WJEC England Physics GCSE

Specified Practical

I-V Characteristics

SP7.1 Investigation of the current-voltage (I-V) characteristics of a component

Equipment

- 12V filament lamp
- Connecting wires
- Variable resistor
- Ammeter
- Voltmeter
- 12V power supply (such as a power pack or a battery)

Diagram

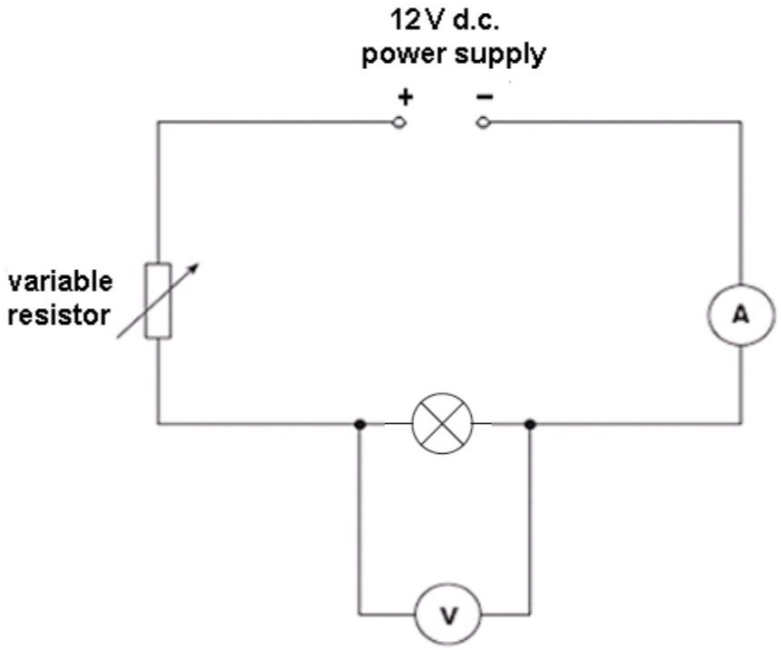

Image: Eduqas

Method

1. Set up a series circuit with the lamp, the power supply, the variable resistor and the ammeter, with the voltmeter in parallel across the resistor as in the diagram above.
2. Adjust the variable resistor so that the voltmeter shows a reading of 1V.
3. Record the readings on the ammeter and voltmeter.
    - Take these readings straight away so the resistor does not get too hot and cause the results to be less accurate
    - You should also leave a little time after turning off the power supply for the resistor to cool back down to room temperature
4. Repeat, increasing the voltage by 1V intervals (using the variable resistor) up to 12V.
5. Plot these values on a graph of current against potential difference.
6. The reciprocal of the gradient ($\frac{1}{gradient}$) will give the resistance of the fixed resistor as $R = \frac{V}{I}$
    - The gradient remains constant, showing that the resistance of the fixed resistor **does not change** as the potential difference across it changes

Tips

- Always take readings as soon as the power supply has been turned on so that the equipment does not get too hot and make the results less accurate.
- Leave time after each reading for the components to cool to room temperature so that the test is more reliable.

Safety Precautions

- Ensure the power supply is turned off before changing anything in the circuit to reduce the risk of electric shock
- Do not touch the filament lamp while it is on or just after it has been turned off to reduce the risk of burns