

**Unit 1**

Chemical basis of life- composition of living matter, ionization of water, pH, pK, buffer system and their applications; Henderson-Hasselbach equation.

Bio-energetic, concept of entropy, free energy, electrical properties of biological compartments, electro-chemical gradients, membrane potential, chemiosmotic hypothesis.

**Unit 2**

Classification and structure of carbohydrates, amino acids, proteins and fats. Oxidative phosphorylation, mechanism of ATP synthesis, electron transport chain in bacteria, plants and animals.

**Unit 3**

Metabolism- basic concepts, glycolysis, citric acid cycle, pentose phosphate pathway and gluconeogenesis, glycogen metabolism,  $\beta$ -Oxidation of fatty acids, fermentation,  $\text{CO}_2$ -fixation, C-reduction cycle ( $\text{C}_3$ ,  $\text{C}_4$  CAM). Photorespiration.

**Unit 4**

Enzymes, protein and non-protein enzymes-classification and nomenclature of enzymes, regulation of enzyme activity (allosteric regulation and Zymogenicity) coenzymes-structure and function; Kinetics of enzyme catalysed reactions, isolation and purification of enzymes.

**Suggested readings**

1. Biochemistry, D Voet and JG Voet, J Willey and Sons (2001).
2. Biochemistry, G Zubay, Wm.C.Brown Publishers. (2000).
3. Lehninger's Principle of Biochemistry, Nelson DL and Cox MM, Worth Publishers, (2008).
4. Harper's Biochemistry, Murray RK et al., Prentice Hall International (2006).
5. Physical Chemistry of Macromolecules, Tanford, C., John Wiley and Sons, (2005).

1. Preparations of buffers.
2. Estimation of proteins (Lowry's Method).
3. Estimation of carbohydrates.
4. Estimation of lipids.
5. Paper chromatography of amino acids.
6. Determination of  $K_m$  and  $V_{max}$

**Suggested readings**

1. An introduction to Practical Biochemistry, Plummer DT, Tata McGraw Hill, (1987).
2. Practicals in Biochemistry, Jayaraman J (1981) Wiley Eastern Publishing Co. Ltd.
3. Principles and Techniques of Practical Biochemistry, Wilson K and Walker J, Cambridge Univ Press, (1994).