

Paper Reference 1SC0/1PH
Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Combined Science
PAPER 3
Higher Tier

May–June 2023 Assessment Window

Equation Booklet

**DO NOT RETURN THIS BOOKLET WITH THE
QUESTION PAPER.**

If you're taking **GCSE (9–1) Combined Science** or **GCSE (9–1) Physics**, you will need these equations:

HT = higher tier

distance travelled = average speed × time
acceleration = change in velocity ÷ time taken $a = \frac{(v - u)}{t}$
force = mass × acceleration $F = m \times a$
weight = mass × gravitational field strength $W = m \times g$
HT momentum = mass × velocity $p = m \times v$
change in gravitational potential energy = mass × gravitational field strength × change in vertical height $\Delta GPE = m \times g \times \Delta h$
kinetic energy = $\frac{1}{2} \times \text{mass} \times (\text{speed})^2$ $KE = \frac{1}{2} \times m \times v^2$
$\text{efficiency} = \frac{(\text{useful energy transferred by the device})}{(\text{total energy supplied to the device})}$
wave speed = frequency × wavelength $v = f \times \lambda$

wave speed = distance ÷ time

$$v = \frac{x}{t}$$

work done =

force × distance moved in the direction of the force

$$E = F \times d$$

power = work done ÷ time taken

$$P = \frac{E}{t}$$

energy transferred = charge moved × potential difference

$$E = Q \times V$$

charge = current × time

$$Q = I \times t$$

potential difference = current × resistance

$$V = I \times R$$

power = energy transferred ÷ time taken

$$P = \frac{E}{t}$$

electrical power = current × potential difference

$$P = I \times V$$

electrical power = (current)² × resistance

$$P = I^2 \times R$$

density = mass ÷ volume

$$\rho = \frac{m}{V}$$

force exerted on a spring = spring constant \times extension
 $F = k \times x$

$(\text{final velocity})^2 - (\text{initial velocity})^2 =$
 $2 \times \text{acceleration} \times \text{distance}$
 $v^2 - u^2 = 2 \times a \times x$

HT
force = change in momentum \div time
 $F = \frac{(mv - mu)}{t}$

energy transferred = current \times potential difference \times time
 $E = I \times V \times t$

HT
force on a conductor at right angles to a
magnetic field carrying a current =
magnetic flux density \times current \times length
 $F = B \times I \times l$

For transformers with 100% efficiency,
potential difference across primary coil \times
current in primary coil =
potential difference across secondary coil \times
current in secondary coil
 $V_P \times I_P = V_S \times I_S$

change in thermal energy =
mass \times specific heat capacity \times change in temperature
 $\Delta Q = m \times c \times \Delta\theta$

**thermal energy for a change of state =
mass × specific latent heat**

$$Q = m \times L$$

**energy transferred in stretching =
 $0.5 \times \text{spring constant} \times (\text{extension})^2$**

$$E = \frac{1}{2} \times k \times x^2$$

If you're taking **GCSE (9–1) Physics**, you also need these extra equations:

moment of a force =
force × distance normal to the direction of the force

pressure = force normal to surface ÷ area of surface

$$P = \frac{F}{A}$$

HT

$$\frac{\text{potential difference across primary coil}}{\text{potential difference across secondary coil}} = \frac{\text{number of turns in primary coil}}{\text{number of turns in secondary coil}}$$

$$\frac{V_p}{V_s} = \frac{N_p}{N_s}$$

to calculate pressure or volume for gases of fixed mass at constant temperature

$$P_1 \times V_1 = P_2 \times V_2$$

HT

pressure due to a column of liquid =
height of column × density of liquid ×
gravitational field strength

$$P = h \times \rho \times g$$

END OF EQUATION LIST