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

Combined Science
PAPER 3
Higher Tier

May–June 2022 Assessment Window

Equation Booklet

DO NOT RETURN THIS BOOKLET WITH THE QUESTION PAPER.

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Pearson

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 × a
weight = mass × gravitational field strength W = m × g
HT momentum = mass × velocity p = m × v

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change in gravitational potential energy = mass × gravitational field strength × change in vertical height $\Delta GPE = m \times g \times \Delta h$
kinetic energy = 1/2 × mass × (speed)^2 $KE = \frac{1}{2} \times m \times v^2$
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 $E = F \times d$

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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 = $(\text{current})^2$ × resistance $P = I^2 \times R$

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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 $E = I \times V \times t$

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HT **force on a conductor at right angles to a magnetic field carrying a current = magnetic flux density × current × length** $F = B \times I \times l$
For transformers with 100% efficiency, potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil $V_P \times I_P = V_S \times I_S$
change in thermal energy = mass × specific heat capacity × change in temperature $\Delta Q = m \times c \times \Delta\theta$
thermal energy for a change of state = mass × specific latent heat $Q = m \times L$

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energy transferred in stretching =
$0{\cdot}5 \times$ spring constant $\times$ (extension)^2

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

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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

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

$$\frac{V_p}{V_S} = \frac{N_p}{N_S}$$

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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