

Equation Sheet

GCSE (9–1) Physics A

(Gateway Science)

J249/01, J249/02, J249/03, J249/04

The information in this sheet is for the use of candidates following GCSE (9–1) Physics A (J249/01, J249/02, J249/03, J249/04).

A copy of this sheet will be provided as an insert within the question paper for each component.

Copies of this sheet may be used for teaching.

Equations in physics

change in thermal energy = mass × specific heat capacity × change in temperature	$\Delta E = m c \Delta \theta$
thermal energy for a change of state = mass × specific latent heat	$E = m l$
for a given mass of gas at a constant temperature: pressure × volume = constant	$p V = \text{constant}$
(final velocity) ² - (initial velocity) ² = 2 × acceleration × distance	$v^2 - u^2 = 2 a s$
energy transferred in stretching = $\frac{1}{2}$ × spring constant × (extension) ²	$E = \frac{1}{2} k x^2$
potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil	$V_p I_p = V_s I_s$

Higher tier only

pressure due to a column of liquid = height of column × density of liquid × gravitational field strength	$p = h \rho g$
force on a conductor (at right angles to a magnetic field) carrying a current: force = magnetic flux density × current × length	$F = B I l$
$\frac{\text{potential difference across primary coil}}{\text{potential difference across secondary coil}} = \frac{\text{number of turns in primary coil}}{\text{number of turns in secondary coil}}$	$\frac{V_p}{V_s} = \frac{N_p}{N_s}$

Summary of updates

Date	Version	Details
May 2022	2.0	<p>Data sheet changed to Equation sheet. Removed unnecessary wording in PM4.2i.</p> <p>Word equations are presented in a table with the symbol equations. Reformatted some word equations to improve readability and consistency:</p> <ul style="list-style-type: none">• 0.5 is now represented as $\frac{1}{2}$• division in word equations is represented with a horizontal fraction bar• clearer separation of introductory statement from the subject of the equation
May 2023	2.1	Watermark removed