

## Current characteristics 2

Name & Set

1 In a physics book a student reads that the resistance of a piece of wire depends upon

- its cross-sectional area
- its length
- the material of which it is made

The student decides to examine how the cross-sectional area of a piece of wire affects its resistance. He selects some pieces of resistance wire, each 1 m long.

(a) (i) Why should all the pieces of wire be made of the same material?

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[2]

(ii) Why should they all be the same length?

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[2]

(b) (i) Using the standard symbols for electrical components draw a circuit diagram for the circuit that you would use in this experiment in the space below.

[4]

(i) Write down in words in the space below the equation that links *RESISTANCE*, *CURRENT* and *VOLTAGE*.

[2]

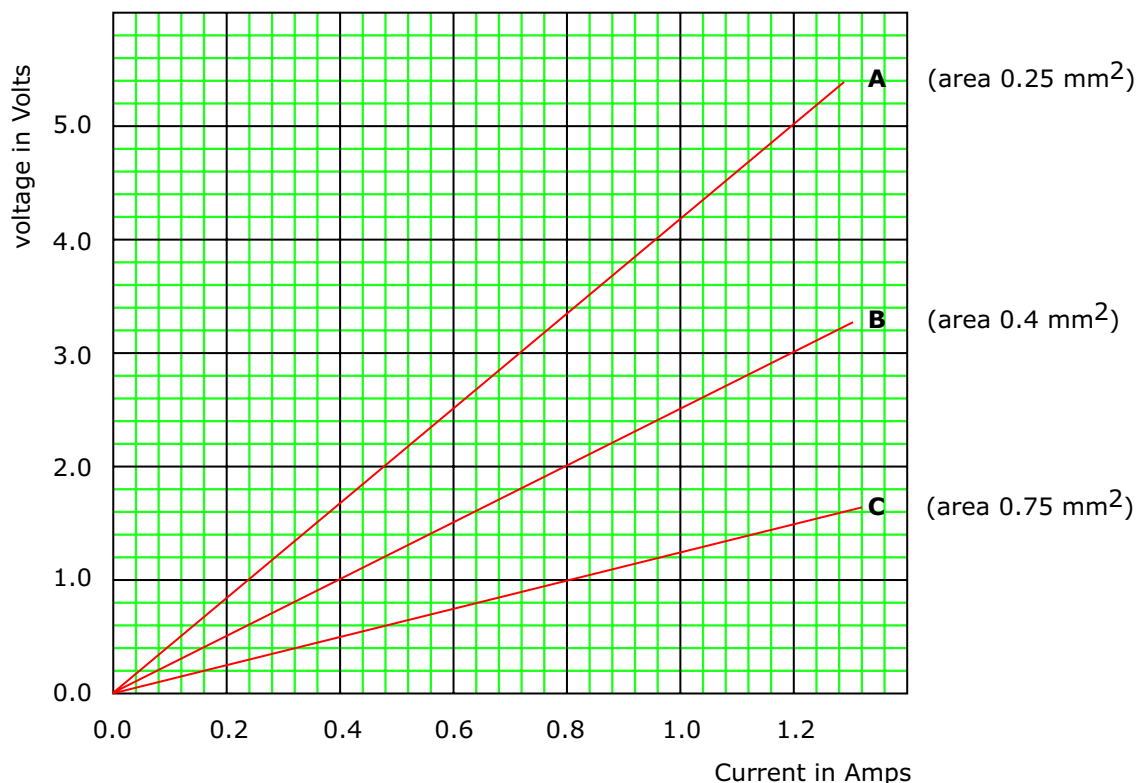
(ii) What measurements would you make to determine the resistance of the wire?

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[2]

(c) Using each of the wires in turn the voltage was varied, and both the voltage and the current were measured. A graph of these results was plotted in each case.



(i) For each wire, find the resistance, showing how you do your calculation.

Wire A \_\_\_\_\_  
 \_\_\_\_\_ [2]

Wire B \_\_\_\_\_  
 \_\_\_\_\_ [2]

Wire C \_\_\_\_\_  
 \_\_\_\_\_ [2]

(ii) Use the graph to explain what the effect of changing the voltage will be on the current through the wire \_\_\_\_\_  
 \_\_\_\_\_ [2]

resistance of the wire \_\_\_\_\_  
 \_\_\_\_\_ [2]

(iii) The cross-sectional areas of the wires are shown on the graph. What would you say happens to the resistance of the wires as the cross-sectional area increases?  
 \_\_\_\_\_  
 \_\_\_\_\_ [2]