
Syllabus for PhD entrance Examination: Medical Biochemistry

Applied and Clinical Biochemistry:

1. History & scope of Biochemistry
2. Biochemistry of Cell
3. Chemistry & biological importance of carbohydrates, proteins & amino acids, lipids, nucleic acids
4. Chemistry of blood & hemoglobin, plasma proteins, Blood coagulation
5. Environmental Biochemistry
6. Chemistry, composition & functions of biological fluids
7. Urine formation, excretion & urine analysis.
8. Composition, chemistry & functions of specialized tissues like muscle, bone, nerve, connective tissue, & brain adipose tissue.
9. Acid base balance & imbalance
10. Biochemistry of Diabetes mellitus, Atherosclerosis, Fatty liver, and obesity
11. Organ function tests : Liver function tests, Kidney function test, Thyroid function tests, Adrenal function tests, Pancreatic function tests, Gastric function tests
12. Radioisotopes & their clinical applications
13. Biochemistry of aging.
14. Neurochemistry in Health & Disease.
15. Biochemical changes in pregnancy & lactation
16. Water & electrolytes balance & imbalance.
17. Total Quality Management of Laboratories: Internal Quality control, External Quality control, Accreditation of laboratories
18. Basics of Medical statistics
19. Inborn errors of metabolism
20. Biotransformations of Xenobiotics
21. Basic concepts of Biochemical Defense Mechanisms

Vitamins, Minerals, Hormones and Nutrition:

1. Principles of Nutrition – Balanced diet & its planning, Nutritive importance of various food sources, Calorific value of food , toxins & additives , Obesity, Protein Energy Malnutrition (PEM)- Kwashiorkor & Marasmus .
2. Diet in management of chronic diseases viz, Diabetes mellitus, Coronary artery disease, Renal disorders, Cancer, Hypertension, Anemia, Rickets & Osteomalacia.
3. Diet for overweight person, pregnant woman and during lactation
4. Vitamins- chemistry, biological importance, deficiency manifestations & recommended daily allowance.
5. Macro & micro –elements & their role in health & disease
6. Hormones : Communication among cells & tissues, Hormone- General mechanism of action of hormones, chemistry, functions, synthesis of steroid hormones, polypeptide hormones, & thyroid hormones. Chemistry & functions of hormones of pancreas and parathyroid. Local hormones. Clinical disorders of hormones, Hormone receptors.
7. Principles of Nutrition –Balanced diet & its planning, Nutritive importance of various
8. food sources, Calorific value of food , toxins & additives , Obesity, Protein Energy
9. Malnutrition (PEM)- Kwashirkor & Marasmus .

10. Diet in management of chronic diseases viz, Diabetes mellitus, Coronary artery disease, Renal disorders, Cancer, Hypertension, Anemia, Rickets & Osteomalacia.
11. Diet for over weight person, pregnant woman and during lactation

Metabolism, Genetics and Molecular Biology:

1. Digestion & absorption from gastrointestinal tract.
2. Intermediary metabolism, metabolism of Carbohydrates, Lipids, Proteins and Amino acids, Nucleic acids, Hemoglobin, metabolic control, energy production & regulation.
3. Metabolic interrelationships & regulatory mechanisms
4. Metabolic changes during starvation
5. Energy metabolism- Calorimetry, BMR- its determination & factors affecting it, SDA of food.
6. Central dogma, genetic code, protein biosynthesis & its regulation.
7. DNA: structure, functions, replications, Mutation & repair of DNA, Sequencing of nucleotides in DNA, Mitochondrial DNA, and DNA recombination.
8. RNA: composition, types, structure & functions.
9. Role of Nucleic acids in diagnosis of Molecular diseases & infectious diseases
10. Mitochondrial DNA & diseases.
11. Human Genome Project.
12. Genes & chromosomes, Gene mapping, Chromosome walking etc.
13. Gene expression & gene amplification & gene regulation, Oncogenes & biochemistry of cancer.
14. Genetic engineering: Recombinant DNA technology & its applications. Restriction endonucleases, Plasmids, Cosmids, Gene cloning, Gene libraries.
15. Basics techniques in genetic engineering.
 - a) Isolation & purification of DNA, Methods of DNA assay.
 - b) Blotting techniques – Southern, Northern & Western blotting.
 - c) Polymerase chain reaction & its applications.
 - d) Ligase chain reaction & its applications.
16. Tumor markers & growth factors
17. Biotechnology: Gene therapy, Nucleic acid hybridization, and DNA probes, Microarray of gene probes.
18. Genomics and Proteomics
19. Medical Bioinformatics
20. Lipid peroxidation, free radicals & antioxidants, Nitric oxide formation & its metabolism & its role in Medicine.
21. Biochemistry of AIDS
22. Genetic control of Immunity
23. Research Methodology & Medical ethics.