Medical Biochemistry

1. Introduction to Biochemistry
    1.1   Introduction, scope and application of biochemistry.
    1.2   Structure of cell , cell organelles and their biochemical functions. transport across cell membrane.
    1.3   Structure and properties of water,ionization of water, Ph , Henderson .Hasselbalch equation and buffers.
    1.4   Thermodynamics of the cell, biochemical reactions.

2. Biomolecules
    2.1   Classification, structure, properties and functions of amino acid
    2.2   Classification, structure, properties and functions of proteins. purification   and sequencing of proteins.
    2.3   Classification, structure, properties and functions of carbohydrate. biological significance of monosacharrides, oligosaccharides and polysaccharides.
    2.4   Classification, structure, properties and functions of lipids. properties of fatty acid, TAG. Structure and Functions of essential fatty acids, phospholipid, glycolipid and cholesterol. Structure and functions of prostaglandins and bile acids.
    2.5   Nucleic acid- nucleotides, nucleosides, structure of DNA, types of RNA. Replication of DNA both in prokaryotes and eukaryotes. Transcription of DNA both in prokaryotes and eukaryotes. genetic code.
    2.6   Identification and estimation of different biomolecules.

3. Enzymes
    3.1   Nomenclature, classification, properties of enzymes.
    3.2   Factors affecting enzyme Activity.
    3.3   Application of enzymes, coenzymes.
    3.4   Enzyme inhibition, isozymes.
    3.5   Mechanism of enzyme action & kinetics of enzyme.

4. Vitamins and Minerals
    4.1   History, classification and role of vitamins in coenzymes formation
    4.2   Functions, dietary sources, RDA and abnormality associated with fat soluble vitamins.
    4.3   Functions, dietary sources, RDA and abnormality associated with water soluble vitamins.
    4.2   Functions, dietary sources, RDA and abnormality associated with macro minerals.
    4.2   Functions, dietary sources, RDA and abnormality associated with micro minerals.

5. Metabolism
    5.1   Overview of metabolism.
    5.2   Carbohydrate metabolism: glycolysis and BPG shunt, TCA cycle and amphibolic role, gluconeogenesis, glycogenesis, glycogenolysis, HMP shunt, galactose metabolism and lactose synthesis, glucuronic acid pathway. Carbohydrate metabolism in ruminants.
    5.3   Lipid metabolism: b-oxidation of fatty acid, biosynthesis of fatty acid, TAG biosynthesis and degradation. ketone bodies synthesis and degradation. lipoprotein metabolism.
    5.4   Protein metabolism: amino acid biosynthesis, degradation of amino acids(transamination, deamination, decarboxylation), protein synthesis, urea cycle.
    5.5   Integration of metabolism.
    5.6   Biological oxidation: enzymes involve in biological oxidation. Biological oxidation and electron transport chain, oxidative phosphorylation, mechanism of oxidative phosphorylation, inhibitors of ETC and oxidative phosphorylation.

6. Hormones
    6.1   Classification of hormones
    6.2   Metabolic functions and abnormality of the hormones of the hypothalamus pituitary, thyroid, parathyroid, pancreas, adrenal pineal, ovaries and testis.
    6.3   Regulation of body mass, production of beef, egg, poultry and fish.
    6.4   Clinical endocrine aspects in production and reproduction status in domestic animals and poultry.

7. Nutritional biochemistry and toxicology

     7.1   Digestion and absorption of carbohydrate, protein and fat bot in ruminants and non- ruminants.
     7.2   Calorimetry, BMR, SDA, RQ
     7.3   Carbohydrate, protein and fat malnutrition
     7.4   Food additives and naturally occuring toxic substances in food
     7.5   Dietary factors in carcinogenesis, free radical and anti oxidant, pro oxidant.
     7.6   Heavy metal toxicity in blood.

8. Biochemical basis of diseases

     8.1   Liver, kidney and cardiac function test.
     8.2   Diabetes mellitus, hyperinsulemia, galactosemia, hypoglycemia
     8.3   Ruminant ketosis, atherosclerosis and hypercholesterolemia
     8.4   Hyperlipidemia and fatty lier formation

9. Biochemical techniques

     9.1   Electrophoresis, chromatography, centrifugation
     9.2   Spectrophotometry and colorimetry ,ELISA,RIA, auto analyser
     9.3   PCR,RAPD,RFLP