1) Cell

Chemical composition, types of cells, distribution of enzymes and pathways in cellular organelles, subcellular organelles

2) Biological membrane and its significance

Functions of plasma membrane, fluid mosaic model, transport across membrane, endocytosis, exocytosis

3) Carbohydrate chemistry Part 1

Definition and classification of carbohydrates, properties and reactions of carbohydrates, derivatives of carbohydrates, monosaccharides

4) Carbohydrate chemistry Part 2

Disaccharides, homopolysaccharides and heteropolysaccharides

5) Lipid chemistry Part 1

Definition and classification of lipids, classification of fatty acids, trans fatty acids, PUFAs, glycerol, cholesterol, triglycerides, lipid indices

6) Lipid chemistry Part 2

Phospholipids, glycolipids, amphipathic lipids, liposomes, prostaglandins

7) Protein chemistry Part 1

Definition and classification of amino acids, properties of amino acids, definition and classification of proteins, properties of proteins, biologically important peptides

8) Protein chemistry Part 2

Structure of proteins, protein folding and misfolding, prion diseases, denaturation, plasma proteins, specialized proteins

9) Haemoglobin chemistry Part 1

Structure of haeme, structure of globin, types of normal haemoglobin, derivatives of haemoglobin, methaemoglobin, methaemalbumin

10) Haemoglobin chemistry Part 2

Myoglobin, sickle cell anemia, alpha thalassemia, beta thalassemia

11) Enzymes Part 1

Definition and classification of enzymes, coenzymes, metalloenzymes, enzyme specificity, active site, mechanism of enzyme action, enzyme kinetics

12) Enzymes Part 2

Factors affecting enzyme action, regulation of enzyme action, enzyme inhibition, uses of enzymes, isoenzymes, alloenzymes

13) Biological Oxidation

Redox potential, electron transport chain, sites of ATP production and its inhibitors, cyanide poisoning, MELAS, oxidative phosphorylation, chemiosmotic theory, uncouplers, enzymes involved in biological oxidation, substrate level phosphorylation, shuttle systems

14) Carbohydrate metabolism Part 1

Digestion and absorption of carbohydrates, glucose transporters, glycolysis, Rapaport Leubering shunt, formation and fate of pyruvate, pyruvate dehydrogenase reaction

15) Carbohydrate metabolism Part 2

Krebs cycle, glycogenesis, glycogenolysis, HMP shunt pathway, gluconeogenesis, Cori cycle, Cahill cycle

16) Carbohydrate metabolism Part 3

Clinical significance of blood glucose, regulation of blood glucose level, galactose metabolism, fructose metabolism, uronic acid pathway, glycosuria, diabetes mellitus, GTT

17) Lipid metabolism Part 1

Digestion and absorption of lipids, triglyceride synthesis and breakdown, brown adipose tissue, beta oxidation of fatty acids, alpha oxidation of fatty acids, peroxismal oxidation of fatty acids

18) Lipid metabolism Part 2

Fatty acid synthesis, metabolism of ketone bodies, metabolism of cholesterol, metabolism of lipoproteins

19) Lipid metabolism Part 3

Lipid profile, atherosclerosis, formation and fate of acetyl CoA, metabolism of alcohol

20) Haemoglobin metabolism Part 1

Haeme synthesis, haemoglobin synthesis, formation, transport and conjugation of bilirubin

21) Haemoglobin metabolism Part 2

Neonatal physiological jaundice, Lucey Driscoll syndrome, Criggler Najjar syndrome, Gilbert syndrome, Dubin Johnson syndrome, Rotor syndrome, excretion of bilirubin, paroxysmal nocturnal haemoglobinuria, porphyrias, jaundice

22) Integration of metabolism

Energy demand and supply, stage of hydrolysis, preparatory stage, oxidative stage, organ specialization and metabolic integration

23) Starvation

General features of starvation, stages of starvation, metabolic changes of starvation, metabolic changes in organs in feeding and fasting states

24) Nucleotide chemistry Part 1

Characteristic features of nucleosides and nucleotides, digestion of nucleic acids, biologically important nucleotides, cyclic AMP, ATP, synthetic nucleotide analogues

25) Nucleotide chemistry Part 2

Watson and Crick model of DNA, types of DNA, characteristic features of DNA, functions of DNA, structure of RNA, types of RNA, mRNA, tRNA, rRNA, functions of RNA, ribozymes, differences between DNA and RNA

26) Purine and pyrimidine metabolism Part 1

De novo purine synthesis, regulation of purine synthesis, inhibitors of purine synthesis, salvage pathway of purine synthesis, degradation of purine, hyperuricemia, gout, Lesch Nyhan syndrome, adenosine deaminase deficiency, purine nucleoside phosphorylase deficiency, hypouricemia

27) Purine and pyrimidine metabolism Part 2

Pyrimidine synthesis, regulation of pyrimidine synthesis, degradation of pyrimidines, orotic aciduria

28) Molecular biology Part 1

DNA replication, telomere, inhibitors of DNA replication, cell cycle, DNA damage, repair of DNA damage, disorders of DNA damage, transcription, post transcriptional changes, inhibitors of transcription, reverse transcription

 29) Molecular biology Part 2

Genetic code, translation, inhibitors of translation, post translational changes, mutation, lac operon, regulation of gene expression in eukaryotes

 30) Molecular biology Part 3

Recombinant DNA technology, blotting techniques, RFLP, VNTR, polymerase chain reaction, cloning, human genome project, CRISPR

 31) Vitamin Part 1

Definition and classification of vitamins, comparison of fat soluble and water soluble vitamins, vit A, vit D, vit E, vit K

 32) Vitamins Part 2

Thiamine, riboflavin, niacin, pantothenic acid, biotin, folic acid, cobalamin

 33) Mineral metabolism Part 1

Classification of minerals, calcium, phosphorus, magnesium, sodium, potassium

 34) Mineral metabolism Part 2

Iron, zinc, fluorine, iodine, selenium, sulfur, manganese

 35) Nutrition Part 1

Calorie, basal metabolic rate, respiratory quotient, specific dynamic action, energy requirement of man, nutritional importance of proteins, carbohydrates, and lipids, nitrogen balance, recommended dietary allowance, balanced diet

 36) Nutrition Part 2

Protein energy malnutrition, marasmus, kwashiorkor, obesity, dietary fibers, glycaemic index, composition and nutritive value of foodstuff, malabsorption syndrome, nutritional anemias, therapeutic diets, drug and nutrient interaction, nutrigenomics

 37) Cancer Part 1

Definition, etiology and incidence of cancer, types of tumours, chemical carcinogens, radiation energy, carcinogenic viruses, oncogenes, activation of proto-oncogenes into oncogenes, mechanism of action of oncogenes, tumour suppressor genes, genes that regulate apoptosis, unified hypothesis of cancer

 38) Cancer Part 2

Characteristics of growing tumour cells, metastasis, tumour markers, cancer therapy, prevention of cancer

 39) Detoxication

Definition and characteristic features of detoxication, mechanisms, sites and phases of detoxication, detoxication by oxidation, reduction, hydrolysis, detoxication of drugs by hydroxylation, cytochrome P448, detoxication by conjugation

 40) Water and electrolyte balance

Distribution of body water, distribution of electrolytes, normal fluid and electrolyte exchange in the body, normal water balance, regulation of water and electrolyte balance, primary dehydration, secondary dehydration, cholera, oral rehydration therapy, water intoxication

 41) Acid base balance

Buffers, production of acids and bases by the body, blood buffers, renal mechanism of pH regulation, respiratory mechanism of pH regulation, anion gap, metabolic and respiratory acidosis, metabolic and respiratory alkalosis, arterial blood gas analysis

 42) Liver function tests

Functions of the liver, causes of hepatocellular damage, indications for LFTs, tests based on - excretory functions, carbohydrate metabolism, serum proteins, lipid metabolism, detoxicating function, synthetic function, amino acid catabolism, drug metabolism, serum enzymes and immunological tests, LFTs in hepatitis and cirrhosis, jaundice, portal hypertension and ascites

 43) Kidney function tests

Function of the kidney, formation of urine, renal threshold substances, classification of KFTs, patient’s history, analysis of blood, urine examination, urea clearance test, creatinine clearance test, inulin clearance test, cystatin C estimation, PAH test, filtration fraction, concentration test, dilution test, PSP test, urinary acidification test, IV pyelography, radioactive renogram, radioactive scanning, microalbuminuria, nephrotic syndrome, acute renal failure, chronic renal failure

 44) Thyroid function tests

Functions of thyroid hormones, classification of thyroid functions tests, assay of hormones, serum TSH, thyroxine binding globulin, TRH stimulation test, detection of auto antibodies, thyroid scanning, hypothyroidism, hyperthyroidism

 45) Adrenal function tests

Structure of adrenal cortex and medulla, functions of glucocorticoids, mineralocorticoids, adrenal androgens and catecholamines, cause, clinical features, diagnostic tests and treatment of - Cushing’s syndrome, Addison’s disease, Conn’s syndrome and pheochromocytoma

 46) Mechanism of hormone action

Definition and characteristic features of hormones, hormone secreting glands, classification of hormones, factors regulating hormone action, regulation of hormone secretion, mechanisms of hormone action - nuclear action, cyclic AMP, ITP and DAG, calcium, cyclic GMP, tyrosine kinase

 47) Free radicals

Definition and characteristic features of free radicals, types, formation, sources and measurement of free radicals, clinical significance, harmful effects and medical applications of free radicals, antioxidants

 48) Radioisotopes

Radioactivity, radioactive emissions, measurement of radioactivity, radioisotopes in medicine, radiation hazards, radiation safety and protection, diagnostic uses of radioisotopes, therapeutic uses of radioisotopes

 49) Immunochemistry

Humoral and cell mediated immune response, structure and properties of immunoglobulins, heavy and light chains, features of individual immunoglobulins, quantitative determination of immunoglobulins, antigens, HLA, complement system, cytokines, vaccines, hybridoma technique, multiple myeloma, autoimmune diseases

 50) Biochemical techniques

Colorimetry, spectrophotometry, determination of pH, chromatography, electrophoresis, flamephotometer, centrifugation, ELISA, RIA, autoanalyzer, urine pregnancy test, DNA analysis, biomedical waste management, quality control

 51) Environmental biochemistry

Classification of environmental pollutants, air pollution, water pollution, toxic substances in foodstuff, noise pollution, heavy metal poisons, corrosives, irritants, pesticides and insecticides, occupational and industrial hazards, pollutants in household

 52) HIV

Epidemiology of AIDS, origin of HIV, transmission, structure, gene and gene products of HIV, immunological abnormalities in AIDS, entry of HIV and lysis of CD4 cells, clinical features of HIV infection, opportunistic infections in AIDS, natural course of HIV infection, lab diagnosis of HIV, management of HIV infections, pre-exposure prophylaxis, post exposure prophylaxis, vaccine against HIV, prognosis of HIV infection, prevention of HIV infection