Topic 1: Energy

Equations to Learn:

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

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

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

$$E_p = m \times g \times h$$

$$\text{kinetic energy} = 0.5 \times \text{mass} \times \text{speed}^2$$

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

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

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

$$P = \frac{W}{t} \text{ or } P = \frac{E}{t}$$

Equations given in exam:

$$\text{elastic potential energy} = 0.5 \times \text{mass} \times (\text{extension})^2$$

$$E_e = \frac{1}{2} \times m \times e^2$$

Energy = mass x Specific Heat Capacity x Temp change

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

Topic 2: Electricity

Equations to learn:

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

$$P = I \times V$$

$$\text{power} = \text{current}^2 \times \text{resistance}$$

$$P = I^2 \times R$$

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

$$V = I \times R$$

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

$$Q = I \times t$$

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

$$E = Q \times V$$

Resistance total = sum of individual resistors in series

$$R_T = R_1 + R_2$$

$$\text{Energy} = \text{power} \times \text{time}$$

$$E = P \times t$$

Topic 5: Forces

Equations to Learn

$$\text{distance travelled} = \text{speed} \times \text{time}$$

$$s = v \times t$$

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

$$a = \frac{\Delta v}{t}$$

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

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

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

$$F = m \times a$$

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

$$W = m \times g$$

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

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

$$\text{moment of a Force} = \text{force} \times \text{distance}$$
$$M = F \times d$$

$$\text{Work done} = \text{force} \times \text{distance}$$
$$W = F \times s$$

$$\text{force applied to a spring} = \text{Spring constant x extension}$$

$$F = k \times e$$

Stopping distance =braking distance + thinking distance

$$\text{pressure difference} = \text{height} \times \text{density} \times g$$

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

$$\text{elastic potential energy} = 0.5 \times \text{mass} \times (\text{extension})^2$$

$$E_e = 0.5 \times m \times e^2$$

Equations given in exam:

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

$$\boldsymbol{F = \frac{mv - mu}{t}} \text{ or } \boldsymbol{F = \frac{m\Delta v}{t}}$$

$$(\text{Final speed})^2 = (\text{initial speed})^2 + (2 \text{ x acceleration x distance})$$

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

Topic 6: Waves

Equations to Learn

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

$$v = f \times \lambda$$

Equations given in exam:

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

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

$$\text{magnification} = \frac{\text{image height}}{\text{object height}}$$

Topic 3: Particle model of matter

Equations to Learn

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

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

Equations given in exam

Energy = mass x Specific Heat Capacity x Temp change

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

$$\text{Thermal energy for Change of State} = \text{mass} \times \text{specific latent heat}$$
$$E = m \times L$$

$$\text{pressure} \times \text{volume} = \text{constant}$$

$$pV = constant$$

Topic 7: Magnetism & Electromagnetism

Equations given in exam

$$\mathbf{Force = magnetic\ flux\ density \times current \times length}$$

$$\mathbf{F = B \times I \times l}$$

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

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

$$\mathbf{input\ power = output\ power}$$

$$V_P \times I_P = V_S \times I_S$$

for 100% efficiency

No equations are required for the following topics:

Topic 4: atomic structure

Topic 8 Space Physics

AQA GCSE PHYSICS

EQUATIONS IN BOLD ARE PAPER 2 CONTENT ONLY