

Appendix 7: Physics formulae for relationships

The relationships listed below will **not** be provided for students either in the form given or in rearranged form.

- (1) the relationship between average speed, distance moved and time taken:

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

- (2) the relationship between force, mass and acceleration:

$$\text{force} = \text{mass} \times \text{acceleration}$$

- (3) the relationship between acceleration, change in velocity and time taken:

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

- (4) the relationship between momentum, mass and velocity:

$$\text{momentum} = \text{mass} \times \text{velocity}$$

$$\text{momentum} = m \times v$$

- (5) the relationship between density, mass and volume:

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

- (6) the relationship between work done, force and distance moved:

$$\text{work done} = \text{force} \times \text{distance moved}$$

- (7) the energy relationships:

$$\text{energy transferred} = \text{work done}$$

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

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

- (8) the relationship between mass, weight and gravitational field strength:

$$\text{weight} = \text{mass} \times \text{gravitational field strength}$$

- (9) the relationship between an applied force, the area over which it acts and the resulting pressure:

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

- (10) The relationship between the moment of a force and its perpendicular distance from the pivot:

$$\text{moment} = \text{force} \times \text{perpendicular distance from the pivot}$$

- (11) the relationship between charge, current, voltage, resistance, energy and power:

$$\text{charge} = \text{current} \times \text{time}$$

$$\text{voltage} = \text{current} \times \text{resistance}$$

$$\text{electrical power} = \text{voltage} \times \text{current}$$

$$\text{energy transferred} = \text{charge} \times \text{voltage}$$

- (12) the relationship between speed, frequency and wavelength of wave:

$$\text{wave speed} = \text{frequency} \times \text{wavelength}$$

- (13) the relationship between turns and voltage for a transformer:

$$\frac{\text{input (primary) voltage}}{\text{output (secondary) voltage}} = \frac{\text{primary turns}}{\text{secondary turns}}$$

- (14) the relationship between refractive index, angle of incidence and angle of refraction:

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

- (15) the relationship between refractive index and critical angle:

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

- (16) the relationship for efficiency:

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

- (17) the relationship for pressure difference:

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

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

- (18) input power = output power

$$V_p I_p = V_s I_s$$

for 100% efficiency