

For the post of Written Recruitment Test for the post of Post Graduate Assistants in Tamil Nadu Higher Secondary Educational Service.

Syllabus: Bio-Chemistry

Unit I : Techniques in Bio-Chemistry

Principles and application of light, phase contrast, Fluorescence, scanning and Transmission electron microscopy. Cytophotometry; Gel filtration; HPLC, Ultracentrifugation; X-ray diffraction; Fluorimetry; spectroscopy (UV, DRD/CD, visible, NMR, ESR, Atomic absorption and plasma emission); Principles and application of tracer techniques in biology, Liquid scintillation spectrometry.

Unit II : Chemistry of Bio-Molecules

Structure of carbohydrates, Polysaccharides, Glycoproteins, Peptidoglycans, cell wall polysaccharides; structure of aminoacides and proteins, forces involved, Ramachandran Plot. Structure of Purine, Pyrimidine bases, Nucleotides, DNA, different types of RNA and vitamins.

Unit III : Metabolism

Metabolism of Carbohydrates, Aminoacids, lipids and Nucleic acids, Respiratory chain, oxidative phosphorylation, free energy change; coupled reactions: Biological energy transducers; High energy compounds and group transfer potentials; Bio-energetics.

Unit IV : Enzymes

Enzyme kinetics; Regulation of enzyme activity Coenzymes, Activators / inhibitors, isoenzymes; Mechanism of enzyme action.

Unit V : Clinical Bio-Chemistry

Disorders of carbohydrate, Fat and Nitrogen, Metabolisms, Laboratory Diagnosis, Liver and Kidney function tests; Blood coagulation disorders; Inborn errors of metabolism.

Unit VI : Bio - Membranes

Structures and organization of membranes, hormones - structure, function and its role in signal transduction, Neurotransmitters; Transport across Membranes.

Unit VII : Microbial Bio-Chemistry

Classification of Micro-organisms - Viruses, bacteria, Fungi, Yeast; Basic principles of Bioprocess technology, Fermentation products - ethanol, glycerol, lactic acid, acetone, riboflavin, vitamin B12 and Penicillin, Preparation of media to culture micro-organisms, Soil microbiology; use of micro organisms in sewage treatment.

Unit VIII : Molecular Biology

Prokaryotic and Eukaryotic cell structure; Eukaryotic genome organisation; cell cycle, Replication, Transcription, Translation and Regulation of Gene Expression; Lysogeny and Lytic cycles in bacteriophages; bacterial transformation; principles of Genetic-engineering - Enzymes, vectors, cDNA and Genomic Library construction; Screening of Libraries; Western, Northern and Southern blotting; Agarose Gel and SDS PAGE Electrophoresis; Dot Blot analysis; DNA sequencing methods; Autoradiography; Transgene Technology; PCR and its application, RFLP, RAPD; Molecular Pathogenesis of Cancer.

Unit IX : Immunology

Antigens, Immunoglobulins, T and B Lymphocytes and their characterization; mono-clonal antibodies; Accessory cells - Macrophages and Dendritic cells; Purification of immunoglobulins - Ion exchange and affinity chromatography; Enzyme Linked Immunosorbent Assay, vaccines; Hypersensitivity reactions: Auto immunity, Antibody engineering; Antigen Presentation; Radioimmunoassay.

Unit X : Tissue Culture Primary cultures derived from plant, animal and human tissues, Maintenance of cell lines; Artificial Insemination technology; Callus culture; Somaclonal Variation Micropropagation; somatic embryogenesis; protoplast fusion; artificial seeds.