

Physics Equations Sheet GCSE Combined Science: Trilogy (8464) and GCSE Combined Science: Synergy (8465)

FOR USE IN JUNE 2022 ONLY

HT = Higher Tier only equations

kinetic energy = $0.5 \times mass \times (speed)^2$	$E_k = \frac{1}{2} m v^2$
elastic potential energy = $0.5 \times \text{spring constant} \times (\text{extension})^2$	$E_e = \frac{1}{2} k e^2$
gravitational potential energy = mass × gravitational field strength × height	$E_p = m g h$
change in thermal energy = mass × specific heat capacity × temperature change	$\Delta E = m \ c \ \Delta \theta$
power = $\frac{\text{energy transferred}}{\text{time}}$	$P = \frac{E}{t}$
power = $\frac{\text{work done}}{\text{time}}$	$P = \frac{W}{t}$
efficiency = $\frac{\text{useful output energy transfer}}{\text{total input energy transfer}}$	
efficiency = $\frac{\text{useful power output}}{\text{total power input}}$	
charge flow = current × time	Q = I t
potential difference = current × resistance	V = I R
power = potential difference × current	P = VI
power = (current) ² × resistance	$P = I^2 R$
energy transferred = power × time	E = P t

energy transferred = charge flow × potential difference	E = Q V
potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil	$V_p I_p = V_s I_s$
density = $\frac{\text{mass}}{\text{volume}}$	$\rho = \frac{m}{V}$
thermal energy for a change of state = mass × specific latent heat	E = m L
weight = mass × gravitational field strength	W=m g
work done = force × distance (along the line of action of the force)	W = F s
force = spring constant × extension	F = k e
distance travelled = speed × time	s = v t
acceleration = $\frac{\text{change in velocity}}{\text{time taken}}$	$a = \frac{\Delta v}{t}$
(final velocity) ² – (initial velocity) ² = $2 \times \text{acceleration} \times \text{distance}$	$v^2 - u^2 = 2 \ a \ s$
resultant force = mass × acceleration	F = m a
momentum = mass × velocity	p = m v
period = $\frac{1}{\text{frequency}}$	$T = \frac{1}{f}$
wave speed = frequency × wavelength	$v=f \lambda$
force on a conductor (at right angles to a magnetic field) carrying a current = magnetic flux density × current × length	F=BIl
	potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil $\frac{\text{density} = \frac{\text{mass}}{\text{volume}}}{\text{density} = \frac{\text{mass}}{\text{volume}}}$ thermal energy for a change of state = mass × specific latent heat weight = mass × gravitational field strength work done = force × distance (along the line of action of the force) force = spring constant × extension distance travelled = speed × time acceleration = $\frac{\text{change in velocity}}{\text{time taken}}$ (final velocity) ² – (initial velocity) ² = 2 × acceleration × distance resultant force = mass × acceleration momentum = mass × velocity period = $\frac{1}{\text{frequency}}$ wave speed = frequency × wavelength force on a conductor (at right angles to a magnetic field) carrying a current =