IMAT TOPICS

General Knowledge & Critical Thinking
General Knowledge questions may address a range of cultural topics, including aspects of literary, historical, philosophical, social and political culture. Critical Thinking involves reasoning using everyday written language. Questions focus on the skills involved in understanding and evaluating arguments. These include: drawing and summarising conclusions, identifying assumptions and reasoning errors, and assessing the impact of additional evidence.

Problem Solving
Relevant Selection – Very often a real world problem will be overloaded with information, much of which is unimportant. This kind of question demands Relevant Selection, in which the task is to select only that information which is necessary and helpful in finding a solution.
Finding Procedures – Sometimes you will find that even if you have selected all the relevant information, no solution presents itself. For this type of question, you have to find a method or procedure which you can use to generate a solution.
Identifying Similarity – In this type of question you will be presented with information and asked to identify the same information presented in a different way, or a situation in which different information has a similar structure.

Biology
The chemistry of living things
The biological importance of weak interactions. Organic molecules in living organisms and their respective functions. The role of enzymes.
The cell as the basis of life
Cellular membrane: structure and function – transport via the membrane.
Cellular structures and their specific functions
Bioenergetics
The energy currency of cells: ATP.
The processes of oxidation and reduction in living things.
Fermentation.
Reproduction and Inheritance
Life cycles. Sexual and asexual reproduction.
Mendelian genetics: laws and applications.
Classical genetics: chromosome theory of inheritance – models of inheritance.
Molecular genetics: DNA structure and duplication, genetic code and its translation, protein synthesis.
DNA of prokaryotes. The chromosome structure of eukaryotes. Regulation of gene expression.
Inheritance and environment.
Anatomy and Physiology of animals and humans

Chemistry
The constitution of matter
States of matter; heterogeneous and homogeneous systems; compounds and elements.
The structure of the atom
Elementary particles, atomic number and mass number, isotopes, electronic structure of atoms of the elements.
The periodic table of elements
Groups and periods, transition elements, periodic properties of elements: atomic radius, ionization potential, electron affinity, metals and non-metals; relations between electronic structure, position in the periodic table and properties.
The chemical bond:
Ionic bond, covalent bond, bond polarity, electronegativity.
Fundamentals of inorganic chemistry:
Nomenclature and main properties of inorganic compounds: oxides, hydroxides, acids, salts; position in the periodic table.
Chemical reactions and stoichiometry:
Atomic and molecular weight, Avogadro constant, concept of the mole, conversion from grams to moles and vice versa, elementary stoichiometric calculations, balancing simple reactions, various types of chemical reactions.
Solutions:
Solvent properties of water, solubility, the main ways of expressing the concentration of solutions.
Elements of chemical kinetics and catalysis.
Oxidation and reduction:
Oxidation number, the concepts of oxidising and reducing agents.
Acids and bases
Concepts of acids and bases, acidity, neutrality and basicity of aqueous solutions, pH, buffers, hydrolysis.
Fundamentals of organic chemistry
Bonds between carbon atoms; molecular, structural and displayed formulae; concept of isomers; aliphatic, alicyclic and aromatic hydrocarbons; functional groups: alcohols,
ethers, amines, aldehydes, ketones, carboxylic acids, esters, amides. Elements of nomenclature.

**Physics**

**Measures**
Direct and indirect measures, fundamental and derived quantities, physical dimensions of quantities, knowledge of the metric system and the CGS System of Units, Technical (or practical) (ST) and the International System (SI) of Units (names and relationships between fundamental and derived units), and multiples and submultiples (names and values).

**Kinematics**
Kinematic quantities, various types of motion with particular regard to uniform and uniformly accelerating rectilinear motion, uniform circular motion, harmonic motion (for all motion: definition and relationships between measures).

**Dynamics**

**Fluid mechanics**
Pressure, and its units of measurement (not only in the SI system). Archimedes’ principle. Pascal’s principle. Stevino’s law.

**Thermodynamics**

**Electrostatics and electrodynamics**

**Mathematics**

**Algebra and numerical sets**

**Systems of equations.**

**Functions**
Basic concepts of functions and their graphical representations (domain, codomain, sign, maxima and minima, increasing and decreasing, etc.). Elementary functions: whole and fractional algebraic functions, exponential, logarithmic and trigonometric

Geometry


Probability and Statistics
