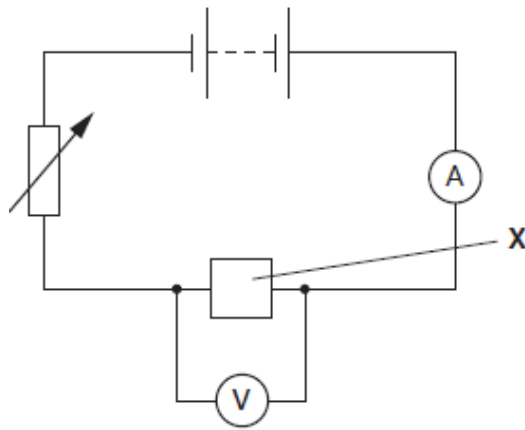


GCSE Physics A (Gateway)

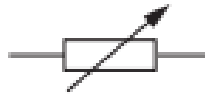
J249/01 Physics A P1-P4 and P9 (Foundation Tier)

Question Set 7

- 1 (a) A student builds a circuit to investigate the resistance of component X.



- (i) What is the name of this component?



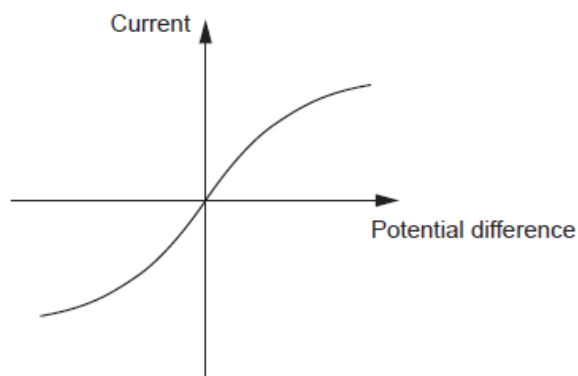
variable resistor

[1]

- (ii) Why is this component needed in this circuit?

[1]

- (b) The student uses the circuit to take current and potential difference readings.
The student plots a graph of her results.



- (i) Look at the graph.

What is component X in the circuit?

filament lamp (non-ohmic component)

[1]

- (ii) The resistance of component **X** varies as the potential difference changes.

Describe **how** the graph shows this and explain **why** this happens.

[3]

$R = \frac{1}{V} = \frac{1}{\text{gradient}}$ The gradient is not constant (straight line) - it decreases at higher potential differences (graph levels off) meaning resistance is increasing. This is because as temperature increases, atoms vibrate more impeding electron flow.

- (c) Component **X** has a resistance of 16Ω when a current of 0.25A flows.

- (i) Calculate the potential difference across component **X**.

Use the equation: Potential difference = Current \times Resistance

$$P.d. = 0.25 \times 16 = 4$$

Answer = ⁴ V [2]

- (ii) Calculate the power of component **X** when a current of 0.25A flows.

$$P = IV = 0.25 \times 4 = 1$$

Answer = ¹ W [3]

Total Marks for Question Set 7: 11

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