6   (a) A metal wire of constant resistance is used in an electric heater.
         In order not to overload the circuit for the heater, the supply voltage to the heater is reduced from 230V to 220V.

         Determine the percentage reduction in the power output of the heater.

                                      reduction = ... % [2]

     (b) A uniform wire AB of length 100cm is connected between the terminals of a cell of e.m.f. 1.5V and negligible internal resistance, as shown in Fig. 6.1.
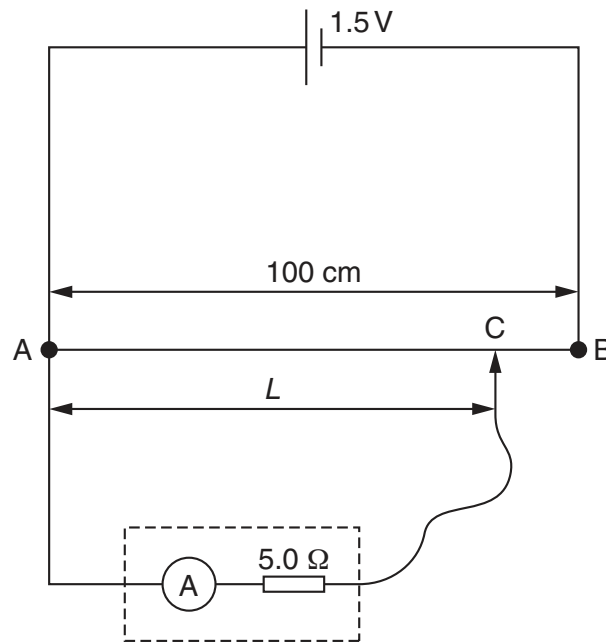

Fig. 6.1

         An ammeter of internal resistance 5.0Ω is connected to end A of the wire and to a contact C that can be moved along the wire.

         Determine the reading on the ammeter for the contact C placed

         (i) at A,

                                      reading = ... A [1]

(ii) at B.

reading = ... A [1]

(c) Using the circuit in **(b)**, the ammeter reading I is recorded for different distances L of the contact C from end A of the wire. Some data points are shown on Fig. 6.2.
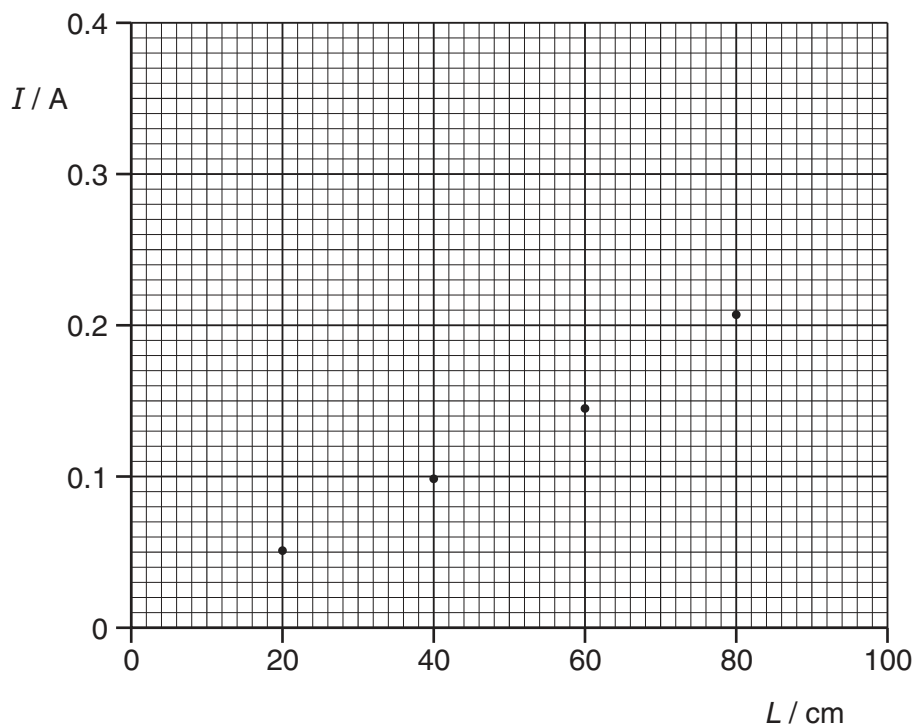

Fig. 6.2

(i) Use your answers in **(b)** to plot data points on Fig. 6.2 corresponding to the contact C placed at end A and at end B of the wire. [1]

(ii) Draw a line of best fit for all of the data points and hence determine the ammeter reading for contact C placed at the midpoint of the wire.

reading = ... A [1]

(iii) Use your answer in **(ii)** to calculate the potential difference between A and the contact C for the contact placed at the midpoint of AB.

potential difference = ... V [2]

(d) Explain why, although the contact C is at the midpoint of wire AB, the answer in **(c)(iii)** is **not** numerically equal to one half of the e.m.f. of the cell.

....

....

....[2]