

AQA Physics GCSE

RP04 - I-V Characteristics

Flashcards

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Outline the basic steps of the practical.



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1. Set-up circuit with lamp/resistor/diode
2. Alter the potential difference in regular increments
3. Record the current for each p.d
4. Plot a graph of current against p.d
5. Repeat for the other two components



What two types of meters are needed in the circuit, and how should they be connected?



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1. Voltmeter: Connected in parallel to the component
2. Ammeter: Connected in series with the component



What component is required to alter potential difference if you're not using a variable power pack?



What component is required to alter potential difference if you're not using a variable power pack?

A rheostat, or variable resistor.



What is an 'Ohmic Conductor'? State the condition required.



What is an 'Ohmic Conductor'? State the condition required.

- A conductor for which current and potential difference are directly proportional
- Resistance remains constant as current changes
 - Temperature must be constant



What specific type of ammeter may be required in this experiment and why?



What specific type of ammeter may be required in this experiment and why?

A milliammeter since the currents and current changes involved may be quite low.



What must also be present in the circuit when the diode is being tested? Where should it be connected?



What must also be present in the circuit when the diode is being tested? Where should it be connected?

A protective resistor should be connected to prevent the current levels getting too high. It should be connected in series with the diode.



For which component does the polarity of the power supply matter and why?



For which component does the polarity of the power supply matter and why?

The diode, since diodes only allow current to flow through in one direction.



What must be kept constant to get reliable results? How can you achieve this?



What must be kept constant to get reliable results?
How can you achieve this?

Temperature should remain constant so that the resistance of the components isn't affected. You should disconnect the supply when not taking readings to avoid unnecessary heating.



How do you determine the resistance of a component from an I-V graph?



How do you determine the resistance of a component from an I-V graph?

The resistance at a given point, is the inverse of the gradient of the line drawn from that point to the origin.

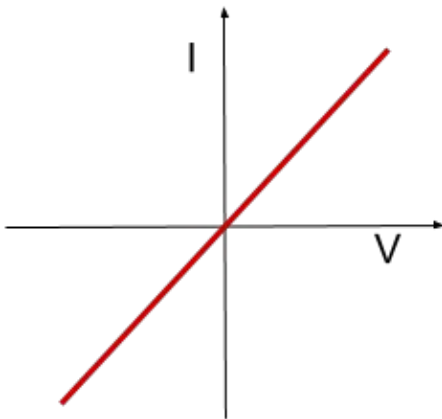
Work out the gradient and use $1/\text{gradient}$ to obtain the resistance.



What would you expect the I-V graph of a resistor to look like?



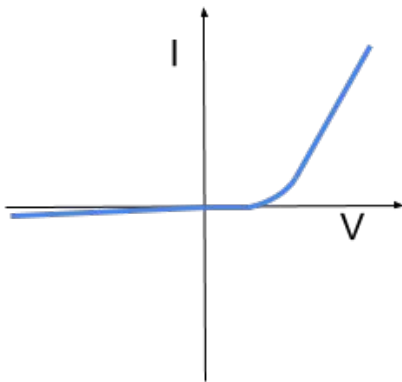
What would you expect the I-V graph of a resistor to look like?



What would you expect the I-V graph of a diode to look like?



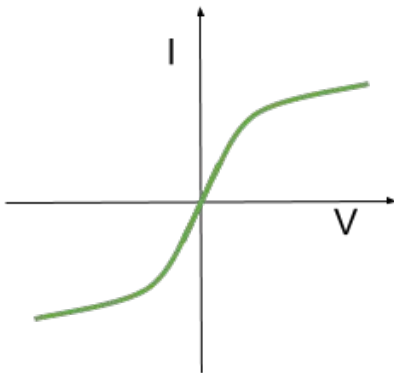
What would you expect the I-V graph of a diode to look like?



What would you expect the I-V graph of a lamp to look like?



What would you expect the I-V graph of a filament lamp to look like?



What happens to the resistance of a filament lamp as the temperature increases? Why?



What happens to the resistance of a filament lamp as the temperature increases? Why?

- Resistance increases
- Ions in metal have more energy, so vibrate more, causing more collisions with electrons as they flow through the metal, creating greater resistance to current flow

