

7 A nichrome resistance wire has length 150 cm, cross-sectional area $2.45 \times 10^{-7} \text{ m}^2$ and resistivity $1.12 \times 10^{-6} \Omega \text{ m}$.

(a) Calculate, to three significant figures, the resistance of the wire.

resistance = Ω [3]

(b) The nichrome wire forms part of a potentiometer circuit together with a cell of electromotive force (e.m.f.) 1.2V and negligible internal resistance, as shown in Fig. 7.1.

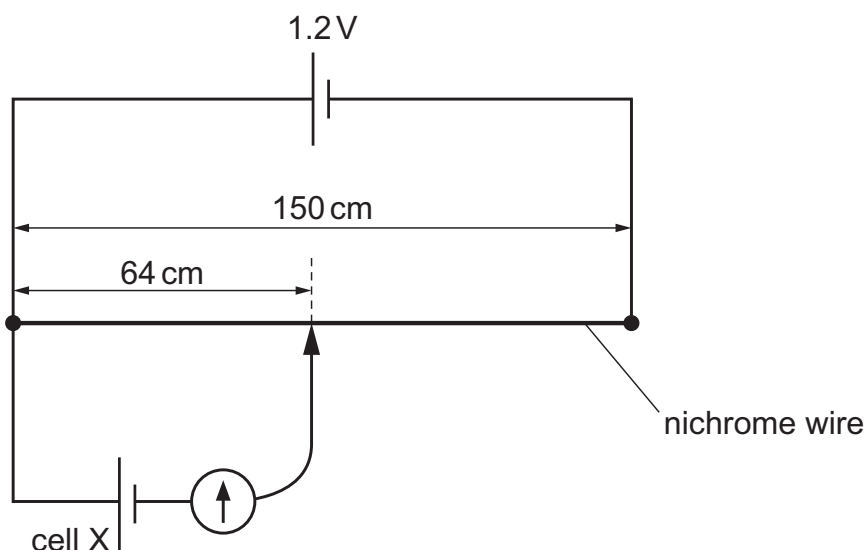


Fig. 7.1 (not to scale)

The circuit is used to determine the e.m.f. of cell X.

The galvanometer is used in a null method to find the null point 64 cm from the left-hand end of the nichrome wire.

(i) Explain what is meant by a null method.

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 [1]

(ii) Calculate the e.m.f. of cell X.

e.m.f. = V [2]

(iii) The cell of e.m.f. 1.2V is replaced by a new cell with the same e.m.f. but with an internal resistance that is **not** negligible.

State and explain the effect, if any, of the internal resistance of the new cell on the position of the null point.

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 [2]