

- 5 A student uses a circuit containing an ammeter, a voltmeter and a cell to take measurements to determine the resistance of a length of nichrome wire.

(a) (i) Define resistance.

.....
 [1]

- (ii) Draw a circuit diagram to show how the components should be connected. Use the symbol for a resistor to represent the nichrome wire.

[2]

- (b) The student also measures the length and the diameter of the wire. Table 5.1 shows the measurements recorded for each quantity.

Table 5.1

quantity	measurement
length	$(0.864 \pm 0.001)\text{m}$
diameter	$(0.496 \pm 0.002)\text{mm}$
voltmeter reading	$(1.38 \pm 0.02)\text{V}$
ammeter reading	$(0.276 \pm 0.001)\text{A}$

- (i) Show that the resistance of the wire is $5.00\,\Omega$.

[1]

- (ii) Calculate, to three significant figures, the resistivity ρ of the nichrome.

$$\rho = \dots\dots\dots \Omega \text{ m} \quad [3]$$

- (iii) Calculate the percentage uncertainty in ρ .

$$\text{percentage uncertainty} = \dots\dots\dots \% \quad [2]$$

- (iv) Determine the absolute uncertainty in ρ .

$$\text{absolute uncertainty} = \dots\dots\dots \Omega \text{ m} \quad [1]$$

[Total: 10]