

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

**Physics**  
**UNIT: 4PH1**  
**PAPER: 2PR**

**Friday 14 June 2024 – Afternoon**

**Time: 1 hour 15 minutes**

**Formulae Booklet**

**DO NOT RETURN THIS BOOKLET  
WITH THE QUESTION PAPER.**

**You may find the following formulae useful.**

**energy transferred =  
current × voltage × time**

$$\mathbf{E = I \times V \times t}$$

**frequency =  $\frac{1}{\text{time period}}$**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\frac{\text{change of wavelength}}{\text{wavelength}} = \frac{\text{velocity of a galaxy}}{\text{speed of light}}$$

$$\frac{\lambda - \lambda_0}{\lambda_0} = \frac{\Delta\lambda}{\lambda_0} = \frac{v}{c}$$

$$\begin{aligned} &\text{change in thermal energy} = \\ &\text{mass} \times \text{specific heat capacity} \times \\ &\text{change in temperature} \end{aligned}$$

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

Where necessary, assume the acceleration of free fall,  $g = 10 \text{ m/s}^2$ .