3-1-21

Subject: BIO-CHEMISTRY

SEMESTER-I

Paper I :Biomolecules

Unit - I : Biophysical Concepts

Water as a biological solvent and its role in biological processes. Biological relevance of pH, measurement of pH, pKa of functional groups in biopolymers such as proteins and nucleic acids. Importance of buffers in biological systems, ion selective electrodes, and oxygen electrode. Donnan membrane equilibrium. Significance of osmotic pressure in biological systems,

Unit - II : Carbohydrates

Carbohydrates: Classification, monosaccharides, D and L designation, open chain and cyclic structures, epimers and anomers,mutarotation, reactions of carbohydrates (due to functional groups - hydroxyl , aldehyde and ketone). Amino sugars, Glycosides. Structure and biological
importance of disaccharides (sucrose, lactose, maltose, isomaltose, trehalose), trisaccharides (raffinose, melezitose), structural polysaccharides (cellulose, chitin, pectin) and storage polysaccharides (starch, inulin, glycogen). Glycosaminoglycans, Bacterial cell wall polysaccharides. Outlines of glycoproteins, glycolipids and blood group substances.

Unit - III Lipids

Lipids: Classification, saturated and unsaturated fatty acids, structure and properties of fats and oils (acid, saponificition and iodine values, rancidity). General properties and structures of phospholipids, sphingolipids and cholesterol. Prostaglandins- structure and biological role of PGD_2,PGE_2 and PGF_2 □. Lipoproteins: Types and functions
Biomembranes: Behavior of amphipathic lipids in water- formation of micelles, bilayers, vesicles, liposomes. Membrane composition and organization - Fluid mosaic model.

Unit-IV : Amino Acids, Peptides

Amino Acids: Classification, structure, stereochemistry, chemical reactions of amino acids due to carbonyl and amino groups. Titration curve of glycine and p*K* values. Essential and nonessential amino acids, non-protein amino acids. Peptide bond - nature and conformation. Naturally occurring peptides - glutathione, enkephalin.

Unit-V : Proteins

Proteins: Classification based on solubility, shape and function. Determination of amino acid composition of proteins. General properties of proteins, denaturation and renaturation of
proteins. Structural organization of proteins- primary, secondary, tertiary and quaternary structures (Eg. Hemoglobin and Myoglobin), forces stabilizing the structure of protein. Outlines
of protein sequencing.

Signature of the
Chairman (B.O.S.)
(20.....Exams)

1st Semester Practicals : Qualitative Analysis

1. Preparation of buffers (acidic, neutral and alkaline) and determination of *p*H.
2. Qualitative identification of carbohydrates- glucose, fructose, ribose/xylose, maltose, sucrose, lactose, starch/glycogen.
3. Qualitative identification of amino acids - histidine, tyrosine, tryptophan, cysteine, arginine.
4. Qualitative identification of lipids- solubility, saponification, acrolein test, Salkowski test, Lieberman-Burchard test.
5. Preparation of Osazones and their identification.
6. Absorption maxima of colored substances- *p*-Nitrophenol, Methyl orange.
7. Absorption spectra of protein-BSA, nucleic acids- Calf thymus DNA.

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Signature of the
Chairman (B.O.S.)
(20.....Exams)

(3) (1) B.Sc

MODEL QUESTION PAPERfor End Semester Exam

B.Sc Degree Course

(Semester pattern)

B.Sc Bio Chemistry

Time : 3 Hrs Max marks : 75

SECTION A (5 x 5 = 25 marks)

I. Attempt any five of the following

1.
2.
3.
4.
5.
6.
7.
8.

SECTION – B (10x5 = 50 marks)

Attempt all the questions

9.

(Or) Unit I

10.

11.

(Or) Unit-II

12.

(Or) Unit-III

13.

(Or) Unit IV

14.

15.

(Or) Unit V

16.

Distribution of Practical Marks

Time: 3 Hrs Max marks: 75

1. Principles 20
2. Major Experiment 30

Signature of the Chairman (B.O.S.) (20.....Exams)