Section 1: Forces and motion

Equations to Learn

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

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

$$a = \frac{(v - u)}{t}$$

force = mass × acceleration

$$F = m \times a$$

weight = mass × gravitational field strength

$$W = m \times g$$

momentum = mass × velocity

$$\mathbf{p = m \times v}$$

moment = force × perpendicular distance from the pivot

Stopping distance =braking distance + thinking distance

Force = Spring constant x extension

Equations given in exam:

$$\boldsymbol{F = \frac{change\ in\ momentum}{change\ in\ time}}$$

$$\boldsymbol{F = \frac{mv - mu}{t}}$$

(Final speed)^2 = (initial speed)^2+ (2 x acceleration x distance)

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

Section 2: Electricity

Equations to learn:

power = current × voltage

$$P = I \times V$$

voltage = current × resistance

$$V = I \times R$$

charge = current × time

$$Q = I \times t$$

energy transferred = charge × current × resistance

$$E = Q \times I \times R$$

energy = charge × voltage

$$E = Q \times V$$

Equations given in exam:

energy transferred = current × voltage × time

$$E = I \times V \times t$$

Section 3: Waves

Equations to Learn

wave speed = frequency × wavelength

$$v = f \times \lambda$$

$$\text{refractive index, } n = \frac{\sin i}{\sin r}$$

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

$$n = \frac{c}{v}$$

Equations given in exam:

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

Section 4: Energy Resources & Energy Transfer

Equations to Learn:

$$\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy input}}$$

work done = force × distance moved

$$W = F \times d$$

gravitational potential energy = mass × g × height

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

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

$$KE = \frac{1}{2} \times m \times v^2$$

energy transferred = work done

Equations given in exam:

$$\text{Power} = \frac{\text{Work done}}{\text{time taken}} = \frac{\text{Energy Transferred}}{\text{time taken}}$$

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

Section 5: Solids, liquids and gases

Equations to Learn

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

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

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

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

pressure difference = height × density × g

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

Equations given in exam

Energy = mass x Specific Heat Capacity x Temp change

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

pressure × volume = constant

$$p_1 \times V_1 = p_2 \times V_2$$

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

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

Section 6: Magnetism & Electromagnetism

Equations to Learn

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

$$\boldsymbol{\frac{V_P}{V_S} = \frac{N_P}{N_S}}$$

input power = output power

$$\mathbf{V_P \times I_P = V_S \times I_S}$$

for 100% efficiency

Section 7: Radioactivity and particles

No equations in this section

Section 8: Astrophysics

Equations given in exam

$$\boldsymbol{\frac{change\ in\ wavelength}{reference\ wavelength} = \frac{velocity\ of\ a\ galaxy}{speed\ of\ light}}$$

$$\boldsymbol{\frac{\lambda - \lambda_o}{\lambda_o} = \frac{\Delta\lambda}{\lambda_o} = \frac{v}{c}}$$

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

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

IGCSE EDEXCEL PHYSICS EQUATIONS

EQUATIONS IN BOLD ARE PAPER 2 CONTENT ONLY