

Kinematics

Cambridge International AS & A Level Physics

Unlike IGCSE, 9702 gives you a data sheet: it is page 2 of Papers 1, 2 and 4, with more formulae on page 3 of Paper 4. Everything marked GIVEN is printed for you; everything else you must recall. Compiled by GioPhysics from the published syllabus. This is an independent study aid, not a Cambridge document; the official syllabus is the authority.

2.1 Equations of motion

AS Uniformly accelerated motion

$$s = ut + \frac{1}{2}at^2$$

s — displacement (m)
 u — initial velocity (m s^{-1})
 a — acceleration (m s^{-2})
 t — time (s)

AS Uniformly accelerated motion, without time

$$v^2 = u^2 + 2as$$

v — final velocity (m s^{-1})
 u — initial velocity (m s^{-1})
 a — acceleration (m s^{-2})
 s — displacement (m)

AS Velocity after uniform acceleration

$$v = u + at$$

v — final velocity (m s^{-1})
 u — initial velocity (m s^{-1})
 a — acceleration (m s^{-2})
 t — time (s)

Not on the data sheet. Two of the four equations of motion are printed for you and two are not — this is one of the two to memorise.

AS Displacement from average velocity

$$s = \frac{1}{2}(u + v)t$$

s — displacement (m)
 u, v — initial and final velocity (m s^{-1})
 t — time (s)

Not on the data sheet.

AS From the graphs

velocity = gradient of s–t · acceleration = gradient of v–t · displacement = area under v–t
 gradient — of a tangent for non-uniform motion