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 phosphoerylation, 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, Neurotranmitters; 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 Pencillin, Preparation of media to culture micro-organisms, Soil microbiology; use of micro organisms in seage treatment.

Unit VIII : Molecular Biology

Prokaryotic and Kukaryotic cell structure; Eukaryotic genome organisation; cell cycle, Replication, Transcription, Translation and Regulation of Gene Expression; Lysogeneity and Lytic cycles in bacteriophages; bacterial transformation; principles of Genetic-engineering - Enzymes, vectors, C DNA and Genomic Libracy construction; Screening of Libraries; Western, Nothern 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, Immunoglobulines, T and B Lymphocytes and their characterization; monpo-clonal antibodies; Accessory cells - Macrophages and Dendritic cells; Purification of immunoglobulins - Ion exchange and affinity chromatography; Enzyme Linked Immunoabsorbant Assay, vaccines; Hypersensitivity reactions: Auto immunity, Antibody engineering; Antigen Presentation; Ratio immunoassay.

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