A

Physics Equations Sheet

GCSE Combined Science: Trilogy (8464) and GCSE Combined Science: Synergy (8465)

FOR USE IN JUNE 2023 ONLY

[Turn over]

HT = Higher Tier only equations

kinetic energy = 0.5 × mass × (speed)^2	$E_k = \frac{1}{2} m v^2$
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 = $\frac{\text{energy transferred}}{\text{time}}$	$P = \frac{E}{t}$
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	$E = Q\,V$
HT	potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil	$V_p\,I_p = V_s\,I_s$
	density = $\dfrac{\text{mass}}{\text{volume}}$	$\rho = \dfrac{m}{V}$

[Turn over]

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 = $\dfrac{\text{change in velocity}}{\text{time taken}}$	$a = \dfrac{\Delta v}{t}$
(final velocity)^2 – (initial velocity)^2 = 2 × acceleration × distance	$v^2 - u^2 = 2\ a\ s$
resultant force = mass × acceleration	$F = m\ a$

HT	momentum = mass × velocity	$p = m\ v$
	period = $\frac{1}{\text{frequency}}$	$T = \frac{1}{f}$
	wave speed = frequency × wavelength	$v = f\ \lambda$
HT	force on a conductor (at right angles to a magnetic field) carrying a current = magnetic flux density × current × length	$F = B\ I\ l$

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