

OCR A Physics: Rearranging equations

35-40 minutes independent practice + 15-20 minutes review | Total: 25 marks

Equations practised

$v = u + at$ $W = Fs$ $W = QV$ $p = F/A$ $\rho = m/V$
 $E = Pt$ $f = 1/T$ $F = BIl$ $V = IR$ $P = IV$
 $E = mc\Delta\theta$ $v^2 = u^2 + 2as$ $pV = nRT$ $T = 2\pi\sqrt{(m/k)}$

Skills focus: rearrange first, then substitute values. Use the blank space to show clear algebra and calculation working.

A. Quick rearrange practice

1. The motion relationship is $v = u + at$. Make t the subject. [1 mark]
2. The work done relationship is $W = Fs$. Make F the subject. [1 mark]
3. The electrical work relationship is $W = QV$. Make Q the subject. [1 mark]
4. The pressure relationship is $p = F/A$. Make A the subject. [1 mark]
5. The density relationship is $\rho = m/V$. Make V the subject. [1 mark]
6. The energy relationship is $E = Pt$. Make t the subject. [1 mark]
7. The frequency relationship is $f = 1/T$. Make T the subject. [1 mark]
8. The motor-effect relationship is $F = BIl$. Make I the subject. [1 mark]

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B. Rearrange, then calculate

9. A sensor has a potential difference of 1.80 V across it and a current of 0.0750 A through it. Use $V = IR$ to calculate its resistance. [2 marks]

10. A 12.0 V heater transfers energy at a rate of 48.0 W. Use $P = IV$ to calculate the current through the heater. [2 marks]

11. A 250 g aluminium block absorbs 3.78×10^4 J of energy. The specific heat capacity of aluminium is $840 \text{ J kg}^{-1} \text{ K}^{-1}$. Use $E = mc\Delta\theta$ to calculate the temperature rise of the block. [3 marks]

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C. Multi-step algebra

12. A test trolley increases its speed from 4.00 m s^{-1} to 16.0 m s^{-1} over a distance of 120 m. Use $v^2 = u^2 + 2as$ to calculate its acceleration. [3 marks]

13. A gas sample has a pressure of $1.20 \times 10^5 \text{ Pa}$, a volume of $4.00 \times 10^{-3} \text{ m}^3$ and an amount of 0.200 mol. Use $pV = nRT$, where $R = 8.31 \text{ J mol}^{-1} \text{ K}^{-1}$, to calculate its temperature. [3 marks]

14. A 0.400 kg mass oscillates on a spring with a period of 1.60 s. Use $T = 2\pi\sqrt{m/k}$ to calculate the spring constant k. [4 marks]

Check and improve

- ☐ I chose the quantity to make the subject before doing any calculation.
- ☐ I checked powers, roots and denominators carefully.
- ☐ I gave each numerical answer with an appropriate unit.

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