

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

Combined Science
PAPER 3
Higher Tier

Wednesday 22 May 2024 – Morning

Time: 1 hour 10 minutes

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**

$$\Delta \text{GPE} = m \times g \times \Delta h$$

kinetic energy = $\frac{1}{2} \times \text{mass} \times (\text{speed})^2$

$$\text{KE} = \frac{1}{2} \times m \times v^2$$

**efficiency =
(useful energy transferred by the device)
(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 × extension**

$$F = k \times x$$

**(final velocity)² – (initial velocity)² =
2 × acceleration × distance**

$$v^2 - u^2 = 2 \times a \times x$$

HT

force = change in momentum ÷ time

$$F = \frac{(mv - mu)}{t}$$

**energy transferred = current ×
potential difference × 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 ×
current × length**

$$\mathbf{F = B \times I \times l}$$

**For transformers with 100% efficiency,
potential difference across primary coil ×
current in primary coil =
potential difference across secondary coil
× current in secondary coil**

$$\mathbf{V_P \times I_P = V_S \times I_S}$$

**change in thermal energy = mass ×
specific heat capacity ×
change in temperature**

$$\mathbf{\Delta Q = m \times c \times \Delta \theta}$$

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

$$\mathbf{Q = m \times L}$$

**energy transferred in stretching =
0.5 × spring constant × (extension)²**

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

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

**potential difference
across primary coil**

**potential difference
across secondary coil**

number of turns in primary coil

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