

## TOPICS FOR THE ADMISSION INTERVIEW

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### General questions

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- Motivation, interest, career choice. Why Medicine? Why not nursing or other medical and health related fields?
  - Tell us about yourself, experience, interests etc.
  - Why this medical school? What do you know about this school?
  - Your strengths and attributes, how you handle stress, main weaknesses
  - Concerns about studying medicine
  - Knowledge of medical profession, other professions allied to medicine. Recent developments.
  - What medical publications do you read?
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### Biology

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1. The structure function and examples of main molecules (carbohydrates, proteins, nucleic acids and lipids).
2. Similarities and differences in structure and function between Prokaryotic and Eukaryotic cells. Cell surface structures. Motility. Internal organization. Binary fission and conjugation in bacteria. Membrane. Compartmentalization. Cytoskeleton. Endomembrane system: endoplasmic reticulum, Golgi Apparatus and lysosomes, nucleus, ribosomes, mitochondria.
3. Cell cycle. Mitosis and meiosis. 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.
4. Viruses. Structure of viruses. General features of viral replication cycles.
5. Chromosomal and molecular basis of inheritance. The chromosomal basis of sex. Inheritance of X- and Y-linked genes. Alternation of chromosome number and structure. Human disorders due to chromosomal alternation. Inheritance of organelle genes. DNA as genetic material. Structural model of DNA. Chromosomes' structure.
6. Genetic mechanisms. The flow of genetic information. Replication: Transcription (alternation of mRNA ends, RNA splicing). Translation. Genetic code. Type of mutations. Regulation of gene expression (promoters, transcription factors).

7. Tissues and body membranes. Structure and physiology of connective, muscle, epithelial and nervous tissue; serous, mucous, synovial and cutaneous membranes.
8. Nervous system. Organization of nervous system. The central nervous system. The organization of human brain. Peripheral nervous system: motor and autonomic nervous system. Neurons, synapses and signalling. Neurons structure and function. Resting and action potential. Conduction of action potentials. Examples of neurotransmitters.
9. Hormones and endocrine system. Intercellular communication. Endocrine tissues and organs. Chemical classes of hormones. Multiple effects of hormones. Simple hormone pathways. Feedback regulation.
10. Immune system. Innate and adaptive immunity. Antigen. Antibody. The humoral immune response. The cell-mediated immune response. Inflammatory response. Immunological memory. Allergies.
11. Cardiovascular system. Organization of human circulatory system. Heart and heart's rhythmic beat. Structure of the heart. Blood vessels structure and function. Blood pressure. Blood composition and function.
12. Respiratory system. Organization of human respiratory system. Function and basic structure of haemoglobin and myoglobin.
13. Organization of human digestive system. Chemical digestion in the human digestive system. Examples and location of digestive enzymes. The correct glucose levels. What information cholesterol measurement provides us. Role of water in maintaining health.
14. Human reproduction and development. Gametogenesis. Conception.
15. Factors and behaviours which contribute to maintaining health. Factors and behaviours which contribute to the loss of health.

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## Chemistry

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### *Inorganic chemistry*

1. Modern atomic theory. Elements and atomic number. Isotopes and atomic weight.
2. The Periodic Table. Symbols of elements. The periodic table and some characteristics of different groups. Electronic structure of atoms and electron configurations. Electron configurations and the periodic table.
3. Molecular compounds. Covalent bonds and the periodic table. Multiple covalent bonds and coordinate covalent bonds. Characteristics of molecular compounds. Molecular

formulas and Lewis structures. Polar covalent bonds and electronegativity, polar molecules. Naming binary molecular compounds.

4. Classification and balancing of chemical reactions. Classes of chemical reactions. Chemical equations and balancing chemical equations. Acids, bases, and neutralization reactions. Redox reactions.
5. Mole and mass relationships. The mole and Avogadro's number.
6. Reaction rates and chemical equilibria. Endothermic and exothermic chemical reactions. Factors that influence chemical reaction rates.
7. Physical quantities. Metric system of units. Metric units of length, mass, volume
8. Fundamental chemical laws. Law of conservation of mass, definite proportions, multiple proportions.
9. Mole concept and chemical formulas. Calculations involving chemical equations. Calculations involving volume and concentration.
10. Acids and bases in aqueous solution, some common acids and bases, the Brønsted–Lowry definition of acids and bases, acid dissociation constants, acid and base strength.
11. Buffers Measuring acidity in aqueous solution: pH. Buffer solutions. Titration.

### *Organic chemistry*

1. Alkanes. The nature of organic molecules The structure of organic molecules: alkanes and their isomers, Drawing organic structures. Naming alkanes, cycloalkanes.
2. Alkenes and Alkynes. Naming alkenes and alkynes. The structure of alkenes, cis–trans isomerism.
3. Aromatic compounds and the structure of benzene. Naming aromatic compounds.
4. Alcohols - some common alcohols Naming alcohols. Phenols- some common phenols.
5. Carboxylic acids and their derivatives properties and names. Some common carboxylic acids.
6. Amino acids structures. Chemical properties of proteins.
7. Enzymes and vitamins. Catalysis by enzymes. How enzymes work. Some of vitamins and minerals.
8. 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.

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## Physics

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1. Force, mass, Newton's 1st, 2nd and 3rd law.
2. Work, kinetic energy, potential energy, power. Conservative and non-conservative forces. Conversion of mechanical energy, energy transformations.
3. Temperature, kinetic theory of gases and molecular interpretation of temperature. Thermal equilibrium and the zero-the law of thermodynamics. The ideal gas law. Heat and internal energy. First law of thermodynamics. Specific heat and latent heat. Heat engines. Second law of thermodynamics.
4. Elements of modern physics: early quantum theory and models of the atom. Photon theory of light, photon energy, Planck's constant. Photoelectric effect. Early models of the atoms, atomic spectra, the Bohr model: energy levels, transitions, absorption and emission.
5. Elements of kinematics and dynamics of circular and rotational motion. Angular velocity, angular acceleration, torque and rotational inertia. Angular momentum, conservation of angular momentum. Period, frequency, centripetal acceleration , centripetal force. Condition of equilibrium. Stability and balance.
6. Fluids and solids. Mass and weight, specific density and specific gravity. Pascal's principle, pressure, hydraulic lift. Archimedes' principle.
7. Electric field. Electric charge, static electricity, induced charge, electric field, field lines, electric potential, equipotential lines, voltage, Coulomb's law. Electric field, conductors and dielectrics, charge distribution. Capacitance, storage of electric energy, capacitors in series and in parallel.