

## **XL-Q Biochemistry**

### **Section 1:**

Organization of life; Importance of water; Structure and function of biomolecules: Amino acids, Carbohydrates, Lipids, Proteins and Nucleic acids; Protein structure, folding and function: Myoglobin, Hemoglobin, Lysozyme, Ribonuclease A, Carboxypeptidase and Chymotrypsin.

### **Section 2:**

Enzyme kinetics including its regulation and inhibition, Vitamins and Coenzymes ; Metabolism and bioenergetics; Generation and utilization of ATP; Metabolic pathways and their regulation: glycolysis, TCA cycle, pentose phosphate pathway, oxidative phosphorylation, gluconeogenesis, glycogen and fatty acid metabolism; Metabolism of Nitrogen containing compounds: nitrogen fixation, amino acids and nucleotides. Photosynthesis: Calvin cycle.

### **Section 3:**

Biochemical separation techniques: ion exchange, size exclusion and affinity chromatography, Characterization of biomolecules by electrophoresis, UV-visible and fluorescence spectroscopy and Mass spectrometry.

### **Section 4:**

Cell structure and organelles; Biological membranes; Transport across membranes; Signal transduction; Hormones and neurotransmitters.

### **Section 5:**

DNA replication, transcription and translation; Biochemical regulation of gene expression; Recombinant DNA technology and applications: PCR, site directed mutagenesis and DNA-microarray.

### **Section 6:**

Immune system: Active and passive immunity; Complement system; Antibody structure, function and diversity; Cells of the immune system: T, B and macrophages; T and B cell activation; Major histocompatibility complex; T cell receptor; Immunological techniques: Immunodiffusion, immunoelectrophoresis, RIA and ELISA.

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