Enzymology and Bioenergetics BVOMLT-203

UNIT I

Enzymes General Characteristics : Introduction to enzymes. General characteristics of enzymes. Prosthetic group. Holoenzymes, apoenzyme and cofactors. Coenzymes and their biochemical functions, assay of enzyme activity, units of enzyme activity. Active sites(s) of enzymes. IUB system of nomenclature and classification of enzymes. Enzymes as catalysts. Theories of enzymes catalysis : Proximity and orientation effects, acid base catalysis, covalent catalysis. Role of metals in enzyme catalysis.

UNIT II

Enzyme Purification and Chromatography Techniques

Enzyme Purification : Need for purification. Preliminary fractionation procedures and precipitation techniques, Chromatography methods : Gel filtration—, adsorption–, ion exchange–and affinity chromatography. Types of support materials. Selection of appropriate conditions and elution procedures. Criteria of enzyme purity.

Enzyme Kinetics Enzyme Kinetics : Factors affecting velocity of enzyme catalysed reactions : Enzyme concentration, pH and

UNIT III

temperature. Michaelis –Menten equation. Determination of Km and its significance. Enzyme inhibition. Various types of enzyme inhibitions. Determination of Ki value. Enzyme inhibitors and their importance. Introduction to multisubstrate enzymes. Allosteric enzymes and enzyme regulation. Isoenzymes and their clinical significance. Bioenergetics :

UNIT IV

Bioenergetics Biological systems and concept of free energy, Endergonic processes and role of ATP & other high energy compounds. Biological oxidations. Redox potential. Enzymes and co-enzymes involved in oxidations and reductions. Mitochondrial electron transport chain and oxidative phosphorylation. Mechanism of oxidative phosphorylation.