

Pearson Edexcel International GCSE (9–1)

May–June 2022 Assessment Window

Syllabus
reference

4PH1 4SD0

Physics 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 2022
question papers. This document is valid if downloaded from the [Pearson
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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

$$\text{average speed} = \frac{\text{distance moved}}{\text{time taken}}$$

$$\text{acceleration} = \frac{\text{change in velocity}}{\text{time taken}} \qquad a = \frac{(v-u)}{t}$$

$$(\text{final speed})^2 = (\text{initial speed})^2 + (2 \times \text{acceleration} \times \text{distance moved})$$

$$v^2 = u^2 + (2 \times a \times s)$$

$$\text{force} = \text{mass} \times \text{acceleration} \qquad F = m \times a$$

$$\text{weight} = \text{mass} \times \text{gravitational field strength} \qquad W = m \times g$$

2. Electricity

$$\text{power} = \text{current} \times \text{voltage} \qquad P = I \times V$$

$$\text{energy transferred} = \text{current} \times \text{voltage} \times \text{time} \qquad E = I \times V \times t$$

$$\text{voltage} = \text{current} \times \text{resistance} \qquad V = I \times R$$

$$\text{charge} = \text{current} \times \text{time} \qquad Q = I \times t$$

$$\text{energy transferred} = \text{charge} \times \text{voltage} \qquad E = Q \times V$$

3. Waves

$$\text{wave speed} = \text{frequency} \times \text{wavelength} \qquad v = f \times \lambda$$

$$\text{frequency} = \frac{1}{\text{time period}} \qquad f = \frac{1}{T}$$

$$\text{refractive index} = \frac{\sin(\text{angle of incidence})}{\sin(\text{angle of refraction})} \qquad n = \frac{\sin i}{\sin r}$$

$$\sin(\text{critical angle}) = \frac{1}{\text{refractive index}} \qquad \sin c = \frac{1}{n}$$

4. Energy resources and energy transfers

$$\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy output}} \times 100\%$$

$$\text{work done} = \text{force} \times \text{distance moved} \quad W = F \times d$$

$$\text{gravitational potential energy} = \text{mass} \times \text{gravitational field strength} \times \text{height}$$

$$GPE = m \times g \times h$$

$$\text{kinetic energy} = \frac{1}{2} \times \text{mass} \times \text{speed}^2 \quad KE = \frac{1}{2} \times m \times v^2$$

$$\text{power} = \frac{\text{work done}}{\text{time taken}} \quad P = \frac{W}{t}$$

5. Solids, liquids and gases

$$\text{density} = \frac{\text{mass}}{\text{volume}} \quad \rho = \frac{m}{V}$$

$$\text{pressure} = \frac{\text{force}}{\text{area}} \quad p = \frac{F}{A}$$

$$\text{pressure difference} = \text{height} \times \text{density} \times \text{gravitational field strength}$$

$$p = h \times \rho \times g$$

$$\frac{\text{pressure}}{\text{temperature}} = \text{constant} \quad \frac{p_1}{T_1} = \frac{p_2}{T_2}$$

$$\text{pressure} \times \text{volume} = \text{constant} \quad p_1 \times V_1 = p_2 \times V_2$$

8. Astrophysics

$$\text{orbital speed} = \frac{2 \times \pi \times \text{orbital radius}}{\text{time period}} \quad v = \frac{2 \times \pi \times r}{T}$$

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 \times velocity $p = m \times v$

force = $\frac{\text{change in momentum}}{\text{time taken}}$ $F = \frac{(mv - mu)}{t}$

moment = force \times perpendicular distance from the pivot

5. Solids, liquids and gases

change in thermal energy = mass \times specific heat capacity \times 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

$$\frac{\text{change in wavelength}}{\text{reference wavelength}} = \frac{\text{velocity of a galaxy}}{\text{speed of light}} \quad \frac{\lambda - \lambda_0}{\lambda_0} = \frac{\Delta \lambda}{\lambda_0} = \frac{v}{c}$$

END OF EQUATION LIST