STUDY FORMULA BOOKLET

Edexcel AS Physics 8PH0 list of data, formulae and relationships

The 8PH0 booklet prints seven constants and equations for mechanics, electricity, materials and waves; series and parallel resistance, e.m.f., the potential divider and fringe spacing are not printed.

IN THE BOOKLET printed in the official booklet LEARN IT not printed: students must recall it

Based on the official **Pearson Edexcel Level 3 Advanced Subsidiary GCE in Physics (8PH0): List of data, formulae and relationships, Issue 2, November 2022**, with what to learn and exam tips added by CuratedPrep.

Data and constants

Printed at the start of the booklet. The AS booklet gives seven constants.

Acceleration of free fall Close to Earth's surface.	$g = 9.81\ \text{m s}^{-2}$	IN THE BOOKLET
Electron charge	$e = -1.60 \times 10^{-19}\ \text{C}$	IN THE BOOKLET
Electron mass	$m_e = 9.11 \times 10^{-31}\ \text{kg}$	IN THE BOOKLET
Electronvolt	$1\ \text{eV} = 1.60 \times 10^{-19}\ \text{J}$	IN THE BOOKLET
Gravitational field strength Close to Earth's surface.	$g = 9.81\ \text{N kg}^{-1}$	IN THE BOOKLET
Planck constant	$h = 6.63 \times 10^{-34}\ \text{J s}$	IN THE BOOKLET
Speed of light in a vacuum	$c = 3.00 \times 10^{8}\ \text{m s}^{-1}$	IN THE BOOKLET

Mechanics

Displacement from average velocity s displacement, u initial velocity, v final velocity, t time.	$s = \frac{(u+v)t}{2}$	IN THE BOOKLET
Final velocity a is constant acceleration.	$v = u + at$	IN THE BOOKLET
Displacement with acceleration	$s = ut + \frac{1}{2}at^2$	IN THE BOOKLET
Velocity and displacement Use when time is not given or not wanted.	$v^2 = u^2 + 2as$	IN THE BOOKLET
Resultant force Newton's second law, for constant mass.	$\sum F = ma$	IN THE BOOKLET
Gravitational field strength Force per unit mass, in N kg^{-1}.	$g = \frac{F}{m}$	IN THE BOOKLET
Weight W in newtons, m in kg.	$W = mg$	IN THE BOOKLET
Moment of force x is the perpendicular distance from the line of action of F to the pivot.	$\text{moment of force} = Fx$	IN THE BOOKLET

Momentum p in kg m s^{-1}.	$p = mv$	IN THE BOOKLET

Mechanics: work, energy and power

Work done s is measured along the force.	$\Delta W = F\Delta s$	IN THE BOOKLET
Kinetic energy	$E_{\mathrm{k}} = \frac{1}{2}mv^2$	IN THE BOOKLET
Change in gravitational potential energy Near the Earth's surface only.	$\Delta E_{\mathrm{grav}} = mg\Delta h$	IN THE BOOKLET
Power from energy transferred	$P = \frac{E}{t}$	IN THE BOOKLET
Power from work done	$P = \frac{W}{t}$	IN THE BOOKLET
Efficiency from energy	$\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy input}}$	IN THE BOOKLET
Efficiency from power	$\text{efficiency} = \frac{\text{useful power output}}{\text{total power input}}$	IN THE BOOKLET

Electricity

Potential difference Energy transferred per unit charge.	$V = \frac{W}{Q}$	IN THE BOOKLET
Resistance	$R = \frac{V}{I}$	IN THE BOOKLET
Electrical power (current and pd)	$P = VI$	IN THE BOOKLET
Electrical power (current and resistance)	$P = I^2R$	IN THE BOOKLET
Electrical power (pd and resistance)	$P = \frac{V^2}{R}$	IN THE BOOKLET
Electrical energy	$W = VIt$	IN THE BOOKLET
Resistivity ρ is resistivity in ohm metres; l length; A cross-sectional area.	$R = \frac{\rho l}{A}$	IN THE BOOKLET
Current Rate of flow of charge.	$I = \frac{\Delta Q}{\Delta t}$	IN THE BOOKLET
Current and charge carriers n carriers per unit volume, q charge on each, v drift velocity.	$I = nqvA$	IN THE BOOKLET

Materials

Density	$\rho = \frac{m}{V}$	IN THE BOOKLET
Stokes' law Viscous drag on a small sphere of radius r moving at speed v through a fluid of viscosity eta.	$F = 6\pi\eta rv$	IN THE BOOKLET

Hooke's law k is the stiffness of the object, in N m^{-1}.	$\Delta F = k\Delta x$	IN THE BOOKLET
Stress Force per unit cross-sectional area.	$\sigma = \dfrac{F}{A}$	IN THE BOOKLET
Strain Change in length divided by original length.	$\varepsilon = \dfrac{\Delta x}{x}$	IN THE BOOKLET
Young modulus	$E = \dfrac{\sigma}{\varepsilon}$	IN THE BOOKLET
Elastic strain energy	$\Delta E_{\text{el}} = \dfrac{1}{2}F\Delta x$	IN THE BOOKLET

Waves and particle nature of light

Wave speed	$v = f\lambda$	IN THE BOOKLET
Speed of a transverse wave on a string T tension; μ mass per unit length.	$v = \sqrt{\dfrac{T}{\mu}}$	IN THE BOOKLET
Intensity of radiation	$I = \dfrac{P}{A}$	IN THE BOOKLET
Power of a lens Power in dioptres when f is in metres.	$P = \dfrac{1}{f}$	IN THE BOOKLET
Power of thin lenses in combination	$P = P_1 + P_2 + P_3 + \dots$	IN THE BOOKLET
Thin lens equation Real is positive convention.	$\dfrac{1}{u} + \dfrac{1}{v} = \dfrac{1}{f}$	IN THE BOOKLET
Magnification for a lens	$m = \dfrac{\text{image height}}{\text{object height}} = \dfrac{v}{u}$	IN THE BOOKLET
Diffraction grating d is the grating spacing; n is the order.	$n\lambda = d\sin\theta$	IN THE BOOKLET
Refraction at an interface	$n_1 \sin\theta_1 = n_2 \sin\theta_2$	IN THE BOOKLET
Refractive index	$n = \dfrac{c}{v}$	IN THE BOOKLET
Critical angle	$\sin C = \dfrac{1}{n}$	IN THE BOOKLET
Photon energy	$E = hf$	IN THE BOOKLET
Einstein's photoelectric equation φ is the work function.	$hf = \phi + \dfrac{1}{2}mv_{\max}^2$	IN THE BOOKLET
de Broglie wavelength	$\lambda = \dfrac{h}{p}$	IN THE BOOKLET

Learn these: not in the booklet

Resistors in series

$R = R_1 + R_2 + R_3 + \dots$

Derive it from conservation of energy (pds add).

Resistors in parallel

$\dfrac{1}{R} = \dfrac{1}{R_1} + \dfrac{1}{R_2} + \dfrac{1}{R_3} + \dots$

Derive it from conservation of charge (currents add).

Potential divider

$V_{\text{out}} = \dfrac{R_2}{R_1 + R_2} V_{\text{in}}$

R_2 is the resistor across which V_out is taken.

E.m.f. of a cell

$\varepsilon = I(R + r)$

R is the external resistance and r the internal resistance.

Terminal pd

$$V = \varepsilon - Ir$$

Terminal pd is less than the e.m.f. when a current flows.

E.m.f. as energy per charge

$$\varepsilon = \frac{W}{Q}$$

Frequency and period

$$f = \frac{1}{T}$$

The booklet prints this only inside the oscillations equation.

Phase difference and path difference

$$\Delta\phi = \frac{\text{path difference}}{\lambda} \times 360^\circ$$

Interference condition

$$\text{path difference} = n\lambda \text{ (constructive)},\ \left(n + \tfrac{1}{2}\right)\lambda \text{ (destructive)}$$

Fringe separation in a double-slit experiment

$$w = \frac{\lambda D}{s}$$

w fringe spacing, D slit-to-screen distance, s slit separation.

Stationary wave on a string, fundamental

$$f = \frac{1}{2L}\sqrt{\frac{T}{\mu}}$$

Combine v = f λ, λ = 2L and v = sqrt(T/μ).

Work done by a force at an angle

$$\Delta W = F\Delta s\cos\theta$$

The booklet prints only F times s; take the component along the motion.

Resolving a vector

$$F_x = F\cos\theta, \quad F_y = F\sin\theta$$

Upthrust

$$\text{upthrust} = \text{weight of fluid displaced}$$

Conservation of momentum

$$\sum p_{\text{before}} = \sum p_{\text{after}}$$

Applies to any collision with no external force.

Threshold frequency and work function

$$\phi = hf_0$$

At the threshold frequency the photoelectron has no kinetic energy.

Energy levels

$$hf = E_1 - E_2$$

Photon frequency for a transition between two energy levels.

Straight line graphs

$$y = mx + c$$

Use with ln plots: the gradient of ln V against t is -1/RC.

Percentage uncertainty

$$\%\ \text{uncertainty} = \frac{\Delta X}{X} \times 100$$

Add percentage uncertainties when multiplying or dividing; multiply by the power for X^n.

Using the booklet in the exam

- The AS booklet has no Boltzmann constant, gravitational constant or permittivity, because those topics are not examined at AS. Do not expect a constant to be given for anything outside mechanics, electricity, materials and waves.
- Learn the headings. Mechanics holds kinematics, forces, momentum, work, energy and power, and efficiency; Electricity is the next column; Materials and Waves and particle nature of light are on the last page.
- Equations for lenses, the photoelectric effect and de Broglie wavelength are printed, but fringe spacing and the conditions for interference are not. Learn those two before the exam.
- Several equations come in more than one form, such as P = VI, P = I²R and P = V²/R. Pick the form that uses the quantities you are given.
- Constants are given to three significant figures (for example g = 9.81 and h = 6.63 × 10⁻³⁴). Use the printed values, keep extra figures in working, and round only the final answer.

Based on: Pearson Edexcel AS Physics (8PH0), List of data, formulae and relationships, Issue 2, November 2022. Statistical tables are calculated by CuratedPrep to the same layout. Updated 31 October 2026. Always practise with the version of the official booklet your exam uses. More free sheets and topic worksheets at curatedprep.com.