

General requirements

An understanding of the following is expected and may be assessed in all units of the specification.

1 Physical quantities and their units.

Understanding of the distinction between base and derived physical quantities and their units in SI. Luminous intensity and the candela are not included.

2 Order of magnitude.

Appreciation of the order of magnitude of common physical quantities.

3 Word equations.

The use, where appropriate, of word equations to define physical quantities and their units.

4 Rate of change

An understanding of the concept rate of change with time, eg average $u = \Delta x / \Delta t$ average $a = \Delta u / \Delta t$
Instantaneous value as gradient of graph is expected.

5 Graphs.

- Translate information between graphical, numerical and algebraic forms.
- Plot two variables from experimental or other data.
- Understand that $y = mx + c$ represents a linear relationship.
- Determine the slope and intercept of a linear graph.
- Draw and use the slope of a tangent to a curve as a measure of rate of change.
- Understand the possible physical significance of the area between a curve and the x axis and be able to calculate it or measure it by counting squares as appropriate. eg Work done = area under a force–displacement graph.

6 Homogeneity.

Understanding of homogeneity of equations and its use as a check for possible correctness.

7 Vectors and scalars.

- The recognition of a physical quantity as either a vector or a scalar.
- Resolution of a vector into two components at right angles to each other.
- Addition rule for two vectors. Mathematical calculations will be limited to two perpendicular vectors.

8 Graphs.

Use logarithmic plots to test exponential and power law variations; sketch simple functions including $y = k/x$, $y = kx^2$, $y = k/x^2$, $y = \sin x$, $y = \cos x$, $y = e^{-k}$

9 Measurements

You should be aware of the principles involved in measuring such fundamental quantities as pressure, frequency, wavelength, velocity, acceleration, force, momentum, charge, capacitance, strain, magnetic flux density, potential difference, work, energy and power in a variety of contexts.