2 **(a)** Define electrical *resistance*.

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.....

..... [1]

(b) A circuit is set up to measure the resistance R of a metal wire. The potential difference (p.d.) V across the wire and the current I in the wire are to be measured.

(i) Draw a circuit diagram of the apparatus that could be used to make these measurements.

[3]

(ii) Readings for p.d. V and the corresponding current I are obtained. These are shown in Fig. 2.1.

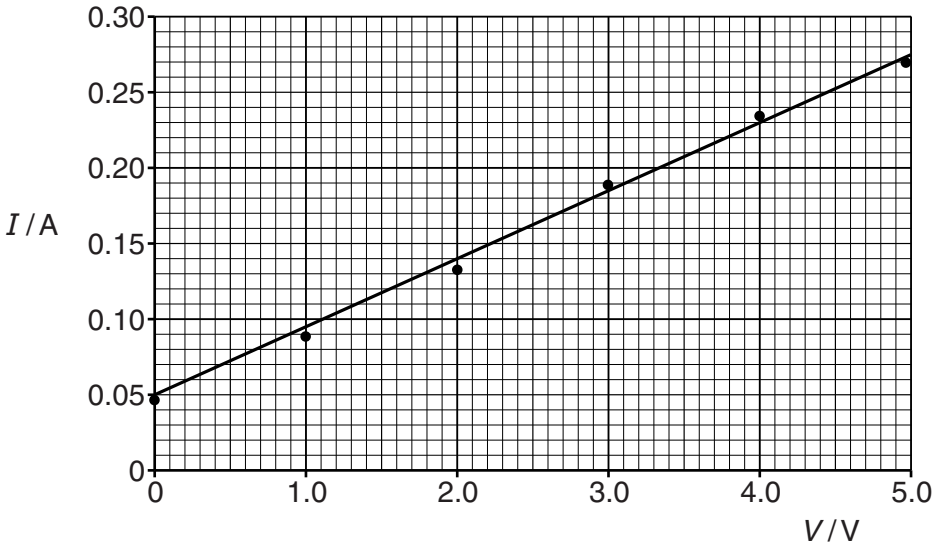

Fig. 2.1

Explain how Fig. 2.1 indicates that the readings are subject to

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1. a systematic uncertainty,

.....

..... [1]

2. random uncertainties.

.....

..... [1]

(iii) Use data from Fig. 2.1 to determine R. Explain your working.

R = ... Ω [3]

(c) In another experiment, a value of R is determined from the following data:

Current $I = 0.64 \pm 0.01$ A and p.d. $V = 6.8 \pm 0.1$ V.

Calculate the value of R, together with its uncertainty. Give your answer to an appropriate number of significant figures.

R = ... ± .....Ω [3]