2 A student investigates the resistance of a wire.

Fig. 2.1 shows the circuit used.

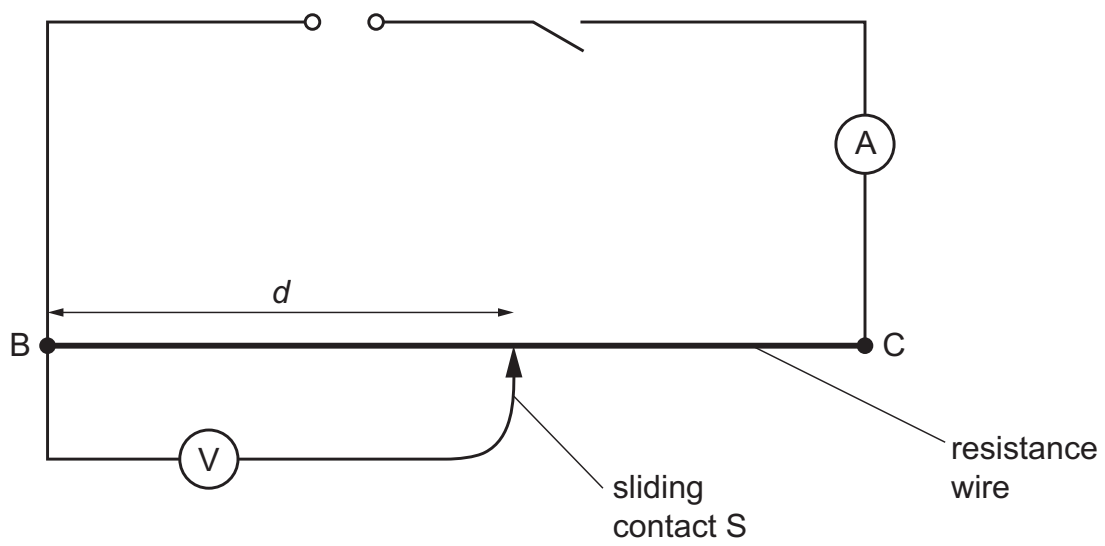

Fig. 2.1

(a) The student measures the current I in the circuit.

She places the sliding contact S at a distance d = 50.0 cm from B.

She measures the potential difference (p.d.) V_{50} across length d of the resistance wire.

Fig. 2.2 shows the ammeter and voltmeter.

(i) Record the readings on the ammeter and voltmeter. Include the units.

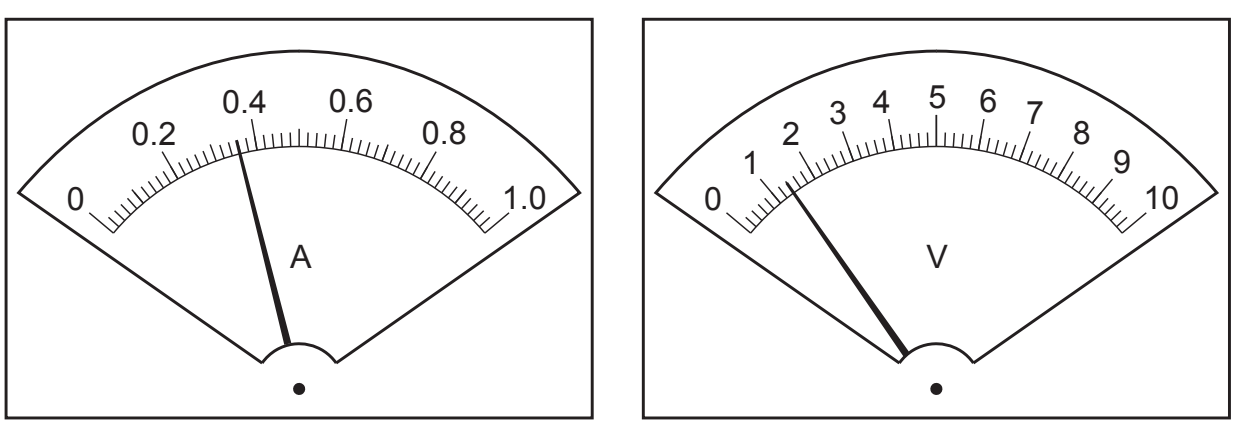

Fig. 2.2

I = ...

V_{50} = ...

[2]

(ii) Calculate the resistance R_{50} of 50.0 cm of the resistance wire using the equation

$$R_{50} = \frac{V_{50}}{I}.$$

Include the unit.

R_{50} = ... [2]

(iii) Calculate r_1, a value for the resistance per cm of the resistance wire, using the equation

$$r_1 = \frac{R_{50}}{d},$$

where d = 50.0 cm. Include the unit.

r_1 = ... [2]

(b) The student repeats the procedure in **(a)** using d = 75.0 cm and calculates r_2 using the equation

$$r_2 = \frac{R_{75}}{d}.$$

V_{75} = 2.2

R_{75} = 6.1

r_2 = 0.081

A student suggests that the resistance per cm of the resistance wire is constant.

(i) State whether your results support this suggestion and justify your statement by reference to the results.

statement .....

justification .....

.....

.....

[2]

(ii) The student plans to plot a graph of resistance R against length d to test the suggestion.

Suggest suitable additional values of length d to use.

..... [2]

(c) A variable resistor is a circuit component that can be made using a coil of resistance wire.

Draw the electrical symbol for a variable resistor.

[1]

[Total: 11]