Pearson Edexcel International GCSE (9–1)

May–June 2024 Assessment Window

Syllabus reference **4PH1 4SD0**

International GCSE Physics and International GCSE Science (Double Award)
Equation List

You are not permitted to take this notice into the examination.
A version of this equation list will be included with the May–June 2024 question papers. This document is valid if downloaded from the Pearson Qualifications website.

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These equations may be required for both International GCSE Physics (4PH1) and International GCSE Combined Science (4SD0) papers.

1. Forces and Motion	
average speed = $\frac{\text{distance moved}}{\text{time taken}}$	
acceleration = $\frac{\text{change in velocity}}{\text{time taken}}$	$a = \frac{(v-u)}{t}$
(final speed)^2 = (initial speed)^2 + (2 × acceleration × distance moved)	$v^2 = u^2 + (2 \times a \times s)$
force = mass × acceleration	$F = m \times a$
weight = mass × gravitational field strength	$W = m \times g$
2. Electricity	
power = current × voltage	$P = I \times V$
energy transferred = current × voltage × time	$E = I \times V \times t$
voltage = current × resistance	$V = I \times R$
charge = current × time	$Q = I \times t$
energy transferred = charge × voltage	$E = Q \times V$
3. Waves	
wave speed = frequency × wavelength	$v = f \times \lambda$
frequency = $\frac{1}{\text{time period}}$	$f = \frac{1}{T}$
refractive index = $\frac{\sin(\text{angle of incidence})}{\sin(\text{angle of refraction})}$	$n = \frac{\sin i}{\sin r}$
$\sin(\text{critical angle}) = \frac{1}{\text{refractive index}}$	$\sin c = \frac{1}{n}$

4. Energy resources and energy transfers	
efficiency = $\frac{\text{useful energy output}}{\text{total energy output}} \times 100\%$	
work done = force × distance moved	$W = F \times d$
gravitational potential energy = mass × gravitational field strength × height	$GPE = m \times g \times h$
kinetic energy = $\frac{1}{2}$ × mass × speed^2	$KE = \frac{1}{2} \times m \times v^2$
power = $\frac{\text{work done}}{\text{time taken}}$	$P = \frac{W}{t}$
5. Solids, liquids and gases	
density = $\frac{\text{mass}}{\text{volume}}$	$\rho = \frac{m}{V}$
pressure = $\frac{\text{force}}{\text{area}}$	$p = \frac{F}{A}$
pressure difference = height × density × gravitational field strength	$p = h \times \rho \times g$
$\frac{\text{pressure}}{\text{temperature}}$ = constant	$\frac{p_1}{T_1} = \frac{p_2}{T_2}$
pressure × volume = constant	$p_1 \times V_1 = p_2 \times V_2$
8. Astrophysics	
orbital speed = $\frac{2 \times \pi \times \text{orbital radius}}{\text{time period}}$	$v = \frac{2 \times \pi \times r}{T}$

The equations on the following page will only be required for International GCSE Physics.

These additional equations may be required in International GCSE Physics papers 2P and 2PR.

1. Forces and Motion	
momentum = mass × velocity	$p = m \times v$
force = $\frac{\text{change in momentum}}{\text{time taken}}$	$F = \frac{(mv - mu)}{t}$
moment = force × perpendicular distance from the pivot	
5. Solids, liquids and gases	
change in thermal energy = mass × specific heat capacity × change in temperature	$\Delta Q = m \times c \times \Delta T$
6. Magnetism and electromagnetism	
relationship between input and output voltages for a transformer	$\frac{\text{input (primary) voltage}}{\text{output (secondary) voltage}} = \frac{\text{primary turns}}{\text{secondary turns}}$
input power = output power	$V_p I_p = V_s I_s$ for 100% efficiency
8. Astrophysics	
$\frac{\text{change in wavelength}}{\text{reference wavelength}} = \frac{\text{velocity of a galaxy}}{\text{speed of light}}$	$\frac{\lambda - \lambda_0}{\lambda_0} = \frac{\Delta\lambda}{\lambda_0} = \frac{v}{c}$

END OF EQUATION LIST