

**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 $W = m \times g$
<b>HT</b> 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)<sup>2</sup> × resistance**

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

**density = mass ÷ volume**

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

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

(final velocity)<sup>2</sup> – (initial velocity)<sup>2</sup> =  
 2  $\times$  acceleration  $\times$  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**

potential difference  
across primary coil

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

potential difference  
across 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**