Paper Reference(s)   4PH1/2P
Pearson Edexcel International GCSE (9–1)

Physics
UNIT: 4PH1
PAPER: 2P

May–June 2022 Assessment Window

Equation Booklet

V70953A

Pearson

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

1. Forces and Motion
average speed = $\dfrac{\text{distance moved}}{\text{time taken}}$
acceleration = $\dfrac{\text{change in velocity}}{\text{time taken}}$ $$a = \frac{(v - u)}{t}$$
(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 $$W = m \times g$$

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2. Electricity

power = current × voltage

$P = I × V$

energy transferred = current × voltage × time

$E = I × V × t$

voltage = current × resistance

$V = I × R$

charge = current × time

$Q = I × t$

energy transferred = charge × voltage

$E = Q × V$

3. Waves

wave speed = frequency × wavelength

$v = f × \lambda$

      Turn over

frequency = $\dfrac{1}{\text{time period}}$

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

refractive index = $\dfrac{\sin(\text{angle of incidence})}{\sin(\text{angle of refraction})}$

$n = \dfrac{\sin i}{\sin r}$

$\sin(\text{critical angle}) = \dfrac{1}{\text{refractive index}}$

$\sin c = \dfrac{1}{n}$

4. Energy resources and energy transfers

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

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Turn over

work done = force × distance moved

W = F × d

gravitational potential energy = mass × gravitational field strength × height

GPE = m × g × h

kinetic energy = $\frac{1}{2}$ × mass × speed^2

KE = $\frac{1}{2}$ × m × v^2

power = $\frac{\text{work done}}{\text{time taken}}$

P = $\frac{W}{t}$

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5. Solids, liquids and gases

density = $\dfrac{\text{mass}}{\text{volume}}$

$\rho = \dfrac{m}{V}$

pressure = $\dfrac{\text{force}}{\text{area}}$

$p = \dfrac{F}{A}$

pressure difference = height $\times$ density $\times$ gravitational field strength

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

$\dfrac{\text{pressure}}{\text{temperature}}$ = constant

$\dfrac{p_1}{T_1} = \dfrac{p_2}{T_2}$

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pressure ✕ volume = constant

$p_1 \times V_1 = p_2 \times V_2$

8. Astrophysics

$$\text{orbital speed} = \frac{2 \times \pi \times \text{orbital radius}}{\text{time period}}$$

$$v = \frac{2 \times \pi \times r}{T}$$

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

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

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1. Forces and Motion

momentum = mass × velocity

p = m × v

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force = $\dfrac{\text{change in momentum}}{\text{time taken}}$

F = $\dfrac{(mv - mu)}{t}$

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moment = force × perpendicular distance from the pivot

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5. Solids, liquids and gases

change in thermal energy = mass × specific heat capacity × change in temperature

$\Delta Q = m \times c \times \Delta T$

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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