

Physics Equations Sheet GCSE Physics (8463)

FOR USE IN JUNE 2023 ONLY

HT = Higher Tier only equations

kinetic energy = 0.5 × mass × (speed) ²	$E_k = \frac{1}{2} m v^2$ $E_e = \frac{1}{2} k e^2$
elastic potential energy = 0.5 × spring constant × (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	$\Delta E = m \ c \ \Delta \theta$
$power = \frac{energy transferred}{time}$	$P = \frac{E}{t}$
$power = \frac{work done}{time}$	$P = \frac{W}{t}$
$efficiency = \frac{useful output energy transfer}{total input energy transfer}$	
efficiency = $\frac{\text{useful power output}}{\text{total power input}}$	
charge flow = current × time	Q = I t
potential difference = current × resistance	V = IR
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
$density = \frac{mass}{volume}$	$ \rho = \frac{m}{V} $

	thermal energy for a change of state = mass × specific latent heat	E = m L
	For gases: pressure × volume = constant	p V= constant
	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
	moment of a force = force × distance (normal to direction of force)	M = F d
	$pressure = \frac{force \ normal \ to \ a \ surface}{area \ of \ that \ surface}$	$p = \frac{F}{A}$
нт	pressure due to a column of liquid = height of column × density of liquid × gravitational field strength	$p = h \rho g$
	distance travelled = speed × time	s = v t
	$acceleration = \frac{change in velocity}{time taken}$	$a = \frac{\Delta v}{t}$
	(final velocity) 2 – (initial velocity) 2 = 2 × acceleration × distance	$v^2 - u^2 = 2 a s$
	resultant force = mass × acceleration	F = m a
нт	momentum = mass × velocity	p = m v
нт	force = $\frac{\text{change in momentum}}{\text{time taken}}$	$F = \frac{m \ \Delta v}{\Delta t}$
	$period = \frac{1}{frequency}$	$T = \frac{1}{f}$
	wave speed = frequency × wavelength	$v=f \lambda$
	$magnification = \frac{image\ height}{object\ height}$	
нт	force on a conductor (at right angles to a magnetic field) carrying a current = magnetic flux density × current × length	F = B I I
нт	$\frac{\text{potential difference across primary coil}}{\text{potential difference across secondary coil}} = \frac{\text{number of turns in primary coil}}{\text{number of turns in secondary coil}}$	$\frac{V_p}{V_s} = \frac{n_p}{n_s}$
нт	potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil	$V_p I_p = V_s I_s$