

RAMAKRISHNA MISSION VIVEKANANDA COLLEGE (AUTONOMOUS)

DEPARTMENT OF BIOCHEMISTRY

B.Sc. DEGREE COURSE

SYLLABUS FOR STUDENTS ADMITTED FROM 2008 - 2009

SEMESTER SYSTEM WITH CREDITS

SEMESTER: I

PAPER I : BIOORGANIC CHEMISTRY I

UNIT I

Introduction to bioorganic chemistry – Biomolecules – Definitions – General functions.

Chemistry of Carbohydrates

Definition, classification based on the number of carbon atoms, functional units of carbohydrates- Mono, Di, and Polysaccharides sources of different sugars – physical properties – stereoisomerism, optical isomerism, enantiomers, epimers, diastereomers, anomers and mutarotation. Chemical properties – reactions based on hydroxyl, aldehyde and keto groups – Configuration of glucose – ring structure – biological importance of monosaccharides and derived sugars – amino sugars (NANA), uronic acid, sialic acid (structure elucidation not necessary).

UNIT II

Chemistry of Polysaccharides

Structure and Biological importance of Homopolysaccharides: Starch, Cellulose, Pectin, Chitin, Dextrin

Isolation of Carbohydrate from plants and animals.

Heteropolysaccharides: Hyaluronic acid, Chondroitin sulphate, Dermatan sulphate, keratin sulphate, Heparin, Agar-Agar, Proteoglycans, Glycoproteins, Bacterial cell wall polysaccharides and Blood Group polysaccharides.

UNIT III

Chemistry of Proteins

Amino acids – Occurrence, classification, structure and biological role – essential, non-essential and non-protein amino acids – physical and chemical properties of amino acids and colour reactions.

Proteins – classification based on composition, solubility, shape and functions. Isolation of Proteins, Physical properties – coagulation, precipitation, denaturation and renaturation.

UNIT IV

Orientation of Proteins

Synthesis of peptides – chemical method, solid phase -- peptide sequencing, determination of amino acids sequence – chemical enzymatic methods

Structure and functions of biologically important peptides.

Forces influencing protein structure – peptide bond, disulphide bond, hydrogen bond, hydrophobic, electrostatic and Van der Waal's interactions

Structure of proteins – primary, secondary, tertiary and quaternary structures.

UNIT V

Heterocyclic Compounds of Biological Importance

Nomenclature and classification of heterocyclic rings – structure and biochemical functions of Furan, Thiazole, Imidazole, Pyrrole, Pyran, Pyridine, Pyrimidine, Purine, Pteridine, Indole and Quinoline

Structure and Biological Importance of Porphyrin, Bile Pigments and Heme

BOOKS RECOMMENDED

1. Text Book of Biochemistry
West & Todd, Fourth Edition
Oxford & IBH Publishing Co. Pvt. Ltd.
2. A. Lehninger - Principles of Biochemistry.
David L Nelson & Michael M Cox, Third Edition (2002)
Macmillan Work Publishers.
3. Organic Chemistry of Natural Products
Gurdeep Chatwal, Volume I (2001)
Himalaya Publishing House, New Delhi
4. Agarwal's Text Book of Biochemistry
O.P. Agarwal, Twelfth Edition, (2002)
Goel Publishing House, Meerut.
5. Fundamentals of Biochemistry
J.L. Jain
S. Chand & Company Ltd., New Delhi
6. Hand Book of Biochemistry
U. Satya Narayana, Second Edition, (2003)
Books & Allied (P) Ltd., Calcutta
7. Concepts of Biochemistry
A.C. Deb, First Edition, (1999)
Books & Allied (P) Ltd., Calcutta