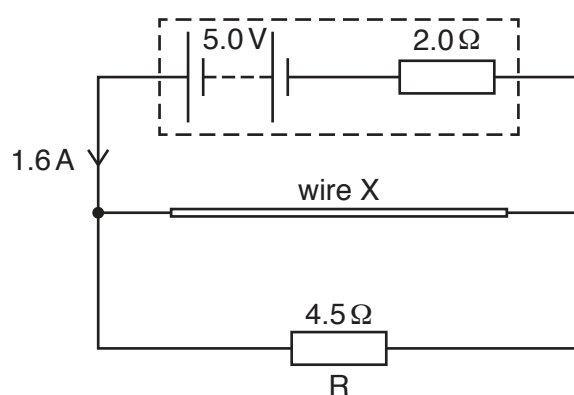6   A wire X has a constant resistance per unit length of $3.0\,\Omega\,m^{-1}$ and a diameter of 0.48 mm.

   (a) Calculate the resistivity of the metal of wire X.

resistivity = ... $\Omega\,m$ [3]

   (b) The wire X is connected into the circuit shown in Fig. 6.1.

Fig. 6.1

The battery has an electromotive force (e.m.f.) of 5.0 V and an internal resistance of $2.0\,\Omega$. The wire X and a resistor R of resistance $4.5\,\Omega$ are connected in parallel. The current in the battery is 1.6 A.

   (i) Calculate the potential difference across resistor R.

potential difference = ... V [1]

(ii) Determine, for wire X,

    1. its resistance,

resistance = ... Ω [3]

    2. its length.

length = ... m [1]

[Total: 8]

Please turn over for Question 7.