



Physics Equations Sheet

GCSE Physics (8463)

FOR USE IN JUNE 2024 ONLY

[Turn over]

HT = Higher Tier only equations

kinetic energy = $0.5 \times \text{mass} \times (\text{speed})^2$	$E_k = \frac{1}{2} m v^2$
elastic potential energy = $0.5 \times \text{spring constant} \times (\text{extension})^2$	$E_e = \frac{1}{2} k e^2$
gravitational potential energy = $\text{mass} \times \text{gravitational field strength} \times$ height	$E_p = m g h$
change in thermal energy = $\text{mass} \times \text{specific heat capacity} \times$ 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	$P = V I$

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 = $\frac{\text{mass}}{\text{volume}}$	$\rho = \frac{m}{V}$
thermal energy for a change of state = mass × specific latent heat	$E = m L$
For gases: pressure × volume = constant	$p V = \text{constant}$
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 = $\frac{\text{force normal to a surface}}{\text{area of that surface}}$	$p = \frac{F}{A}$
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 = $\frac{\text{change in velocity}}{\text{time taken}}$	$a = \frac{\Delta v}{t}$

HT	force on a conductor (at right angles to a magnetic field) carrying a current = magnetic flux density × current × length	$F = B I l$
HT	<u>potential difference across primary coil</u> <u>potential difference across secondary coil</u> <u>=</u> <u>number of turns in primary coil</u> <u>number of turns in secondary coil</u>	$\frac{V_p}{V_s} = \frac{n_p}{n_s}$
HT	potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil	$V_p I_p = V_s I_s$

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