

## ADMA entrance test syllabus for ADSMO / ADMET programs

Total marks: 100

Duration: 120 minutes (2 hours)

Level : Grade 8 - 9 (Science)

**No negative mark scoring**

The test consists of 2 parts:

Part A	Multiple choice questions (MCQs) - 75 marks	General Knowledge and Logic / aptitude. Basic PHYSICS Basic CHEMISTRY Basic MATHEMATICS
Part B	English Essay writing (Academic Writing) - 25 marks	Candidates are given a topic, and they are told to write at least 250 words, which is about 3/4 <sup>th</sup> of an A4 page (provided by the academy) about it.

### Detailed syllabus of Part A

Part A has 30 multiple-choice questions for 2.5 marks each, for a total of 75 marks.

#### **GENERAL KNOWLEDGE**

- Geography, (weather, ports, capitals, monuments, oceans etc)

#### **LOGIC/APTITUDE**

- Reasoning (qualitative, quantitative, abstract, logical, and spatial)

## Basic PHYSICS

### Heat and thermodynamics

- **Thermal Properties**, such as temperature, heat transfer, specific and latent heats, and thermal expansion
- **Laws of Thermodynamics**, such as first and second laws, internal energy, entropy, and heat engine efficiency

### Mechanics

- **Energy and Momentum**, such as potential and kinetic energy, work, power, impulse, and conservation laws
- **Kinematics**, such as velocity, acceleration, motion in one dimension.
- **Dynamics**, such as force, Newton's laws, statics, and friction
- **Simple Harmonic Motion**, such as pendulum
- **Gravity**, such as the law of gravitation, orbits, and Kepler's laws
- **Circular Motion**, such as uniform circular motion and centripetal force

### Electricity and magnetism

- **Electric Fields, Forces, and Potentials**, such as Coulomb's law, induced charge, field and potential of groups of point charges, and charged particles in electric fields
- **Capacitance**, such as parallel-plate capacitors and time-varying behavior in charging/ discharging
- **Circuit Elements and DC Circuits**, such as resistors, light bulbs, series and parallel networks, Ohm's law, and Joule's law
- **Magnetism**, such as permanent magnets, fields caused by currents, particles in magnetic fields, Faraday's law.

### Waves and optics

- **General Wave Properties**, such as wave speed, frequency, wavelength, superposition, standing wave, diffraction and Doppler effect
- **Reflection and Refraction**, such as Snell's law and changes in wavelength and speed
- **Ray Optics**, such as image formation using pinholes, mirrors, and lenses

### Other topics

- Hydrostatics
- Simple hydraulics (Pascal's law)

## Basic CHEMISTRY

### **States of matter**

- Gases, including the kinetic molecular theory, Charles law, Boyle's law, the gas laws /relationships, molar volumes, density.
- Liquids and Solids

### **Reaction types**

- The chemistry of acids and bases
- Conjugate acid- base pairs

## Basic MATHEMATICS

### **Number and operations**

- Operations, ratio and proportion, averages, percentage, elementary number theory, fractions and decimals, sequences (Arithmetic Mean only,)

### **Algebra and functions**

- Expressions (up to cubic level), properties of functions (linear, monomials, binomials and trinomials)

### **Geometry and mensuration**

- Plane Geometry (Geometrical terms, similarity, symmetry, lines and angles, triangles, square, rectangle, parallelogram, trapezium, rhombus, quadrilaterals and other polygons restricted to 4 sided figures, circles , angle theorem)
- Co-ordinate Geometry (lines and circles)
- Three-dimensional Solids (Surface area and volume of cubes, cylinders, cones, spheres and combination of shapes)

### **Trigonometry**

- Application, questions, calculation of height and distances
- use the sine, cosine and tangent ratios for acute angles in calculations involving sides and angles of a right-angled triangle
- Solve problems in two dimensions using Pythagoras' theorem and trigonometry