

SYLLABUS FOR TAMILNADU COMMON ENTRANCE TEST (TANCET)

PART – III

10. BIOTECHNOLOGY

Bioprocess Engineering: Analysis of STR, Analysis of other configurations, Bioreactor scale-up, Modeling and simulation of Bioprocesses, Bioreactor considerations in Enzyme systems.

Cell and Molecular Biology: Cells, Cell lines, Cell culture, Cell Organelles and its functions, types of Cell divisions, cell cycle and its regulation mechanism. Transport mechanism (passive, Active, ATPase pumps and Na^+/K^+ pumps), receptors, signal Transduction, models of signal Amplification Secondary messengers, Structure of Nucleic Acids, Replication, Transcription, Translation and DNA repair mechanism in Prokaryotes and Eukaryotes. Promoters, Enhancers and Transcription factors. Genetic Codes and Lac & trp operons.

Biochemistry and Microbiology: Structure, function and metabolism of carbohydrates, lipids, Nucleic Acids and proteins. Enzymes and its mechanism. Electron Transport Chain system, High energy compound and reducing equivalents. History of Microbiology, Classification of Microorganism, structural organization and multiplication of microorganism. Physical and chemical control of microorganisms, Primary and Secondary metabolites and their applications.

Genetic Engineering: Genes, Control of gene expression, Restriction enzymes, Vectors (prokaryotic and Eukaryotic) construction of cDNA and genomic Library. Screening of DNA libraries, PCR, RACE, PCR, RAPD, RFLP, AFLP, site directed mutagenesis, Methods of Nucleic acid sequencing. Cloning vectors in plants, Transgenic and Knockout animals.

Immunology: Immune system, immunity, lymphoid organs, antigens, adjuvants, types of immune response. Activation and differentiation of T-cells and B –cells, Antibodies, Genes and generation of diversity, monoclonal antibodies. MHC APC, regulation of T-cell and B-cell responses. Immunity to viruses, Bacteria fungi and parasites, cytokines, complements, immunosuppression, allergy and hypersensitivity. Vaccines, Transplantation, Tumor, Immunology, Autoimmunity and Autoimmune disorders.

Bioinformatics: Search engines and algorithms, data management, data technology, biological databases and their uses. Pair wise sequence alignment (local and global), multiple sequence alignment, dot matrix, dynamic programming and Bayesian methods. BLAST, FASTA, machine learning and Hidden Markov models. Phylogenetic tree analysis. Bimolecular and cellular computing, microarray analysis and system Biology.