



## Equations in physics

Key:

HT = Higher Tier only

### P1 Radiation and waves

wave speed = frequency  $\times$  wavelength

### P2 Sustainable energy

energy transferred = power  $\times$  time

efficiency =  $\frac{\text{useful energy transferred}}{\text{total energy transferred}}$

### P3 Electric circuits

charge = current  $\times$  time

potential difference = current  $\times$  resistance

potential difference =  $\frac{\text{work done (energy transferred)}}{\text{charge}}$

power =  $\frac{\text{energy}}{\text{time}}$

energy transferred (work done) = charge flow  $\times$  potential difference

power = potential difference  $\times$  current

power = (current)<sup>2</sup>  $\times$  resistance

potential difference across primary coil  $\times$  current in primary coil =  
potential difference across secondary coil  $\times$  current in secondary coil

HT force = magnetic flux density  $\times$  current  $\times$  length of conductor

**P4 Explaining motion**

weight = mass × gravitational field strength, g

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

$$\text{acceleration} = \frac{\text{change in speed}}{\text{time taken}}$$

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

**HT** momentum = mass × velocity

**HT** change in momentum = resultant force × time for which it acts

force = mass × acceleration

work done = force × distance (along the line of action of the force)

kinetic energy = 0.5 × mass × (speed)<sup>2</sup>

(in a gravity field) gravitational potential energy = mass × gravitational field strength, g × height

$$\text{power} = \frac{\text{energy transferred}}{\text{time}}$$

**P6 Matter – models and explanations**

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

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

energy to cause a change of state = mass × specific latent heat

force exerted by a spring = extension × spring constant

$$\text{energy stored in a stretched spring} = \frac{1}{2} \times \text{spring constant} \times (\text{extension})^2$$

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