

SARDAR PATEL UNIVERSITY
Programme: MSC (Integrated Biotechnology)
Semester: III
Syllabus with effect from: June 2011

Paper Code: PS03CIGB02	Total Credits: 3
Title Of Paper: Biochemistry - I	

Unit	Description in detail	Weightage (%)
1	<p>Introduction to Biomolecules: Nature of biological material, identifying Characteristics of living matter, molecular logic of life, bioelements, general properties of biomolecules.</p>	
2	<p>Carbohydrate: Introduction, occurrence, physiological importance, classification of carbohydrates, monosaccharide, disaccharide, oligosaccharides and polysaccharides.</p> <p>Physiological properties of carbohydrates, asymmetric centre in monosaccharides, Optical isomerism, stereoisomerism, epimers, mutarotation, diastereoisomerism configuration in sugar, cyclic structure anomeric carbon atom, fishers projection formula, Haworths representation.</p> <p>Chemical properties of carbohydrates, oxidation and reduction of sugars, action of mineral acids, hydrogen cyanide, and hydrazine on sugars due to hydroxyl groups, reducing action of sugars.</p> <p>Polysaccharides: occurrence, structure and physiological importance of starch, glycogen, cellulose, hemicellulose, dextrin, pectin, agar, hyaluronic acid, heparin and chondroitin sulphate.</p> <p>Sugar derivatives of biological importance: amino sugars, deoxysugars, sugar phosphates, blood group substances, bacterial cell wall carbohydrates.</p> <p>Biotechnologically important carbohydrates: Amylase-free starch, high amylose starch, cyclodextrins, fructans, trehalose.</p>	
3	<p>Aminoacids and proteins: Structure and classification of amino acids, rare aminoacids of proteins, non protein aminoacids, Essential aminoacids, amphoteric nature of protein, titration curve of glycine.</p> <p>Physical properties of amino acids- stereospecificity and optical activity.</p> <p>Chemical properties of amino acids, chemistry of peptide linkage.</p> <p>Classification of proteins, solubility criteria: salting in and out of protein. Denaturation of proteins.</p> <p>Structure of proteins with examples (Primary, secondary, tertiary, quaternary). Determination of sequence of proteins.</p>	
4	<p>Lipids: Definition, classification of fatty acids, triacylglycerol, phospholipids, sphingolipids, sterols, their properties, structures, functions. Lipoproteins.</p> <p>Biotechnologically important Lipids: Medium chain fatty acid, Saturated fatty acids, Monounsaturated fatty acids, Poly hydroxyl butyrate (For biodegradable plastic)</p> <p>Nucleotides and nucleic acid: Structure of nitrogen bases and sugars, structure of nucleosides and nucleotides, Ribose, Deoxyribose and their conformation. Structure and properties of DNA, forms of DNA.</p>	
	Practical:	
	<ul style="list-style-type: none"> • Identification of biomolecules: Carbohydrate (Molisch's test), Protein (Biuret) & lipid (Saponification). • Qualitative analysis of carbohydrates: Molisch's test, Iodine test, Benedict's test, Fehling's test, Cole's test, Barfoed's test, Saliwanoff's 	



	<p>test, Rapid furfural test, Osazone test, Mucic acid test, Inversion test.</p> <ul style="list-style-type: none"> • Qualitative analysis of proteins: Precipitation test, Mercuric nitrate test, Lead acetate test, Sulphosalicylic test, Potassium ferricyanide test, Tannic acid test, Alcohol test, Heller's test, Ammonium sulphate test. • Qualitative analysis of amino acids: Colour reactions, Biuret test, Ninhydrin test, Millon's test, Arginine test (Sakaguchi test), Xanthoproteic test, Hopkin's Cole test, Ehrlich test, Nitroprusside test. • Qualitative analysis of fat: Test for oil, Solubility test, Dichromate test, Emulsion test, Absorption test, Glycerol test, Acid value of oil, Saponification test, Iodine test, Borax test, Liebermann-Burchard test. • Estimation of protein by Biuret method. • Estimation of carbohydrate by DNS method. • Estimation of DNA by DPA method. 	
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Basic Text & Reference Books:

- Biochemistry by Lubert Stryer, W. H. Freeman and Company. 4th /6th edition, 2000/2004 Hardback, ISBN 0716720094
- FUNDAMENTALS OF BIOCHEMISTRY: Life at the Molecular Level, by D. Voet, J. G. Voet, and C. Pratt, 3rd Edition, John Wiley and Co John Wiley & Sons, Inc., New York, , 2008 ISBN : 0471214957; 9780471214953
- Principles of Biochemistry by Albert Lehninger, W.H. Freeman & Company; 3rd edition (February 2000), ISBN-10: 1572591536
- Harper's Biochemistry : Harper, 27th Edition, McGraw-Hill Publishing Co; Robert K. Murray, Daryl K. Granner, Victor W. Rodwell, 2006 ISBN-10: 0071461973
- Outlines of Biochemistry by Conn E E , Stumps P E and and Doi, R.H., John Wiley and sons, Singapore, 5th Edition - 2001
- Principles of Biochemistry by Horton, Morgan, Secrimgeour, Perry, Rawn , pearson International edition – 4th edition ISBN 978-1-4058-2573-3
- TEXTBOOK OF MEDICAL BIOCHEMISTRY 7th edition (pb) 2007. CHATTERJEE M N and Rana shinde JAYPEE BROTHERS MEDICAL PUBLISHERS PVT LTD.. ISBN: 8184481349
- Harper's Biochemistry: R. K. Murray and others. Appleton and Lange, Stanford. MCGRAW-HILL BOOK COMPANY ISBN: 0838536905 25 edition (pb) 2000
- Plummer, D.T. (1987). 3rd ed. An introduction of Practical Biochemistry. McGraw Hill Book Co.

