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

**Syllabus : Micro-Biology**

**Unit I :** History of Micro-Biology

Concept of orgin of life – abiogenesis – biogenesis – Spontaneous genesation theory, contribution by Luis Pasteur, S.A. Wakmann Alexander Flemming, Robert Koch, Winogradsky, Stanely Iwenewsky, H.W Conn Eswinsmith.

**Unit II :** Methods in Micro-Biology

Sterilization – Discrifection, Isotation, Purification and preservation of Mecrobes, Prinicples of Staining of Micro organisms, Microscopy; Light Phase Contract, Epifluorescence and Election microscopy – Assay of antibiotics.

**Unit III :**

Protists – Archaeobacteria, Procasyotic and Eucaryotic micro-organisms and their differentiation, Evolution and classification of micro-organisms. Protozoa, Algae, Fungi bacteria. Actinomycotes, rickettside Mycoplasma and virsuses, Modem approaches to taxonomy.

**Unit IV :**

Mosphyology and cycology – cycology of microfial cell – comparision of the cycological features of different groups of micro-organisms – chemical nature of cell wall, protoplasm, nucleus, granular materials and other inclusions of microbial cells.

**Unit V :** Physiology of Micro-organisms

Growth and metabolism – growth phases, kinetics and influence of environmental parameters, nutritional groupings, metabolism of Carbohydrates, Nitrogen, Lipids and nucleic acids, Electron transport, Microbial enzymes and resistance.

**Unit VI :** Principles of immunotechnology

Antigen and antibody reactions, hypersensitivity, hybridoma monocional serological techniwues. Host microbe interaction – virulent factors – pathogencity – infection – resistance.

**Unit VII :** Advance Techniques

Principles and application of Gel filtraction, ion exchange and affinity, high pressure liquid chromatography (HPLC) as chromatography (GC) Electrophoresis, Electrofocussing, ultracentrifiogation ELISA technique Fluorescent Antibody Technique, Radioactive isotopes autoradiography.

**Unit VIII :**

Microbial genetics – mutations and variations genetics of Neurospora. Aspergillus and Saccharomyces hetero and bacteriophages, plasmids episomes and tronsposans Transformation. Transduction Conjugation, Gentic Improvement of Micro-organisms, geneclouing and modern R-DNA-techniques to improve biotechnologically important micro-organisms.

**Unit IX :**

Microbial energy – principles and their application to microbial ecosystems. Methods of studying Microbial ecosystem Itlerrelationship of micro-organisms – biological equillibrium.

**Unit X :**

Statistics – elementary principles of statistics mean, mods and medion, chisquare, correltion and regressions. Analysis of variance. Statistical methods in biological research of Duncan's multiplication range test.

**Unit XI : Industrial Micro-biology**

Prduction of ethnol and alcoholic beverages, organic acids, Polyaccharids Aminoacids – Vitamins – enzymes growth regulators, antibiotics fermentation techniques continous cultivation of micro-organisms, patents terms and regulations. Microbial leaching of ores.

**Unit XII :**

Agricultural Microbiology: Distribution of Micro-organisms, organic matter decomposition – Microbiology and biochemistry, biofertilizers denitrification and microbial transformation of iron, sulphur and Phosphorus Ecto and Endo-mycorrihizal association in plants and their significance. Microbial psiticides – Microbial degradation of pesticides.

**Unit XIII :**

Biomass conversion – Production of Biomass with respect to microbial energy conversion – Ethanol from biomass. Biogas Technology – use of biomass for methaneogenesis – Biogas plants hydrogen fuel from microbes.

**Unit XIV :** Plant Microbiology

Concept of Phyllosphere rbizosphere and spermosphere, modification of rhizosphere effect. R.S. ratio, root exudates and their influence on plant growth and microbial community.

**Unit XV :** Environmental microbiology

Microbiology of Water and Air-Microbial assessment of water quality, safe disposal of sewage and industrial effluents. Waste water treatment and pollution control. Management of organic wastes; utilization of agricultural wastes through microbial degradation. Microbial composting. Disposal of municipal. Domestic and industrial wastes through microbial process. Recycling of sewage water. Microbial deodorization and decolouration of effluents.

**Unit XVI :** Food Microbiology

Role of microbes in preparation of sauer – Kraut bread and pickels. Preservation of food, sources of spoilage of food, food infection, food toxicity and control of food borne micro-organisms, food adultration and legislation. Microbes as food single cell protein production, mushroom production.

**Unit XVII :** Dairy Bacteriology

Microbiology of milk – Pathogenic bacteria in milk – Spoilage of fresh milk and milk products – Preventation Preservation of milk and milk products – production of fermented Dairy products.

**Unit XVIII :** Microbiology of Fibres

Microbial relting of fibres – Jute – Flax – Coir. Biodeterioration of cotton – jute. Prevention of damage of fibres.

**Unit XIX :** Microbial diseases and their control

Plant diseases – Damping off, rots and wilts, mildews smuls and rusts and leaf spots. Animal diseases – Anthrax foot mouth disease – Bovine – Rinderpest Human diseases – tuber culosis – leprosy – tetanus – Diptheria, typhoid-Cholera-HIV's.

**Unit XX :** Microbial Biotechnology

Deveploments in microbial biotechnology and Genetic manipulation – recombinant DNA technology – techniques Applications of biotechnology – production of antibioties, enzymes. Insulin, growth hormones – interferons – monoclonal antibodies.