

FUNDAMENTALS OF BIOCHEMISTRY

Paper 6

THEORY

(48 Periods)

Unit 1: Carbohydrates

(8)

Structures and biological importance of monosaccharides, disaccharides, polysaccharides and glycoconjugates; Structures and biological importance of selected derivatives.

Unit 2: Lipids

(8)

Structures and significance of physiologically important saturated and unsaturated fatty acids; Tri-acylglycerols, Phospholipids, Glycolipids, Steroids.

Unit 3: Proteins

(10)

Amino acids: Structure, classification and general properties of α -amino acids; Physiological importance of essential and non-essential α -amino acids

Proteins: Bonds stabilizing protein structure; Levels of organization in proteins; Denaturation; Introduction to simple and conjugate proteins; General methods of protein purification (*in brief*)

Unit 4: Nucleic acids

(6)

Structure of purines and pyrimidines; Nucleotides and nucleic acids; Phospho-diester bonds, Base pairing.

Unit 5: Enzymes

(16)

Nomenclature and classification; Cofactors; Specificity of enzyme action; Isozymes; Mechanism of enzyme action; Enzyme kinetics; Factors affecting rate of enzyme-catalyzed reactions; Derivation of Michaelis-Menten equation, Concept of K_m and V_{max} , Lineweaver-Burk plot; Multi-substrate reactions; Allosteric enzymes and their kinetics; Enzyme inhibition and associated changes in kinetics; Regulation of enzyme action.

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Paper 6

PRACTICAL

1. Colour tests of functional groups in carbohydrate solutions.
2. Colour tests of functional groups in protein solutions.
3. Paper chromatography of amino acids.
4. Action of salivary amylase under optimum conditions.
5. Effect of pH on the action of salivary amylase.
6. Effect of temperature on the action of salivary amylase.
7. Separation of proteins by SDS-PAGE.

ESSENTIAL READINGS

- Cox, M.M and Nelson, D.L. (2008). *Lehninger's Principles of Biochemistry*, V Edition, W.H. Freeman and Co., New York.
- Berg, J.M., Tymoczko, J.L. and Stryer, L. (2007). *Biochemistry*, VI Edition, W.H. Freeman and Co., New York.
- Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W. and Well, P.A. (2009). *Harper's Illustrated Biochemistry*, XXVIII Edition, International Edition, The McGraw- Hill Companies Inc.

SUGGESTED READINGS

- Hames, B.D. and Hooper, N.M. (2000). *Instant Notes in Biochemistry*, II Edition, BIOS Scientific Publishers Ltd., U.K.
- Watson, J.D., Baker, T.A., Bell, S.P., Gann, A., Levine, M. and Losick, R. (2008). *Molecular Biology of the Gene*, VI Edition, Cold Spring Harbor Lab. Press, Pearson Pub.