

Current-Voltage Graphs Resistance and Current

Edexcel International GCSE Physics · Electricity

Resistance is constant for an ohmic conductor (when the temperature is kept constant), but varies for other resistors.

Formula in words

Formula in algebra

How to describe how resistance changes

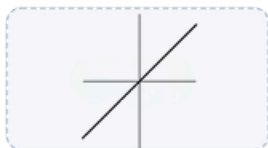
For each mark: **voltage / light intensity / temperature — current — resistance**

1 Set up the circuit.

2 Increase the **voltage**, **temperature** or **light intensity**.

3 Describe the change in **current**, then the change in **resistance**.

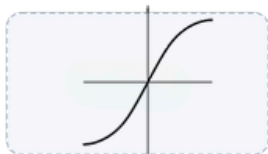
a Describe how the resistance is affected by the voltage. [2 marks]



Draw the circuit symbol

Component: _____

b Explain how the resistance is affected by the voltage. [3 marks]



Draw the circuit symbol

Component: _____

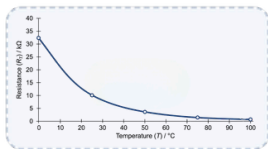
c Describe how the resistance affects the current. [2 marks]



Draw the circuit symbol

Component: _____

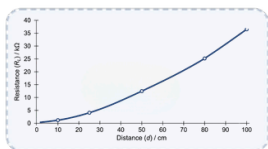
d Describe how the temperature affects the resistance. [2 marks]



Draw the circuit symbol

Component: _____

e Describe how the light intensity affects the resistance. [2 marks]



Draw the circuit symbol

Component: _____

Current-Voltage Graphs

Edexcel International GCSE Physics · Electricity

Practical: I–V Graph for a Filament Lamp

Aim: investigate how the current through a filament lamp varies with the voltage across it.

Apparatus

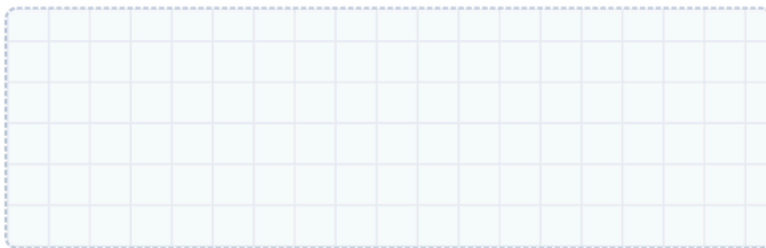
tick each item as you collect it

- ☐ variable power supply
- ☐ filament lamp
- ☐ ammeter
- ☐ voltmeter
- ☐ switch
- ☐ connecting leads

(a)(i) Draw the circuit

[4 marks]

use standard symbols — you need a power supply, the lamp, an ammeter, a voltmeter, and a way of varying the voltage



(a)(ii) Describe your method

[4 marks]

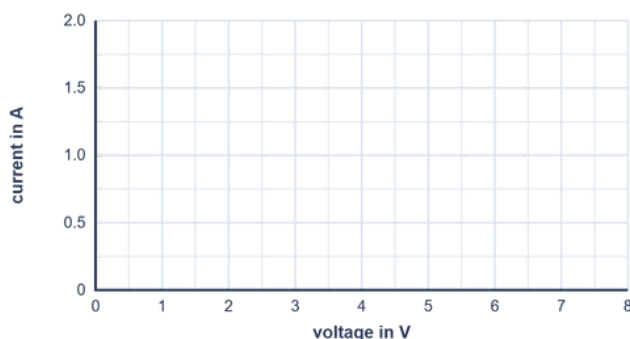
think about: what you measure · how you change the voltage · repeats and averages · switching off between readings · what you plot

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____

Results

Voltage in V	Current 1 in A	Current 2 in A	Mean current in A
0.0			
1.0			
2.0			
3.0			
4.0			
5.0			
6.0			
7.0			
8.0			

Plot your I–V graph



What happens to the **resistance** of the lamp as it gets hotter?

(b) Extension — power and energy

[4 marks]

The student repeats the experiment, switching the lamp on for 45 s at each voltage and recording the colour of the filament.

Voltage in V	Current in A	Power in W	Energy in J	Colour of lamp
0.0	0.00	0.0	0.0	off
2.0	0.40	0.8	36	red
4.0	0.90	3.6		orange
6.0	1.60	9.6	430	yellow
8.0	2.80	22.4	1000	white

(i) State the unit for current. (1)
unit _____

(ii) Calculate the missing value of energy at 4.0 V. Give your answer to 2 significant figures. (2)
energy _____ J

(iii) Suggest the colour of the lamp at 3.0 V. (1)
colour _____

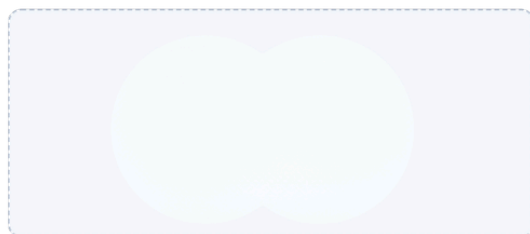
LDRs and Thermistors

Edexcel International GCSE Physics · Electricity

Resistance of a Thermistor

Aim: investigate how the **temperature** of a thermistor affects its **resistance**.

Apparatus — tick each item as you add it to your circuit



Use these to set up the experiment:

- | | |
|--|--------------------------------------|
| ☐ cell | ☐ switch |
| ☐ thermistor | ☐ ammeter |
| ☐ voltmeter | ☐ thermometer |
| ☐ beaker of water + heater
(to change the temperature) | |

Method — fill in the gaps

1. Measure the _____ with an _____ connected in _____.
2. Measure the _____ with a _____ connected in _____.
3. Put the thermistor in a beaker of water and measure the _____ with a _____.
4. Calculate the resistance: $R = \text{_____}$
5. Heat the water and take readings every _____ °C.

Safety & accuracy — fill in the gaps

Safety: take _____ with the hot water and heater — do not touch the hot _____.

Accuracy: _____ the water so the temperature is even before taking a reading.

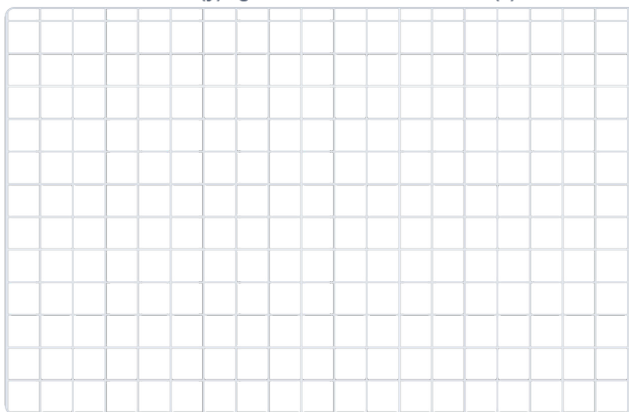
Accuracy: use a _____ current so the thermistor does not _____ itself up.

Results

temperature / °C	p.d. / V	current / A	resistance / Ω

Graph

_____ (y) against _____ (x)



Conclusion

SENTENCE STARTER

As the temperature increases, the resistance of the thermistor _____.