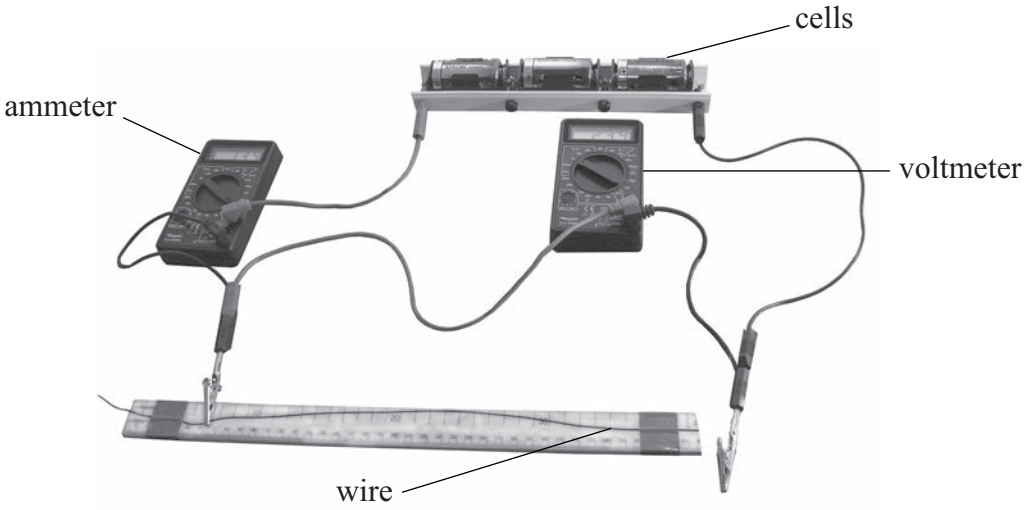
3 A student investigates how the resistance of a wire depends on its length.

The photograph shows the circuit that the student uses.



(a) Draw a circuit diagram to show how the components in the photograph are connected.

(3)

(b) (i) Complete the table by naming the key variables in this investigation.

(1)

independent variable	
dependent variable	

(ii) Describe the method the student should use for this investigation.

(5)

(c) The table shows the student's measurements.

Length of wire in cm	Voltage in V	Current in A	Resistance of wire in Ω
20	4.5	3.6	1.3
40	4.5	1.8	2.5
60	4.5	1.2	3.8
80	4.5	0.9	5.0
100	4.5	0.7	

(i) State the equation linking voltage, current and resistance.

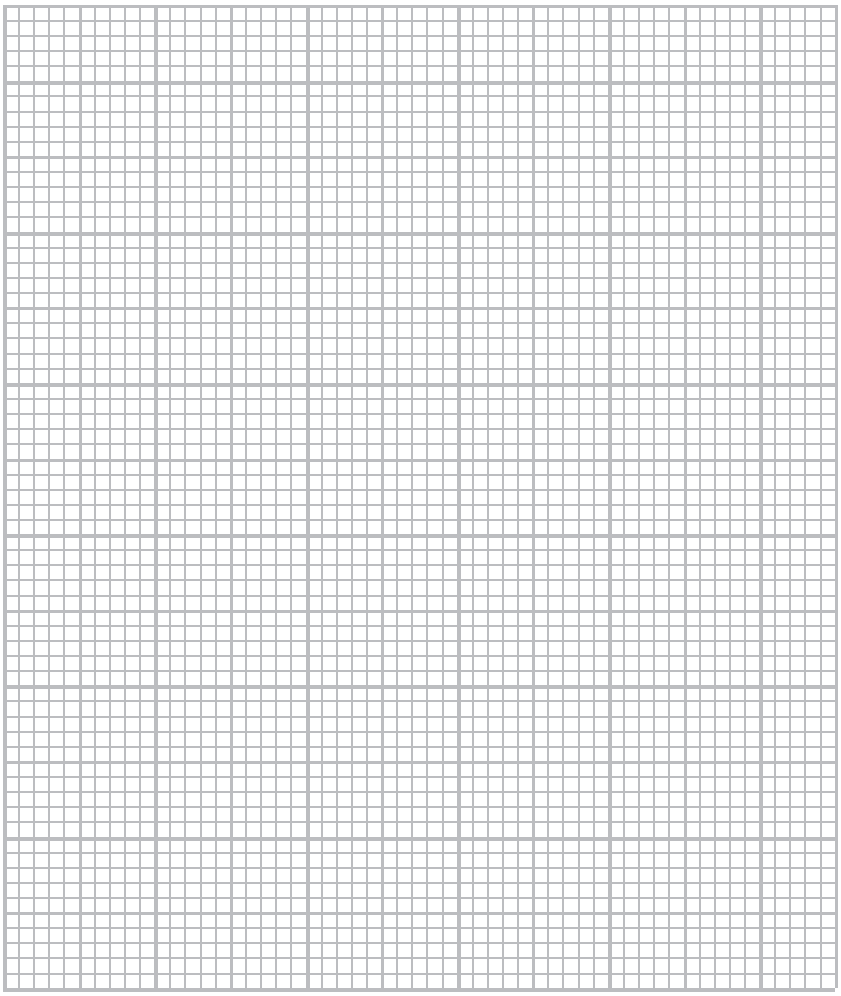
(1)

(ii) Complete the table by calculating the missing value of resistance.

(1)

(d) (i) Use the results from the table opposite to plot a graph of resistance (y-axis) against length of wire (x-axis) and draw the line of best fit.

(5)



(ii) Write a conclusion for the investigation.

(1)

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(iii) Explain how the graph supports this conclusion.

(2)

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(Total for Question 3 = 19 marks)