

2 A student investigates the resistance of a wire.

Fig. 2.1 shows the circuit he uses.

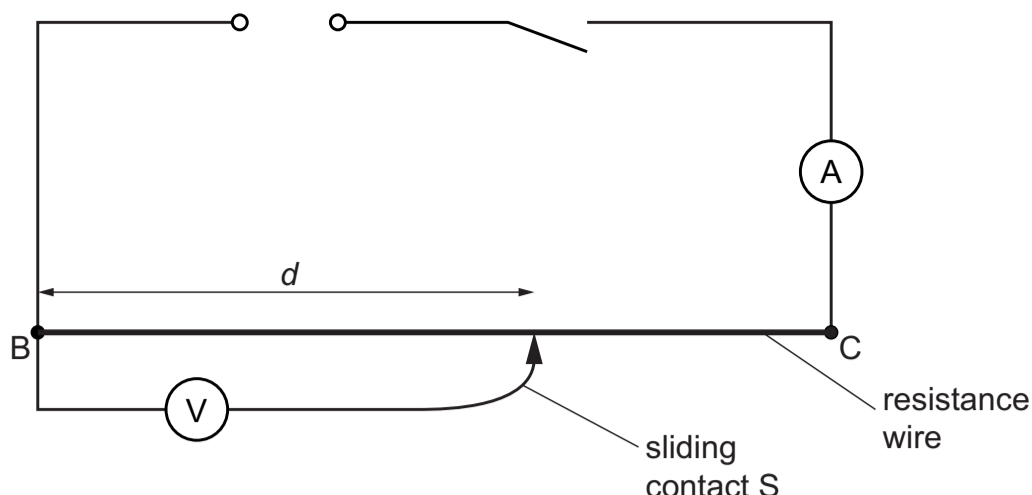


Fig. 2.1

(a) Record the ammeter reading shown in Fig. 2.2.

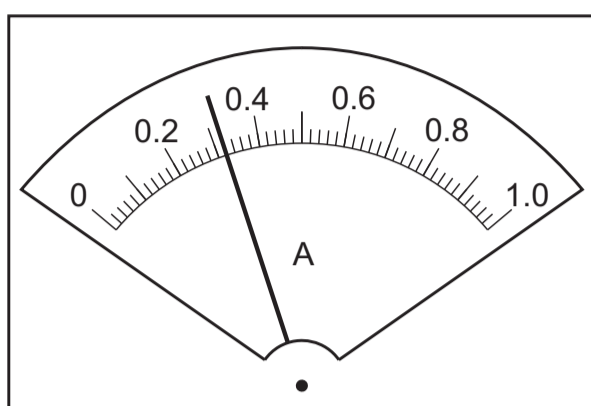


Fig. 2.2

$I = \dots\dots\dots$ A [1]

(b) The student places the sliding contact 15.0 cm from B.

He measures the potential difference (p.d.) V across the length $d = 15.0$ cm of resistance wire BC.

He repeats the procedure using values of $d = 40.0$ cm, $d = 60.0$ cm and $d = 80.0$ cm.

The values of d , V and R are shown in Table 2.1.

The voltmeter reading he obtains when $d = 100.0$ cm is shown in Fig. 2.3.

(i) Record, in the last row of Table 2.1, the voltmeter reading shown in Fig. 2.3. [1]

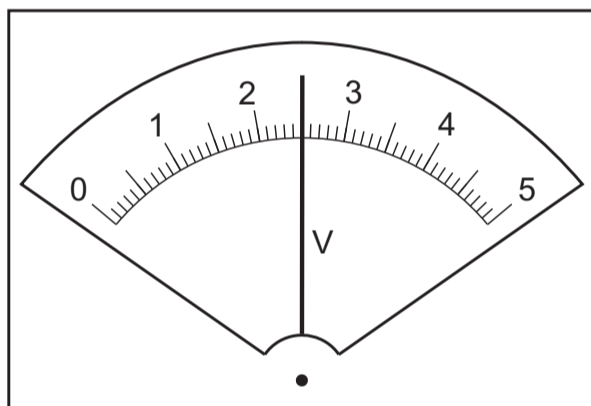


Fig. 2.3

(ii) Calculate the resistance R of 100.0 cm of the resistance wire, using the equation

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

Record R in the last row of Table 2.1.

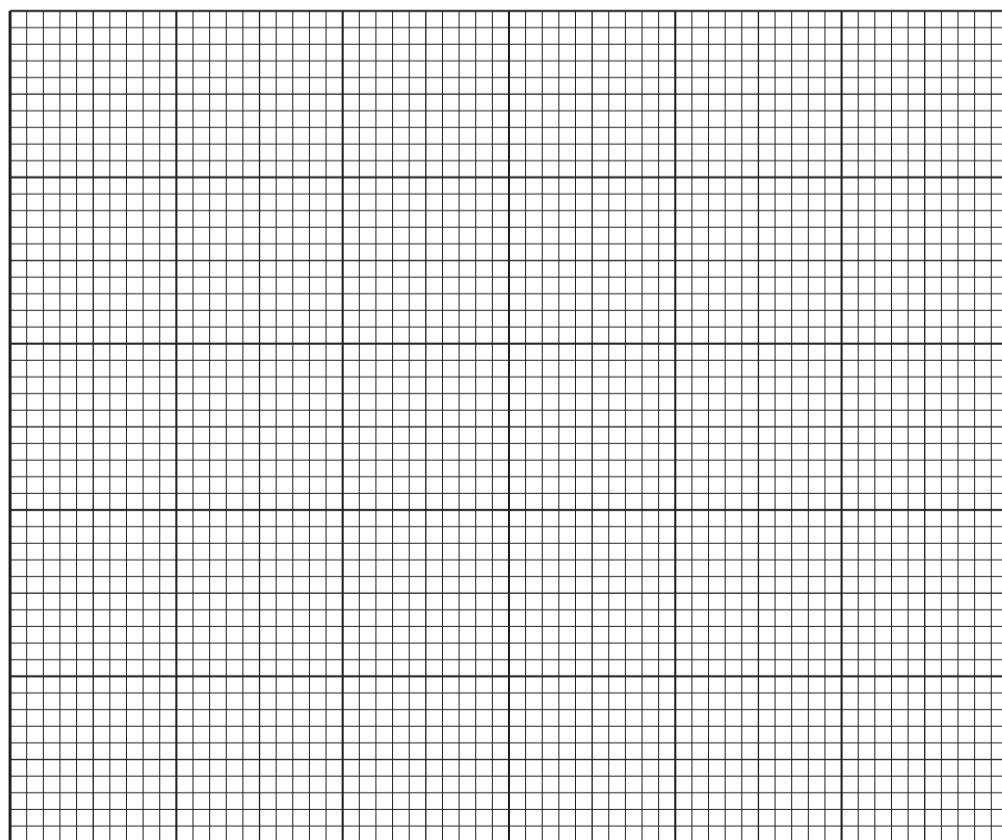
[1]

(iii) Complete the column headings in Table 2.1. [1]

Table 2.1

| d/l | V/l | R/l |
|-------|-------|-------|
| 15.0 | 0.4 | 1.25 |
| 40.0 | 1.1 | 3.44 |
| 60.0 | 1.4 | 4.38 |
| 80.0 | 2.1 | 6.56 |
| 100.0 | | |

(c) Plot a graph of resistance R/Ω (y -axis) against length d/cm (x -axis). Draw a best-fit line.



[4]

(d) Use your graph to determine the resistance R_{75} of a length $d = 75.0$ cm of the resistance wire. Show clearly on the graph how you obtained the value.

$R_{75} = \dots\dots\dots$ [3]

[Total: 11]