

## Entrance Syllabus for Admission to P.G. program in Biochemistry

**Note:** The syllabus prescribed for the entrance test has been divided into fifteen units. Each unit carries 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 1

- Laws of thermodynamics
- Concepts of heat reaction, enthalpy, entropy
- Electrochemistry

### Unit 2

- Electro-negativity
- Acid base equilibria
- Essential and trace elements in biological system

### Unit 3

- Concepts of chemical bonding
- Electron displacements
- Dipole-dipole interactions: hydrogen bond, vander-walls forces, hydrophobic and hydrophilic interactions

### Unit 4

- Isomerism
- Soaps and detergents
- Spectroscopy

### Unit 5

- Photosynthesis and its mechanism
- Significance and mechanism of respiration
- Importance of water to plant life
- Transpiration mechanism
- Methods of study of macro- and micronutrients availability, uptake and role

### Unit 6

- Ecology and environmental conservation
- Air Pollution , Water pollution and their control, Renewable and non-renewable resources, protection, conservation and management
- Toxicity of metals and the reasons of toxicity
- Use of radioisotopes as a tracer in chemical reactions, in agriculture, industry and medicine
- Concepts of evolution, ecosystem, nitrogen, phosphorous and carbon dioxide cycle

### Unit 7

- Structure , transmission and role of viruses
- Bacteria- morphology and their growth
- Host-parasite relationship
- Application of microbiology

### Unit 8

- Structure, classification, properties and importance of carbohydrates, proteins, lipids, and nucleic acids

### **Unit 9**

- Basic concepts of enzymes, mechanism of enzyme action,
- Enzyme kinetics
- Enzyme inhibition and types

### **Unit 10**

- Mutation
- Variation in chromosome number
- DNA as genetic material, replication, transcription, genetic code, mechanism of protein synthesis and regulation
- Various structural levels of nucleic acids
- Chromosome structure, hereditary, linkage and recombination
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### **Unit 11**

- Spectroscopic techniques, chromatography, electrophoresis, and immunological techniques
- Introduction, scope and significance of biotechnology
- Elementary idea of genetic engineering

### **Unit 12**

- Scope and significance of cell biology
- Cell cycle and its different stages
- Morphology of cell – Prokaryotic and eukaryotic cell
- Structure, composition and function of cell wall, plasma membrane, mitochondria, plastids, endoplasmic reticulum, Golgi apparatus, nucleus, lysosomes and ribosomes
- Basic concepts in immunology

### **Unit 13**

- Blood components and their functions
- Composition and function of lymphatic system
- Anatomy and function of various components of human circulatory, respiratory, excretory, nervous, digestive and endocrine system

### **Unit 14**

- Glycolysis, TCA cycle, pentose phosphate pathway, gluconeogenesis, Glycogen synthesis and breakdown
- $\beta$ -oxidation of fatty acids, metabolism of fatty acid, triacylglycerol and cholesterol
- Transamination and deamination reactions, urea cycle, metabolism of phenylalanine, tyrosine and tryptophan

### **Unit 15**

- Metabolism of purines and pyrimidines
- Basic concept of nutrition
- Definition and scope of clinical biochemistry in diagnosis
- Enzyme patterns in health and disease states with reference to plasma lipase, amylase, cholinesterase, alkaline and acid phosphatase, SGOT, SGPT, LDH and CPK
- Liver and Kidney function tests