

SEMESTER II

PAPER II: BIO-ORGANIC CHEMISTRY II

UNIT I

Chemistry of Lipids

Lipids – Definition, occurrence, classification, biological functions and reactions

Fatty acids – Classification, structure and functions

Essential and non-essential fatty acids, Physical and Chemical properties of Fats and Oils

UNIT II

Lipids and their Products in the Biological System

Structure and biological functions of phospholipids, (Lecithin, Cephalin, Phosphatidyl Serine, Inositol, Plasmalogens), Triglycerides, Glycolipids, Lipoproteins.

Sterols – Cholesterol, Ergosterol, Desmosterol,

Bile Acid and Salts

Steroid Hormones (Sex Hormones)

UNIT III

Chemistry of Nucleic Acids

Structure of Purine, Pyrimidine bases

Structure of Nucleosides and Nucleotides in DNA and RNA, forces stabilizing the structure of Nucleic acids, phosphodiester linkage.

UNIT IV

Structural Aspects of Genetic Materials

Structure of DNA, RNA and Functions. (A, B & Z DNA, mRNA, tRNA, rRNA) Denaturation, annealing and melting temperature (T_M)

Isolation of RNA and DNA

UNIT V

Chemistry of Vitamins and Antibiotics

Vitamins – definition, sources, structure, biochemical functions and deficiency symptoms

Water Soluble Vitamins: Ascorbic acid, Thiamine, Riboflavin, Niacin, Pantothenic acid, Folic acid, Lipoic acid, Biotin, Cyanocobalamin

Fat Soluble Vitamins: Vitamins A, D, E and K

Antibiotics – Definition, Structure and Functions – Penicillin, Streptomycin, Chloromycetin and Tetracycline

BOOKS RECOMMENDED

1. A.Lehninger -Principles of Biochemistry.
David L Nelson & Michael M Cox
Third Edition (2002)
Macmillan Work Publishers.
2. Text Book of Biochemistry West & Todd
Fourth Edition
Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi
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
Reprint (2005)
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.

MAJOR BIOCHEMISTRY PRACTICAL I

Note:

1. Students should know the principles, theory and calculations of each experiments.
2. They should know to prepare all the solutions by themselves. They should standardize their solutions individually.

1. QUALITATIVE ANALYSIS.

- a) Reactions of sugars including glucose, fructose, galactose, mannose, pentose, maltose, sucrose, lactose, starch, and glycogen.
- b) Reactions of Proteins – Solubility, Biuret, Millon's Xanthoproteic test, denaturation by heat, pH change and precipitation by acidic reagents. Colour reactions of amino acids like tryptophan, tyrosine, cysteine, methionine, proline and histidine.
- c) Reactions of Lipids – Solubility, saponification tests for unsaturation, Liebermann Burchard test for cholesterol.
- d) Food Adulterants

2. EXPERIMENTS INVOLVING TITRIMETRIC PROCEDURES

- a) Estimation of amino acids by formal titration.
- b) Estimation of ascorbic acid by titrimetric method using 2,6 – dichlorophenol indophenol.
- c) Estimation of reducing sugar from biological fluids by Benedict's titrimetric method.
- d) Determination of saponification value of an edible oil (Gingely Oil & Groundnut Oil)
- e) Determination of Acid number of edible oil (Coconut Oil, Groundnut Oil).
- f) Iodine value of edible oil.

3. GROUP EXPERIMENTS.

- a) Estimation of ascorbic acid from amla, citrus fruits.
- b) Estimation of glucose from fruits like grapes, pineapple.
- c) Estimation of lipids and proteins from commercially available milk.