

OCR A Physics A-Level

PAG 3.2

Investigating the electrical characteristics for a range of ohmic and non-ohmic components

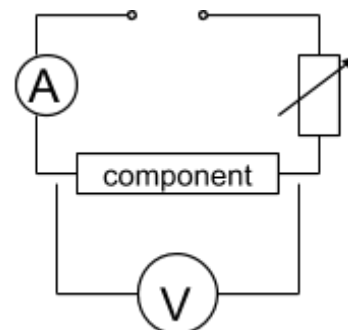


Equipment

- Ammeter
- Voltmeter
- Variable resistor
- Copper block
- Filament lamp
- Diode
- Power Pack
- Wires

Method

1. Set up the circuit as shown where 'component' is the filament lamp, copper block or diode.
2. Vary the voltage across the component by changing the resistance of the variable resistor, using a wide range of voltages.
3. For each voltage record the current 3 times and calculate the mean current.
4. Make sure to switch off the circuit in between readings to prevent heating of components.
5. Repeat for all 3 components.



Calculations

- Plot a graph of mean current against voltage (an I-V characteristic graph) for each component.
- Compare the shapes of each graph and consider the reasons behind the difference between the filament lamp and copper block characteristic graph.

Safety

- The components will get hot especially at higher voltages so be careful when handling them and disconnect the power supply in between readings.
- Do not put non-insulated metal into the plug sockets to reduce the risk of electrocution.

Notes

- The voltmeter will not have infinite resistance and the ammeter will not have 0 resistance (ie. they won't be ideal) therefore the voltages and currents displayed may be slightly inaccurate.
- The equipment used (except from the components) and the temperature of the area should be controlled as these can affect the results.
- To reduce uncertainty take more readings at more voltages and use ammeters and voltmeters with greater resolution.

