STUDY GUIDE OF BIO CHEMISTRY

Cell Biochemistry

1. Overview biochemistry and its significance in medicine
2. Discuss the biochemical composition and functions of cell.
3. Biochemical composition and function of cell membrane.
4. Discuss the transport of substances across the cell membrane.
5. Membrane receptors and other biologically important membrane bound proteins like G- proteins, adenylate cyclase & phospholipase
6. Basic methods to study cell biochemistry;
   - Centrifugation
   - Ultracentrifugation
   - Enzyme-linked immunosorbent assay (ELISA)
   - Radioimmunoassay
   - Chromatography
   - Electrophoresis
   - pH metery
   - Spectrophotometry
7. Discuss the ionization of water; weak acid and bases
8. pH & pH scale and concept of Isoelectric pH.
9. pKa value, dissociation constant and titration curve
10. Henderson- Hassel balch equation and its applications
11. Body buffer systems

Chemistry of Carbohydrates

1. Define & Classify carbohydrates along with their biochemical functions.
2. Explain the structure & functions of biologically important monosaccharides.
3. Explain the isomerism of carbohydrates..
4. Define important disassarides with their biochemical functions .
5. Oligosaccharides, their combinations with other macromolecules.
6. Define Polysaccharides and Classify into their types & biochemical functions.
7. Define Proteoglycans & Mucopolysaccharidosis with their Types.

Chemistry Of Lipids & Fattyacids

1. Define & Classify Lipids with their biological functions.
2. Define & Classify fatty acids along with their properties.
3. Define Nutritionally essential fatty acids and their functions.
4. Briefly discuss the eicosanoids & their biologic functions.
5. Briefly discuss the structure & biological functions of phospholipids, glycolipids, sulpholipids & gangliosides.
6. Explain the structure & biological role of Cholesterol & bile acids.
7. Define lipids peroxidation & its significance

Chemistry of Amino acids and Proteins

1. Define & classify the Amino acids along with examples.
2. Differentiate between standard and non-standard amino acids.
3. Briefly discussed the functions of Amino acids.
4. Importance of amino acids in maintenance of pH.
5. Define & Classify Proteins along with their biomedical functions & Properties.
6. Explain the structural organization of Proteins.
7. Briefly discuss the denaturation of proteins & protein misfolding related to (Amyloidoses & Prion disease)
8. Define Immunoglobulin their types, structure & biological impotance.
9. Define Plasma proteins their types & biomedical importance.
10. Define glycoproteins,components of glycoprotein with their role.
11. Briefly discuss the important Techniques for separation of proteins.

Extracellular Matrix

1. Discuss the Collagen its types & structure, biosythesis & degradation as well as collagenopathies.(Ehlers-Danlos syndrome & Osteogenesis imperfecta.
2. Elastin their structural characteristics & role along with genetic disorder.
3. Explain fibrillin as a role of microfibrills, fibronectin & Laminin.
4. Define glycosaminoglycans their structure & classification.
5. Define Proteoglycans with their structure & functions.

Chemistry of Nucleic acid & Nucleotides

1. Define purine & pyrimidines with their structure & Types.
2. Explain the structure & functions of nucleotides & nucleosides.
3. Structure functions & types of Nucleic acids.
4. Briefly explain the natural & synthetic derivatives of purine & pririmidines & their biochemical role.

Enzymes

1. Define, introduce & classify the enzymes along with their properties.
2. Define coenzymes & cofactors & classify them.
3. Briefly explain the mechanism if enzyme action and kinetics of enzymes.
4. Discuss the factors affecting the enzyme activity.
5. Define enzyme inhibition, classify them into their types with examples.
6. Allosteric enzymes with their biological significance
7. Define isoenzymes & their clinical significance.
8. Briefly explain the regulation of enzyme activity.
9. Briefly explain the diagnostic importance of enzymes in diseases. (Clinical enzymology).
10. Discuss the therapeutic uses of enzymes

Vitamins

1. Elaborate the general features of vitamin.
2. Define vitamins & classify according to their chemical nature & biochemical functions.
3. Important dietary sources & recommended dietary allowances of vitamins.
4. Briefly explain their intestinal absorption, transport & storage of vitamins.
5. Briefly explain the mechanism of action of vitamins.
6. Explain the disorders associated with vitamin deficiency & Hypervitaminosis

Minerals & Trace Elements

1. Define & Classify the minerals
2. Briefly explain the role of minerals in human nutrition
3. Explain the sources & recommended dietary allowances (RDA) of minerals.
4. Briefly explain their absorption, transport, and storage & biochemical function of minerals.
5. Briefly explain their deficiency manifestations along with their clinical aspects.

Nutrition

1. Define Energy metabolism, Caloric value of food, Specific dynamic action of food (SDA).
2. Define Respiratory quotient, Metabolic rate, Basal metabolic rate.
3. Determination of metabolic rate & factors affecting the metabolic rate.
4. Define balance diet & their importance in health & diseases.
5. Discuss proteins in nutrition; Obligatory nitrogen loss, nitrogen balance.
6. Explain the role of essential amino acids in body growth.
7. Briefly discuss the protein energy malnutrion (Kwashiorkor & Marasmus)
8. Briefly explain the role of lipids & fatsin nutrition.
9. Define glycemic index & dietary fibers theirTypes & biochemical importance.
10. Calculate the caloric requirement of a person & nutritional requirements in pregnancy, lactation infancy & oldage.
11. Briefly discuss obesity & food additives.

Porphyrins and Hemoproteins

1. Discuss the Chemistry & biosynthesis of heme & other porphyrins including disorders of heme biosnthesis. (porphyrias)
2. Explain the structure & functions of Hemoglobin & myoglobin & types of Hemoglobin.
3. Explain the oxygen binding capacity of hemoglobin.
4. Explain the bilirubin metabolism.
5. Define Hyperbilirubinemias & their causes
6. Define jaundice and their types and kernicterus.
7. Define Hemoglobinopathies; Sickle cell anemia, Thalassemia, Haemoglobin C disease & Haemoglobin SC disease.