

Entrance Test Syllabus for Admission to MSc Biochemistry (2024)

Note: The syllabus prescribed for the entrance test has been divided into fifteen units. Each unit carries weightage of four marks. Paper setters are required to set four multiple choice type questions with only one correct or most appropriate answer separately for each unit, giving uniform representation to the whole syllabus contained therein.

Unit 1

- Concept of chemical bonding
- Electron displacements: causes and consequences in chemical bonding
- Electronegativity
- Non-covalent interaction: hydrogen bond, van der Waals force, hydrophobic and hydrophilic interactions
- Isomerism: structural isomerism-chain, position and functional isomerism Stereoisomerism-geometrical and optical isomerism

Unit 2

- Laws of thermodynamics and applications
- Concept of heat reaction, enthalpy
- Entropy and its change in physical processes
- Free energy
- Criteria for thermodynamic equilibrium and spontaneity
- Introduction to electrochemistry, electrolytes and their dissociation, types of electrodes, measurement of EMF of a cell
- Acid base equilibrium

Unit 3

- Photosynthesis and its mechanism
- C3, C4 and CAM pathways of carbon fixation
- Photorespiration
- Importance of water to plant life
- Transpiration mechanism

Unit 4

- Ecology and environmental conservation
- Air Pollution, water pollution and their control
- Conservation and management of biological resources
- Nitrogen, phosphorous and carbon cycle
- Macro- and micronutrients-uptake and role
- Metal toxicity and its impact on biodiversity

Unit 5

- Introduction to microbial systems
- Structure, transmission and role of viruses
- Bacteria- morphology and their growth
- Host-parasite relationship
- Importance of microbiology in human health and environment

Unit 6

- Structure, classification, properties and importance of carbohydrates, proteins, lipids and nucleic acids

Unit 7

- Enzymes: classification and nomenclature
- Enzyme activity, factors affecting enzyme activity
- Enzyme kinetics
- Enzyme inhibition
- Enzyme regulation
- Mechanism of enzyme action

Unit 8

- Glycolysis, TCA cycle, pentose phosphate pathway, gluconeogenesis
- Glycogen synthesis and breakdown
- β -oxidation of fatty acids, biosynthesis of fatty acids
- Transamination and deamination reactions, urea cycle
- Metabolism of purines and pyrimidines

Unit 9

- Morphology of prokaryotic and eukaryotic cells
- Structure, composition and function of cell wall, plasma membrane, mitochondria, plastids, endoplasmic reticulum, Golgi apparatus, nucleus, lysosomes and ribosomes
- Cell cycle and its different stages

Unit 10

- DNA as genetic material
- Chromatin organization
- Replication, transcription, genetic code, translation
- Chromosome structure, hereditary, linkage and recombination
- Mutations

Unit 11

- Spectroscopy: basic concepts and applications
- Chromatography: gel filtration, ion exchange and affinity
- Electrophoresis and its types
- Centrifugation: principle and its applications
- Immunological techniques: ELISA and RIA

Unit 12

- Anatomy and function of:
 - Circulatory
 - Respiratory
 - Digestive and
 - Endocrine system

Unit 13

- Basic concept of nutrition
- Definition and scope of clinical biochemistry in disease diagnosis
- Enzyme patterns in health and disease states with reference to plasma lipase, amylase, cholinesterase, alkaline and acid phosphatase, SGOT, SGPT, LDH and CPK

Unit 14

- Cells and organs of immune systems
- Antibodies: structure, function and classes
- Types of immunity and immune response
- Hypersensitivity
- Infection and immune response

Unit 15

- Recombinant DNA technology: concept and applications
- Restriction endonucleases: types and specificity
- Cell culture: basic concepts
- Types of cloning vectors: plasmid, bacteriophage, cosmid, BACs and YACs