Syllabus for Entrance test for Admission to M Sc Biotechnology Course

Note: The syllabus prescribed for the entrance test has been divided into fifteen units. Each unit carries a weightage of four marks. Paper setters are required to set four multiple choice type questions with only one correct or most appropriate answer separately for each unit, giving uniform representation to the whole syllabus contained therein.

UNIT I

General science: Structure and properties of water. Ion product of water. Buffers, pH, pK and pI. Basic concepts on Molarity, Molality and Normality. Mean, Mode, Median, Standard deviation, Standard error and probability. Basics of computer sciences and its applications to biology.

UNIT II

Bio-Energetic & Biological Interaction: Laws of Thermodynamics .Concepts of heat of reaction, enthalpy, and entropy. Concept of chemical bonding, Electron displacements, Dipole-dipole interactions, hydrogen bond, Vander-Waal's forces, hydrophobic and hydrophilic Interactions, Acid-base equilibria, Soaps and detergents.

UNIT III

Bio-molecules: Carbohydrates, Lipids, Proteins, Vitamins and nucleic acids-Types, structure and function.

UNIT IV

Cell biology: Prokaryotic and eukaryotic cell-structure and organelle functions. Functions of sub-organells of cell i.e., Nucleus, Endoplasmic reticulum, Golgi apparatus, Peroxisomes and mitochondria. Structure of Cell membrane types and regulation of transport.

UNIT V

Metabolism: Carbohydrate, Lipids, amino acids and nucleotides turn over and its regulation, Metabolic disorders. Glycolysis, TCA cycle, Urea cycle, Gluconeogenesis, Glyoxalate cycle and pentose phosphate pathway.

UNIT VI

Biological oxidations: Oxidation-reduction potentials, electron acceptors and donors in plants and animals. ATP synthesis-oxidative and photo-phosphorylation.

UNIT VII

Molecular Biology: Prokaryotic and eukaryotic Replication, Transcription Translation, mechanism and their regulation. DNA Repair systems. Recombination.

UNIT VIII

Concept of Recombinant DNA Technology : Cloning vectors: Plasmids, Bacteriophages, Cosmids, phagemids, YACs, Restriction enzymes, Ligases, PCR.

UNIT IX

Immunology: Innate and adaptive immunity, Antigen and super antigens. Structure and functions of immunoglobulin. T-cells and B-cells.

UNIT X

Bio-Techniques: Principles, types and applications of Chromatography, Centrifugation, Electrophoresis, Spectrophotometry and Blotting techniques.

UNIT XI

Genetics: Mendelian laws of inheritance and their application, linkage and crossing over, gene mapping, theories of mutation and evolution, Genetic disorders.

UNIT XII

Animal & Plant physiology: Physiology and development of circulatory, nervous system. Endocrine and exocrine system: hormone diversity and action. Transport across plant cell, Transpiration, Photosystems, Flowering, plant hormones. Plant tissue culture and production of transgenic plants

UNIT XIII

Microbiology: Structure and organization of microbial cells, Microbial growth, Transformation, Transduction, Conjugation. Antimicrobial agents. Drug resistance

UNIT XIV

Enzymology: History, general characteristics, nomenclature and classifications of enzymes, enzyme activity and factors affecting enzyme activity, Competitive and uncompetitive inhibition, allosteric enzymes.

UNIT XV

Cancer biology: Cell cycle progression and regulation. Receptor mediated cell Signaling. Different types of receptors, Secondary messengers. Protein modification with specific emphasis on oncogenesis. Protein modification by phosphorylation and de-phosphorylation and the role in signal transduction processes.