

Required Practical Resistance

GCSE Physics · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

For a 60 cm length of wire, the voltmeter reads 1.24 V and the ammeter reads 0.40 A. Calculate the resistance. (2 marks)

Step 1 · Write the equation

$$R = V \div I$$

Step 2 · Substitute and calculate

$$R = 1.24 \div 0.40 = 3.1 \, \Omega$$

Answer: 3.1 Ω

Check: Voltage on top, current on the bottom.

2. Now try one with the steps

Describe the relationship shown by the example results and suggest why the line does not pass exactly through the origin. (3 marks)

Step 1 · Pattern

Step 2 · Intercept

Step 3 · Reason

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. State the independent variable in the length of wire investigation. [1]

2. State the dependent variable and how it is found. [1]

3. Give two control variables. [2]

4. The voltmeter reads 1.2 V and the ammeter reads 0.40 A. Calculate the resistance in ohms. [2]
-
-
5. State how the ammeter and voltmeter are connected. [2]
-
-
6. Give one safety precaution for this practical. [1]
-
-
7. Describe the relationship between length and resistance shown by the example results. [2]
-
-
8. Explain why the current should be kept small and the circuit switched off between readings. [2]
-
-
9. Two $10\ \Omega$ resistors in parallel give readings of 3.0 V and 0.60 A. Calculate the total resistance in ohms. [2]
-
-
10. Using a gradient of $0.050\ \Omega/\text{cm}$ and an offset of $0.10\ \Omega$, predict the resistance of 50 cm of the wire, in ohms. [2]
-
-
11. Explain why the line of best fit does not pass through the origin. [2]
-
-
12. Calculate the gradient of the graph in Ω per metre, using the points (20 cm, $1.10\ \Omega$) and (100 cm, $5.10\ \Omega$). [3]
-
-
-
-
13. Two $10\ \Omega$ resistors in series are measured as $20.4\ \Omega$. Suggest one reason why this is not exactly $20\ \Omega$. [1]
-
-

14. A student measures each length with a metre rule marked in millimetres. Explain why the percentage uncertainty in length is greater for 10 cm than for 100 cm. [2]
-
-

4. Before you hand it in

Leaving the current on for a long time between readings

Switch off between readings so the wire stays at room temperature; otherwise resistance increases for a reason other than length.

Connecting the voltmeter across the power supply instead of the wire

Connect the voltmeter across the length of wire between the crocodile clips.

Forcing the line of best fit through the origin

Draw the best straight line through the points; explain any intercept (contact resistance).

Calling contact resistance a random error

It is a systematic error: it shifts the line up but does not change the gradient.