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.

Y74480A

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

(continued on the next page)

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 $E = F \times d$

(continued on the next page)

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 $P = I^2 \times R$

(continued on the next page)

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 $E = I \times V \times t$

(continued on the next page)

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

$Q = m \times L$

(continued on the next page)

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

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

(continued on the next page)

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

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

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

(continued on the next page)

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