

CAMBRIDGE OCR

June 2027

**GCSE (9–1) Physics B
(Twenty First Century Science)**

J259 01/02/03/04

Equation Sheet

INSTRUCTIONS

Do NOT send this Equation Sheet for marking. Keep it in the centre or recycle it.

EQUATIONS IN PHYSICS

Key: HT = Higher Tier only

	P1 RADIATION AND WAVES	
	wave speed = frequency × wavelength	$v = f\lambda$

	P2 SUSTAINABLE ENERGY	
	energy transferred = power × time	$E = Pt$
	efficiency = $\frac{\text{useful energy transferred}}{\text{total energy transferred}}$	

	P3 ELECTRIC CIRCUITS	
	charge = current × time	$Q = It$
	potential difference = current × resistance	$V = IR$
	potential difference = work done (energy transferred) charge	$V = \frac{W}{Q}$
	power = $\frac{\text{energy transferred}}{\text{time}}$	$P = \frac{E}{t}$
	energy transferred (work done) = charge × potential difference	$E = QV$
	power = potential difference × current	$P = VI$
	power = (current)² × resistance	$P = I^2R$
HT	force = magnetic flux density × current × length of conductor	$F = BIl$

	potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil	$V_p I_p = V_s I_s$
HT	potential difference across primary coil = potential difference across secondary coil number of turns in primary coil number of turns in secondary coil	$\frac{V_p}{V_s} = \frac{N_p}{N_s}$

4

	P4 EXPLAINING MOTION	
	weight = mass × gravitational field strength	$W = mg$
	average speed = $\frac{\text{distance}}{\text{time}}$	$v = \frac{s}{t}$
	acceleration = $\frac{\text{change in speed}}{\text{time taken}}$	$a = \frac{v - u}{t}$

	$(\text{final speed})^2 - (\text{initial speed})^2 = 2 \times \text{acceleration} \times \text{distance}$	$v^2 - u^2 = 2as$
HT	momentum = mass $\times$ velocity	$p = mv$
HT	change in momentum = resultant force $\times$ time for which it acts	$\Delta p = Ft$
	moment of a force = force $\times$ distance (normal to direction of the force)	$M = Fd$
	force = mass $\times$ acceleration	$F = ma$
	work done = force $\times$ distance (along the line of action of the force)	$W = Fs$
	kinetic energy = $\frac{1}{2} \times \text{mass} \times (\text{speed})^2$	$E = \frac{1}{2}mv^2$
	gravitational potential energy = mass $\times$ gravitational field strength $\times$ height	$E = mgh$
	power = $\frac{\text{energy transferred}}{\text{time}}$	$P = \frac{E}{t}$

	P6 MATTER – MODELS AND EXPLANATIONS	
	density = $\frac{\text{mass}}{\text{volume}}$	$\rho = \frac{m}{V}$
	change in internal energy = mass × specific heat capacity × change in temperature	$\Delta E = m c \Delta \theta$
	energy to cause a change of state = mass × specific latent heat	$E = m l$
	force exerted by a spring = spring constant × extension	$F = k x$
	energy stored in a stretched spring = $\frac{1}{2} \times \text{spring constant} \times (\text{extension})^2$	$E = \frac{1}{2} k x^2$
	pressure = $\frac{\text{force normal to a surface}}{\text{area of that surface}}$	$p = \frac{F}{A}$
	for a given mass of gas at a constant temperature: pressure × volume = constant	$p V = \text{constant}$

HT	pressure = density × gravitational field strength × depth	$p = \rho g h$
----	---	----------------



Copyright Information

Cambridge OCR is committed to securing permission to reproduce all third-party content that it uses in its assessment materials. If Cambridge OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, Cambridge OCR will be happy to correct its mistake at the earliest possible opportunity. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the Cambridge OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

For queries or further information please contact The Cambridge OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

Cambridge OCR is part of Cambridge University Press & Assessment, which is itself a department of the University of Cambridge.

