

BIOCHEMISTRY- Syllabus-2015

Semester	Paper	Paper Code No	
Semester – I	Paper-I : (Theory) Paper-I (Practical)	BCHEM-101 BCHEM- 101 (P)	75 25
Semester – II	Paper-II : (Theory) Paper-II : (Practical)	BCHEM-201 BCHEM-201(P)	75 25
Semester – III	Paper-III (Theory) Paper (Practical)	BCHEM-301 BCHEM-301(P)	75 25
Semester – IV	Paper-IV : (Theory) Paper IV : (Practical)	BCHEM-401 BCHEM-401(P)	75 25
Semester – V	Paper-V : (Theory) Paper V (Practical) Ppaper VI : (Theory) Paper :VI (Practical)	BCHEM-501 BCHEM-501(P) BCHEM-502 BCHEM-502(P)	75 25 75 25
Semester – VI	Paper-VII (Theory) Paper-VII : (Practical) Paper-VIII. (Theory) Paper VIII: (Practical)	BCHEM-601 BCHEM-601(P) BCHEM-602 BCHEM-602(P)	75 25 75 25

Year	Semester	Paper No.	Paper Name	Paper-wise Marks	Total Marks
First Year	1 st Semester	I-T	Biomolecules & Biophysical Techniques	75	100
		I-P	Biochemistry Practical	25	
	2 nd Semester	II-T	Thermodynamics, Membrane Biophysics & Biostatistics	75	100
		II-P	Biochemistry Practical	25	
Second Year	3 rd Semester	III-T	Proteins & Enzymes	75	100
		III-P	Biochemistry Practical	25	
	4 th Semester	IV-T	Cell Biology & Physiology	75	100
		IV-P	Biochemistry Practical	25	
Third Year	5 th Semester	V-T	Intermediary Metabolism	75	100
		V-P	Biochemistry Practical	25	
		VI-T	Nutritional & Clinical Biochemistry	75	100
		VI-P	Biochemistry Practical	25	
	6 th Semester	VII-T	Microbiology & Immunology	75	100
		VII-P	Biochemistry Practical	25	
		VIII-T	Molecular Biology	75	100
		VIII-P	Biochemistry Practical	25	
GRAND TOTAL MARKS					800

Biomolecules

Water: molecular structure of water, hydrogen bonds & physical properties of water; pH, pK;
Buffers in laboratory & biological system.

Properties, structure and classification of monosaccharides (glucose & fructose), disaccharides (sucrose, maltose and lactose) and polysaccharides (dextrins, starch, glycogen and cellulose). Stereochemistry of sugars: chiral carbon, epimers, anomers, mutarotation, chair and boat forms, glycosides, glycopyranose and fructopyranose.

Alpha amino acids: structure and properties of amino acids; Proteins: Primary structure (Structure of peptide bond-restricted rotation, cis/trans); Secondary structure (α , β and super secondary structures); Tertiary structure- Protein folding; and Quaternary structure of Proteins.

Fatty acids: nomenclature and chemical properties; Lipid classification: simple and complex. General structure and function of the major lipid subclasses; acylglycerols, phosphoglycerides, sphingolipids, waxes and terpenes, steroids and prostaglandins.

Nucleotides: chemistry and properties. Nucleic acids: DNA and RNA forms and functions.

Biophysical Techniques

Principles and applications of the following techniques: Centrifugation, chromatography (Gel, Ion exchange & Affinity), electrophoresis (PAGE & SDS-PAGE), UV/Visible spectrophotometry, X-ray crystallography, spectrofluorimetry, microscopy (light & electron), NMR.

Isotopes, radioactive decay, α , β and γ radiation, detection of radioactivity (scintillation counting, labeling, quenching and autoradiography).

Suggested Readings:

- Nelson D L and Cox M M (2008) *Lehninger's Principles of Biochemistry*, Macmillan Pub.
Berg J M, John L, Stryer L (2012) *Biochemistry* 6th Edn., W H Freeman & Co. Ltd.
Zubay G (1999) *Biochemistry* 4th Edn., W C Brown Commun, Inc.
Harper's *Illustrated Biochemistry* 29th Edn. (2012) , Murray et al. McGraw Hill Pubn.
Voet D & Voet J G (2004) *Biochemistry* 3rd Edn., John Wiley & Sons.
Gareth & Grisham (2008) *Biochemistry* 4th Edn., Brooks Cole Pbn.
Devlin T. M. (2010) *Textbook of Biochemistry with Clinical correlations* 7th Edn., Wiley Pubn.
Boyer R F (2009) *Modern Experimental Biochemistry* 3rd edn. , 5th Impression Pearson edn.
Freifelder D (1982) *Physical Biochemistry*, W H Freeman.
Wilson K and Walker J (2002) *Principles and Techniques of Practical Biochemistry* 5th Edn. Cambridge Pbn.

PAPER I
BIOCHEMISTRY PRACTICAL - I

MM 25

1. Preparation of Buffer solution using Henderson Hasselbalch equation.
2. Verification of Beer-Lambert's Law
3. Estimation of protein by Lowry's method
4. Estimation of protein by Bradford's method.
5. Estimation of DNA using diphenylamine
6. Estimation of RNA using orcinol

Suggested readings:

- Boyer R F (2009) Modern Experimental Biochemistry 3rd edn. , 5th Impression Pearson edn.
- Sadasivam S and Manickam A (2005) Biochemical Methods,(Rev Edn.) New Age Int. Pub, New Delhi.
- Jayaraman (2011) Laboratory Manual in Biochemistry, New Age Int. Pub.
- Plummer D T (2008 reprint) An Introduction to Practicals in Biochemistry 3rd Edn., Tata McGraw- Hill
- Sambrook J and Russel D W (2012) Molecular Cloning 4th edn., CSH Lab Press
- Rao B S & Deshpande (2005) Experimental Biochemistry Students Companion I K International Pub
- Damodaran G (2011) Practical Biochemistry, Pub Jaypee bros.
- Nigam A & Ayyagiri A (2008) Lab Manual in Biochemistry, Immunology & Biotechnology, Tata McGraw Hill
- Yadav V. K. et al (2012) Biochemistry & Biotechnology- A Lab Manual, Pointer Publns.