

**GCSE Physics A (Gateway)**

**J249/03 Physics A P1-P4 and P9 (Higher Tier)**

**Question Set 19**

19

A student takes voltage and current measurements for four resistors (A, B, C and D).

$$V = IR \therefore \frac{V}{I} = R$$

The table shows the results from this experiment.

Resistor	Voltage (V)	Current (A)	Resistance ( $\Omega$ )
A	12.0	2.0	6
B	6.0	1.5	4
C	7.5	1.5	5
D	8.0	2.0	4

(a) Which two resistors have the same resistance value?

Use the results to show this.

Resistors B and D have the same value [2]

(b) Calculate the maximum resistance that can be made using all four resistors.

in series

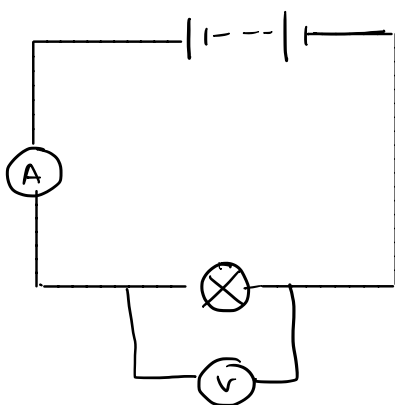
$$6 + 4 + 5 + 4 = 19$$

Answer = .....19.....  $\Omega$

[1]

(c) (i) Draw a circuit diagram that could be used to find out how the resistance of a filament bulb changes with current.

Describe the readings you need to take.

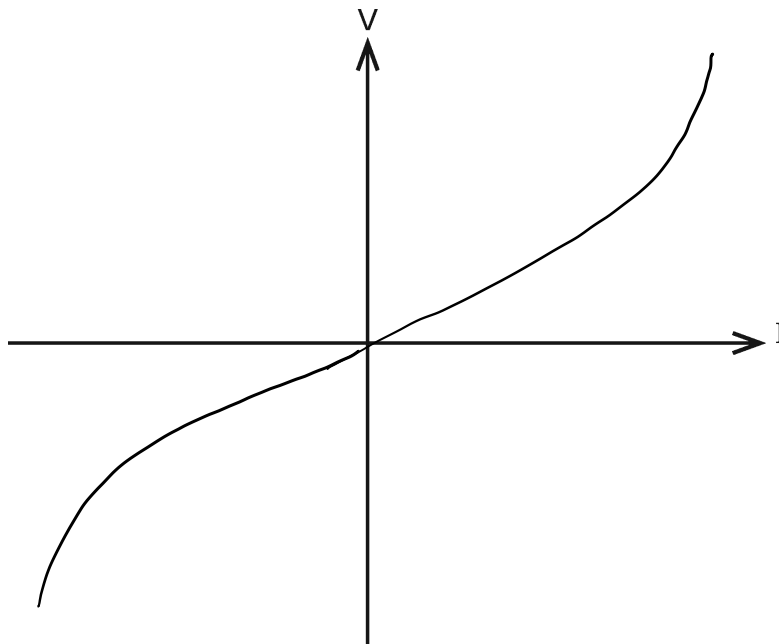


\* you will need to measure the current at fixed points (ie, 2A, 4A etc)

\* you will then need to measure the potential difference. [4]

\* use  $\frac{V}{I} = R$  to find resistance

(ii) Sketch the shape of the graph from (c)(i) using the axes below.

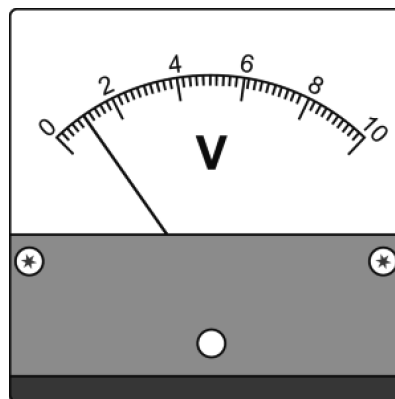


State how this graph can be used to calculate resistance at any specific value of current.

*you can find the gradient at that point which is equal to the resistance* [2]

(d) A voltmeter is used to measure the output voltages produced from the circuit.

The voltmeter is **not** connected to a circuit and **not** recording a voltage.



Name the type of error on the voltmeter and suggest how it should be dealt with.

*zero error, recalibrate the voltmeter or take away 1v from every reading* [2]

**Total Marks for Question Set 19: 11**

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