

Edexcel Physics GCSE

Practical 5a and 5b : Electricity

Practical Flashcards

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Part A: Investigating the relationship between potential difference, current and resistance for a resistor and a filament lamp.



Outline the basic steps of the practical.



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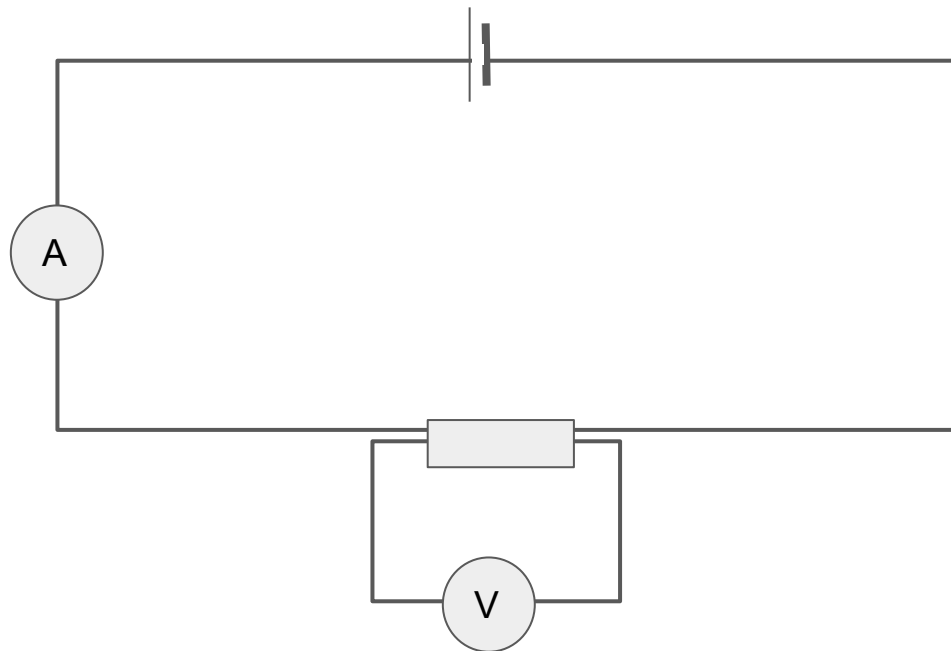
1. Set up a circuit with a voltmeter attached in parallel to a resistor and an ammeter attached in series to the resistor
2. Start on a low voltage and slowly increase the voltage, recording the potential difference and current values each time
3. Repeat, swapping the resistor for a filament lamp
4. Plot a graph of current against potential difference for both components



Draw a circuit diagram for this set up



Draw a circuit diagram for this set up



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



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

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 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 does temperature affect resistance?



How does temperature affect resistance? Why?

Temperature causes an increase in resistance.



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?

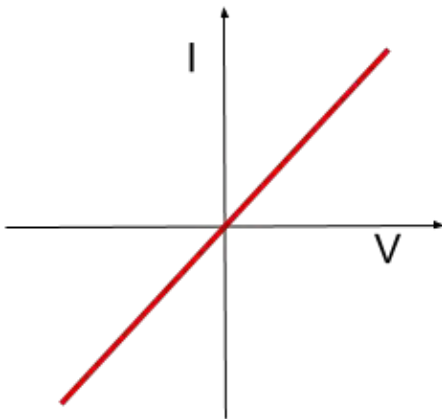
The resistance at a given point is the inverse of the gradient of the line drawn from that point to the origin.



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



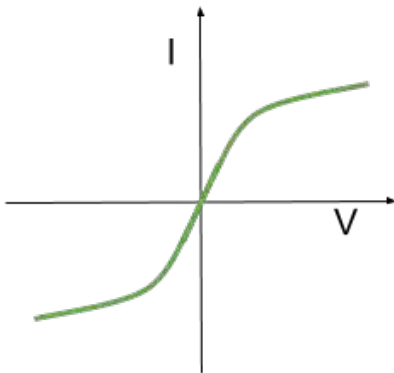
What would you expect the I-V graph of a fixed resistor to look like?



What would you expect the I-V graph of a filament 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



Part B: Testing series and parallel circuits using resistors and filament lamps.



Outline the basic steps of the practical.



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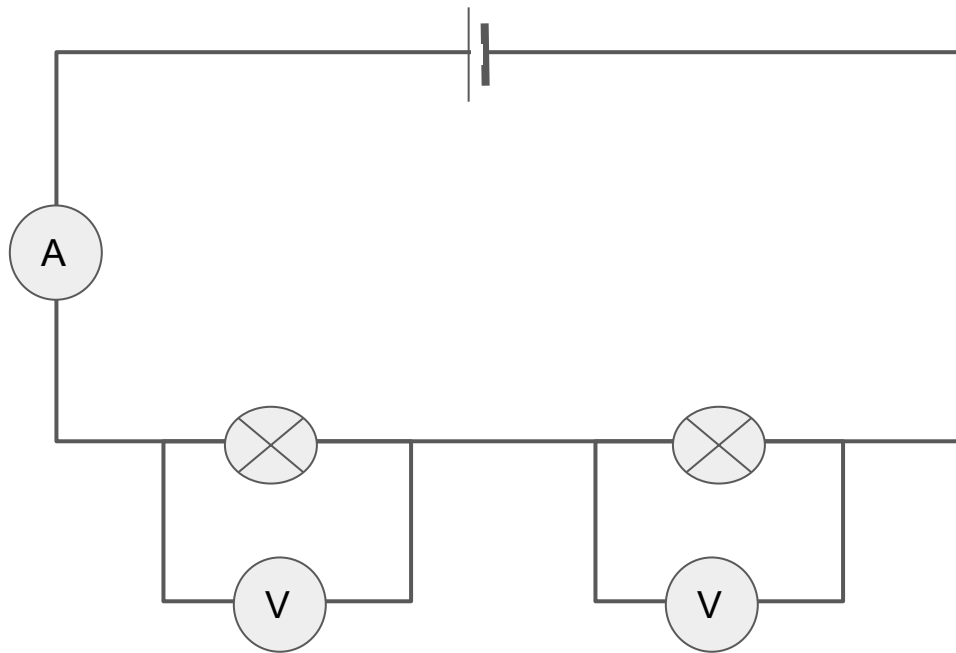
1. Set up a circuit with two filament lamps in series, each with a voltmeter attached over them and an ammeter in series with them
 2. Start on a low voltage and slowly increase the voltage, recording the potential difference and current values each time
3. Set up a second circuit with two lamps in parallel and once again record the potential difference and current values for increasing voltages
 4. Compare the two arrangements



Draw a circuit diagram for the series arrangement



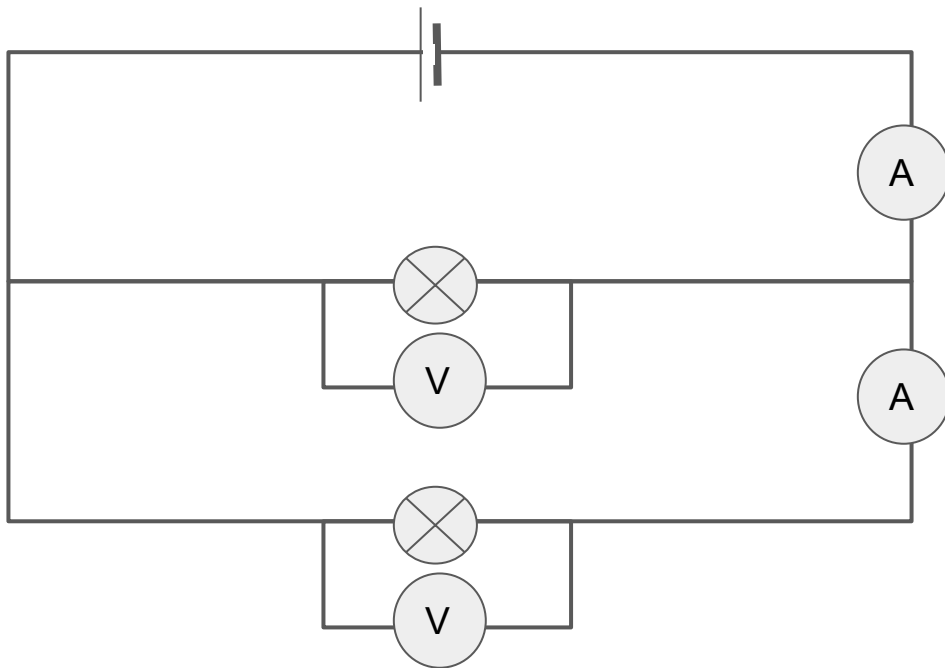
Draw a circuit diagram for the series arrangement



Draw a circuit diagram for the parallel arrangement



Draw a circuit diagram for the parallel arrangement



Which lamp arrangement would you expect to have the greatest total resistance?



Which lamp arrangement would you expect to have the greatest total resistance?

The two lamps in series will have a greater total resistance than the two lamps in parallel.



How would the total resistance of the parallel combination, compare to the lamps' individual resistances?



How would the total resistance of the parallel combination, compare to the lamps' individual resistances?

The total resistance will be smaller than the smallest individual resistance.



What safety precautions should be taken when using filament bulbs?



What safety precautions should be taken when using filament bulbs?

- Avoid touching them when switched on since they can get very hot
- Be careful not to use too high a voltage to avoid blowing the filament

