

ADMISSIONS TO MEDICINE & DENTISTRY

TOPICS TO PREPARE FOR WRITTEN TEST AND INTERVIEW

BIOLOGY

**1. Eukaryotic cell structure and function.**

**2. Cell cycle.**

Cellular organization of genetic material. Phases of cell cycle. Cellular organization of genetic material. The stages of mitosis and meiosis. A comparison of Mitosis and Meiosis. Origins of genetic variation among offspring.

**3. Cellular respiration and fermentation.**

Catabolic pathways and production of ATP. The stages of cellular respiration. Anaerobic respiration.

**4. Viruses.**

Structure of viruses. General features of viral replication cycles. Viral diseases.

**5. Chromosomal and Molecular Basis of Inheritance.**

The chromosomal basis of sex. Inheritance of X- and Y-linked genes. Alteration of chromosome number and structure. DNA as genetic material. Structural model of DNA. Chromosomes' structure.

**6. Genetic mechanisms.**

The flow of genetic information. Replication. Transcription. Translation. Genetic code. Type of mutations. Regulation of Gene Expression.

**7. Tissues and body membranes.**

Structure and physiology of: connective, muscle, epithelial and nervous tissue; serous, mucous, synovial and cutaneous membranes.

**8. Senses.**

Hearing and equilibrium. Visual perception. Taste. Smell. Types of sensory receptors.

**9. Nervous system.**

Organization of nervous system.

**10. Neurons, synapses and signaling.**

Neurons structure and function.

**11. Hormones and endocrine system.**

Endocrine tissues and organs. Multiple effects of hormones. Simple hormone pathways. Feedback regulation.

**12. Cardiovascular system.**

Organization of human circulatory system. Heart and heart's rhythmic beat. Blood vessels structure and function. Blood pressure. Blood composition and function.

**13. Respiratory system.**

Organization of human respiratory system. Hemoglobin.

**14. Digestive system and nutrition.**

Essential nutrients. Dietary deficiencies. Organization of human digestive system. Chemical digestion in the human digestive system. Dental adaptation.

**15. Kidneys**

Kidney structure. Nephron organization and function. Kidney function, water balance and blood pressure.

**CHEMISTRY****1. Atoms.**

Atomic theory. Elements and atomic number. Isotopes and atomic weight.

**2. The Periodic Table.**

The periodic table and some characteristics of different groups. Electronic structure of atoms and electron configurations. Electron configurations and the periodic table.

**3. Classification and Balancing of Chemical Reactions.**

Classes of chemical reactions. Acids, bases, and neutralization reactions. Redox reactions.

**4. Mole and Mass Relationships.**

The mole and Avogadro's number. Gram-mole conversions.

**5. Reaction Rates and Chemical Equilibria.**

Endothermic and exothermic chemical reactions. Factors that influence chemical reaction rates. Chemical equilibrium. Equilibrium constants.

**6. Nuclear Chemistry.**

Radioactivity: alpha, beta and gamma decay; conservation of nucleon number and charge. The law of radioactive decay; the half-life time.

**7. Physical quantities.**

Metric system of units. Metric units of length. Metric units of mass. Metric units of volume. Significant figures.

**8. Chemical Calculations.**

Mole concept and chemical formulas. Calculations involving chemical equations. Calculations involving volume and concentration.

**9. Solutions.**

Mixtures and solutions. Units of concentration. Dilution. Ions in solution: electrolytes.

**10. Acids and Bases.**

pH definition. Acids and bases in aqueous solution, some common acids and bases.

**11. Alcohols.**

Some common alcohols. Naming alcohols. Properties of alcohols, acidity of alcohols. Reactions of alcohols.

**12. Amino Acids and Proteins.**

Amino acids structures. Acid-base properties of amino acids. Chemical properties of proteins.

**13. Enzymes and Vitamins.**

Catalysis by enzymes. How enzymes work. Vitamins and minerals.

**14. Carbohydrates.**

Classification of carbohydrates. The D and L families of sugars: drawing sugar molecules. Structure of glucose. Disaccharides. Some important polysaccharides. Properties of carbohydrates.

**15. Lipids.**

Structure and classification of lipids. Fatty acids and their esters. Properties of fats and oils.

**16. Nucleic Acids and Protein Synthesis.**

DNA, chromosomes, and genes. Composition of nucleic acids. The structure of nucleic acid chains. Base pairing in DNA: the Watson-Crick model.

## PHYSICS

### 1. Dynamics.

Force, mass, Newton's 1st, 2nd and 3rd law.

### 2. Fluids and solids.

Mass and weight, specific density and specific gravity. Archimedes' principle, buoyancy and buoyant force.

### 3. Geometrical optics and wave nature of light.

The ray model of light. Reflection of light, formation of image by plane mirrors and spherical mirrors, total internal reflection, fibre optics. Refraction. Magnifying glass, eye and corrective lenses.

### 4. Kinematics.

Velocity and acceleration. Motion at a constant acceleration; falling objects.

### 5. Sounds.

Characteristics of sound. Sound intensity and intensity level, ear, sound loudness. Doppler effect. Sources of sound: vibrating strings and air columns, standing waves.

### 6. Temperature and kinetic theory of gases.

Temperature, kinetic theory of gases and molecular interpretation of temperature. Thermal Equilibrium and the Zero-the Law of Thermodynamics.

### 7. Vibration and waves.

Wave motion, transverse and longitudinal waves. Propagation of waves: reflection, refraction and diffraction.

### 8. Work, power and energy.

Work, kinetic energy, potential energy, power. Conservative and non-conservative forces. Conversion of mechanical energy, energy transformations. Work-energy principle.