OPEN ELECTIVE PAPERS

SEMESTER II PAPER: Basic Biochemistry				
Open elective	**Paper Code:** 16BCHO1	**Credits 3**	**Max Marks: 80**	**Time: 3hrs**

Course Outcomes

CO1⇨ Enrichment of students about general structure and functions of eukaryotic cell and general knowledge of carbohydrates and lipids.

CO2⇨.Basic knowledge of biological importance of amino acids, proteins and nucleic acids

CO3⇨ Basic knowledge of biological importance of vitamins and enzymes

Instructions

The examiner is required to set even questions in all. Question No. 1 will be compulsory and short answer type covering the entire syllabus. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt Question 1 and four more selecting at-least one from each unit

Syllabus

UNIT I

Cell: definition, general structure and size of some important cells, general functions of cell organelles, basic difference in prokaryotic and eukaryotic cells

Carbohydrates: Definition, classifications and sources of carbohydrates, occurrence and biological functions of monosaccharides, disaccharides, and polysaccharides

Lipids: Introduction, classification and functions of lipids. Saturated and unsaturated fatty acids. Essential fatty acids. Triacylglycerides and their properties,

UNIT 2

Amino acids: Nutritional classification of amino acids and physical properties of amino acids.

Proteins: Definition, types, sources, properties and biological significance of proteins, Primary, secondary, tertiary and quaternary structure of proteins.

Nucleic acids: Nucleotides & nucleosides, types of DNA and RNA, evidence that DNA is the genetic material, feature of DNA double helix, Size of DNA in prokaryotic and eukaryotic cells.

UNIT 3

Vitamins: Sources, examples and classification, important functions of fat soluble and water soluble vitamins

Enzymes: History, general characteristics, nomenclature and IUB classification of enzymes, holoenzyme, apoenzyme, coenzymes, prosthetic groups, cofactors, activators, inhibitors, active site, metalloenzymes and isozymes, Units of enzyme activity, examples of some clinically important enzymes

Factors affecting enzyme activity: pH, temperature, time of incubation, enzyme concentration and substrate concentration. Properties of allosteric enzymes and their significance.

Suggested Readings for 16BCHO1: Basic Biochemistry:

1. Lehninger Principles of Biochemistry 4th Ed By David L. Nelson and Michael M. Cox, WH Freeman and Company.
2. Principles of Biochemistry By Geoffrey Zubay. Publisher: McGraw Hill College.

3. Biochemistry: The Molecular Basis of Life By Trudy McKee and James R McKee. Publisher: McGraw-Hill Higher education.

4. Biochemistry: Biomolecules, Mechanisms of Enzyme Action and Metabolism Vol 1 By D Voet. John Wiley and Sons.

5. Biochemistry By U. S. Satyanarayana

6. Outlines of Biochemistry By Eric C Conn, PK Stumpf, G Bruening and Ray H. Doi. John Wiley & Sons.

SEMESTER III

PAPER: Human Health and Nutritional Disorders

Open Elective	**Paper Code:** 16BCHO2	**Credits 3**	**Max Marks: 80**	**Time: 3hrs**

Course Outcomes

CO1⇨ Enrichment of students about general food physiology, metabolic disorders and role of free radicals in health.

CO2⇨.Basic knowledge of vitamins, minerals and associated disorders

CO3⇨ Basic knowledge of biological significance of digestion related disorders and importance of enzymes of liver origin

Instructions

The examiner is required to set even questions in all. Question No. 1 will be compulsory and short answer type covering the entire syllabus. The remaining six questions will be set with two questions from each unit. The candidate will be required to attempt Question 1 and four more selecting at-least one from each unit

Syllabus

Unit I

Food Physiology: Concept of balanced diet and energy content of foods; Basal and resting metabolism- influencing factors, Absorption of carbohydrates, lipids, proteins, nucleic acids, minerals and vitamins.

Common metabolic disorders: Diabetes mellitus, disorders of HDL-cholesterol, LDL cholesterol, triglycerides, phenylketonuria, albinism.

Antioxidants: Free radicals: definition, formation in biological Systems. Natural anti-oxidants, defense against free radicals. Role of free radicals and antioxidants in health and disease.

Unit II

Vitamins: Dietary sources, biochemical functions and specific deficiency diseases associated with fat and water soluble vitamins; Hypervitaminosis symptoms of fat-soluble vitamins.

Minerals: Dietary sources and deficiency disorders of dietary calcium, phosphorus, magnesium, iron, iodine, zinc and copper.

Malnutrition and blood disorders: Etiology, clinical features, metabolic disorders and management of Marasmus and Kwashiorkor, Nutritional anemia - vitamin B12, folate and iron deficiency anemia; hemoglobinopathies and thalassemias.

Unit III

Obesity: Definition, classification and biochemical basis; Genetic and environmental factors leading to obesity; Obesity related diseases and management of obesity.

Diseases of digestive system: Diseases of Liver, Gall bladder & Pancreas-Hepatitis, (A, B, and C), alcoholic liver disease, Gall stones, pancreatitis, Prevention and dietary management.

Clinical significance of aspartate aminotransferase, alanine aminotransferase, lactate dehydrogenase, amylase, lipase and trypsin. Diagnosis of jaundice and clinical importance of bilirubin.

Suggested Readings for 16BCHO2: Human Health and Nutritional Disorders:

1. Textbook of Medical Biochemistry By MN Chatterjea and Rana Shinde, Jaypee Brothers.
2. Review of Medical Physiology (Lange Basic Science) (Paperback) By William F. Ganong. Publisher: McGraw-Hilll Medical
3. Clinical Biochemistry By Richard Luxton. Scion Publishing Ltd.
4. Principles of Medical Biochemistry: With STUDENT CONSULT Online Access (Paperback) By Gerhard Meisenberg and William H. Simmons. Publisher: Mosby.
5. Essentials of Food and Nutrition Vol I & II, By M. Swaminathan. Bangalore Printing and Publishing Co. Ltd.
6. Modern Nutrition in Health and Diseases, By Maurice E Shils and Vernon Robert Young, 7th Ed., Pub: Lea &Febiger.
7. Handbook of Nutrition and Food 2 nd Ed., By Carolyn Berdanier, Johanna Dwyer and Elaine Feldman, CRC Press
8. Nutritional Biochemistry (Hardcover) By Tom Brody. Academic Press.
9. Nutritional Biochemistry (Paperback) By S Ramakrishnan and S. Venkat Rao. TR Publications
10. Nutritional Biochemistry and Metabolism: With Clinical Applications (Hardcover) By Maria C. Linder. Publisher: Appelton and Lange