential immunodeficiencies.

Environmental Biology – Biotic and abiotic factors of the environment Biogeochemical Cycles – Eco System – Concepts. Resource Management – Ecological energetics; energy transformation, productivity - food chain – Food webs, Pyramids.

Unit-IX:

Zoogeography of Indian wild mammals. Indian primates – Natural Resources – Conversation of natural resources and wild life (Protection) Act. Wild life - Sancturies of Tamil Nadu. Environmental degradation - factors affecting environment. Patterns of Behaviour – Instinctive and learning behaviour – social behaviour – social organisation – Social behaviour in mammals – Aggression and courtship.

EVOLUTION: Origin of life – Theories of evolution evidences for evolution – Natural selection – Micro evolution – Hardy - Weinberg Equilibrium – genetic draft. Speciation – Mechanism of speciation – Phyletic and sudden speciation modes of gradual speciation – Incomplete species – Species problems – Allopatric and sympatric speciation.

Unit-X:

Macro evolution: Geological records – Fessils and fessilization – evolutionary trends – Parallel evolution – Progressive and retrogressive trends – Rates of evolution.

Course of evolution: Chemical evolution – evolution of prokaryotic cells. Speculative origin of Eukaryotic cells – Origin of Metazea. Primate and Human Evolution – Human racial diversity – Theories of human racial origins – Future evolution of man.

MAN AND BIOSPHERE - Man's role in conservation of natural resources. Biosphere. Human activities that modify the biosphere. Human resource management. Tribals and biosphere. Future of man and biosphere.