

5. Biochemistry

B.Sc. Biochemistry-I

Total Mark: 100

Appendix 'A'

(Outlines of Tests)

Paper-A:	Macro Molecules (Written)	40 Marks
Paper-B:	Enzymology and Signal Transduction (Written)	35 Marks
Paper-C:	(Practical)	25 Marks

Appendix 'B'

(Syllabi and Courses of Reading)

Paper-A: Macro Molecules

40 Marks

Course Contents:

Introduction and principles of biochemistry. Amino acids, general properties and their classification. Proteins and their properties, covalent structure of proteins, primary structure determination. Secondary structure, fibrous proteins (collagen, keratin etc.). Tertiary structure and globular proteins, Quaternary structure. Protein stability and folding. Classification and general properties of carbohydrates, structure and functions of mono, oligo and polysaccharides, sugar derivatives. Glycoproteins and Proteoglycans. Storage polysaccharides. Structure and function of bacterial cell-walls. Lipid classification, structure, properties and functions of different lipids, fatty acids, triglycerides, glycerophospholipids, sphingolipids, cholesterol. Micelles, bilayers and liposomes. Properties and functions of lipoproteins. Chemical structures of nucleotides, nucleosides and bases. Structural and functional aspects of DNA and RNA.

Recommended Books:

1. Lehninger Principles of Biochemistry, D.L. Nelson, M.M. Cox 6th edition (2013), W. H. Freeman.
2. Biochemistry, L. Stryer, 7th Edition (2012), W.H. Freeman and Co.
3. Biochemistry, D. Voet, J.G. Voet, 4th edition (2011), John Wiley and Sons Inc.
4. Harper's Illustrated Biochemistry, 29th edition (2012), McGraw-Hill Medical.
5. Lippincott's Biochemistry, P.C. Champe, R.A. Harvey, D.R. Ferrier, 5th edition (2010), J.B. Lippincott Company.
6. Biochemistry, molecules, cells and the body, J. Dow, G. Lindsay, J. Morrison (1996), Addison Wesley Publishing Company Cooperation.
7. Biochemistry, M.K. Campbell and O'Farrell, 7th edition, (2012), John Wiley and Sons, New York.

8. Concepts in Biochemistry, R.F. Boyer, 4th edition (2006), John Wiley and Sons, New York.

Paper-B: Enzymology and Signal Transduction

35 Marks

General characteristics of enzyme reactions, enzyme nomenclature and classification, enzyme specificity, co-enzymes. Enzyme kinetics and Michaelis Menten equation. Effect of pH and other factors on enzyme reaction rate. Steroid and peptide hormones, hormone receptor interactions. and their metabolism; biological functions and clinical aspects of various hormones secreted from pancreatic, thyroid and pituitary gland etc. Fat and water soluble vitamins; hematopoietic. Macrominerals and trace minerals. General composition of blood, blood coagulation, intrinsic and extrinsic pathways, blood groups, types and properties of leukocytes. Immune system, elements of innate and acquired immunity. Antibody structure and functions, types of hypersensitivity.

Recommended Books:

1. Lehninger Principles of Biochemistry, D.L. Nelson, M.M. Cox 6th edition (2013), W. H. Freeman.
2. Biochemistry, L. Stryer, 7th Edition (2012), W.H. Freeman and Co.
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8. Concepts in Biochemistry, R.F. Boyer, 4th edition (2006), John Wiley and Sons, New York.
9. Kuby Immunology, J.A. Owen, J. Punt, J. Kuby, S.A. Stranford 7th edition (2013) W.H. Freeman.

Paper-C: Practical

25 Marks

Course Contents

A study of general properties of amino acids. Qualitative tests for amino acids. Amino acid titration. Protein hydrolysis and chromatographic separation of amino acids. Isolation and solubilization of proteins from plant and animal tissues. Estimation of proteins by qualitative and quantitative methods. A study of carbohydrate properties. Estimation of glucose. Tests for fats, sterol and phospholipids, estimation of acid, saponification and iodine values of fat. Isolation of enzymes

from various sources. Isolation of DNA and RNA, Quantitative and qualitative estimation of DNA and RNA.

Recommended Books:

1. An Introduction to Practical Biochemistry, D. T. Plummer, 3rd edition (1987), McGraw-Hill.
2. Handbook of Molecular and Cellular Methods in Biology and Medicines, L.J. Cseke, A. Kirakosyan, P.B. Kaufmann, M.V. Westfall (2011), CRC Press.
3. Modern Experimental Biochemistry, R. Boyer, 5th edition (2009), Pearson Education, Inc.
4. The Protein Protocols Handbook, J.M. Walker (2008), Springer Science and Business Media