#### Competency Test Decision Making Syllabus

The purpose of this test is to assess students' ability to perform well on a demanding medical degree course. The test is designed to assess problem solving, critical thinking and decision making skills. It does not require any specific knowledge, only basic scientific and mathematical knowledge, which is usually taught in secondary school. The test comprises 20 questions and the range of questions with an approximate number is presented below.

Type of questions	Qualities to be assessed	Number of questions
Verbal reasoning	<ul> <li>Assesses your ability to analyse information in a written form</li> <li>Requires you to draw conclusions, identify assumptions, flaws and information that could have an impact on the argument</li> </ul>	5
Quantitative reasoning	<ul> <li>Assesses your ability to read, analyse and evaluate numerical data</li> <li>Requires you to perform simple arithmetic calculations without a calculator</li> </ul>	5
Problem solving	<ul> <li>Assesses your ability to select relevant information, apply your logic and solve problems</li> </ul>	5
Abstract reasoning	<ul> <li>Assesses your ability to identify patterns in abstract information</li> <li>Assesses your ability to choose relevant information among the distracting elements</li> </ul>	5

Calculators are not allowed, and questions have a multiple-choice format without negative marking.

# **Biology Syllabus**

### The Cell

- viruses
- prokaryotic and eukaryotic cell
- cell membranes
- cell divisions and cell cycles
- cellular transport
- energy in a cell
- microbes and biotechnology

### The chemistry of life

- chemical elements and water
- carbohydrates, lipids and proteins
- DNA structure and replication
- Transcription and translation
- Enzymes
- Cell respiration
- Photosynthesis

#### Genetics

- chromosomes, genes, alleles and mutations
- Mendel's genetics and meiosis
- theoretical genetics
- patterns of heredity
- genetic engineering and biotechnology
- population genetics

#### **Ecology and evolution**

- communities and ecosystems
- the green house effect
- ecology and conservation
- community ecology
- ecosystems and biomes
- impact of humans on ecosystems
- conservation of biodiversity
- population ecology
- origin of life
- species and speciation
- human evolution
- phylogeny and systematics
- classification of organisms

#### Human health and physiology

- digestion and transport of digested food
- human nutrition and health
- circulation system
- defenses against infectious diseases and immunity

- gas exchange
- nerves hormones and homeostasis
- endocrine system and hormonal control
- stimulus and response
- perception of stimuli
- innate and learned behaviour
- the nervous system and human brain
- neurotransmitters and synapses
- support and locomotion
- muscles and movement
- reproduction
- urinary system

### **Plant science**

- the biology of the plant cell
- plant structure and growth
- plant physiology
- reproduction in plants
- Seedless plants
- Seed-producing plants

#### Zoology

- animal tissues
- Invertebrates
- Chordates
- parasitology

### Protist

Fungi

### **Chemistry Syllabus**

#### 1.Stoichiometry

Chemical formulas and the mole concept. Avogadro's constant. Chemical reaction and equations. Mass relationship in reactions. Calculations.

### 2.Atomic theory

Nuclear model of atom. Isotopes. Electron arrangement: shells, sub-shells, orbitals. Electron configuration notation.

### **3.**The Periodic Table of the elements

Electron configurations and the Periodic Table . Valence configuration of atoms. Blocks (s, p, d, f) and groups. Periodic trends: physical properties, chemical properties.

## 4. Bonding

Ionic bonding.

Covalent bonding. Molecular orbitals and hybridization. Shapes of molecules and ions. Intermolecular forces. Hydrogen bonding. Metallic bonding.

### **5.States of matter**

Changes of state and kinetic theory. Gases. Gases Lows.

#### **6.** Energetics

Exothermic and endothermic reactions. Standard enthalpy changes of reaction. Calculation of enthalpy change. Hess'law. Entropy and free energy. Spontaneity of a reaction.

## 7. Kinetics

Reaction mechanism: collision theory. Activation energy. Rates of reactions, rate expression. Factors affecting the rate of reaction. Order of reaction and half-life.

## 8. Equilibrium law

The equilibrium law. Applications of the equilibrium law. Calculations involving equilibrium constans.

#### 9. Solutions

Solubility and solubility product constant. Concentrations of solutions. Dissociation. Dissociation (ionization) constant and the degree of dissociation. Ostwald's Dilution Law.

#### 10. Acids and bases

Definitions of acids and bases: Arrhenius, Bronsted-Lowry, Lewis. Properties of acids and bases. Strong and weak acids and bases.

The pH scale, pH calculations. Indicators.

Salt hydrolysis. Calculations involving acids and bases.

## **11.Oxidation and reduction**

Redox reactions. Definitions: reduction, oxidation, oxidizing agent (oxidant), reducing agent (reductant). Balancing of redox reactions.

## 12. Electrochemistry

Standard electrode potentials. Galvanic cells. Cell electromotive force (EMF). Electrolysis. Calculations in electrochemistry.

## 13. Organic chemistry

Isomerism (structural, geometric, optical) and tautomerism in organic compounds.

Functional groups and homologous series.

Multiple bonds.

Shapes of molecules.

Types of reactions in organic chemistry.

## Hydrocarbons

Alkanes. Alkenes. Alkynes. Arenes.

Methods for preparation. Physical chemical and chemical properties. Characteristic reactions. Detection.

### Halogenoalkanes

Methods for preparation. Physical chemical and chemical properties. Characteristic reactions, detection.

## Acohols, phenols and ethers

Methods for preparation. Physical chemical and chemical properties. Characteristic reactions, detection of functional groups. Distinguishing between alcohols and phenols.

## Aldehydes and ketones

Methods for preparation. Physical chemical and chemical properties. Characteristic reactions, detection of functional groups. Distinguishing between aldehydes and ketones.

#### **Carboxylic acids**

Methods for preparation. Physical chemical and chemical properties. Factors affecting acidity of carboxylic acids. Characteristic reactions, detection of functional group.

#### Esters

Methods for synthesis of esters, estrification reaction, mechanism of estrification. Physical chemical and chemical properties. Hydrolysis of esters. Lipids and fats.

## Amines and amides

Methods for preparation. Physical chemical and chemical properties. Basicity of amines. Characteristic reactions, detection of functional groups.

## Amino acids, proteins.

Physical chemical and chemical properties. Condensation of amino acids, formation of peptide bound. Primary secondary tertiary and quaternary structure of proteins.

#### Carbohydrates

Isomerism. Monosaccharides, disaccharides, polysaccharides.

## Synthetic organic polymers

Polymerization and polycondensation processes.

Most commonly used polymers