5 **(a)** Define the *ohm*.

.... [1]

(b) Determine the SI base units of **resistivity**.

base units of resistivity = ... [3]

(c) A cell of e.m.f. 2.0 V and negligible internal resistance is connected to a variable resistor R and a metal wire, as shown in Fig. 5.1.
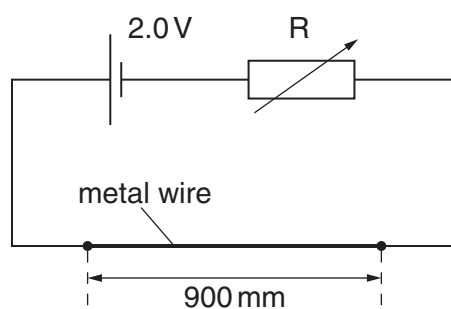

Fig. 5.1

The wire is 900 mm long and has an area of cross-section of $1.3 \times 10^{-7}\,m^2$. The resistance of the wire is $3.4\,\Omega$.

(i) Calculate the resistivity of the metal wire.

resistivity = ... [2]

(ii) The resistance of R may be varied between 0 and 1500 Ω.
Calculate the maximum potential difference (p.d.) and minimum p.d. possible across the wire.

maximum p.d. = ... V

minimum p.d. = ...V

[2]

(iii) Calculate the power transformed in the wire when the potential difference across the wire is 2.0 V.

power = ... W [2]

(d) Resistance R in **(c)** is now replaced with a different variable resistor Q. State the power transformed in Q, for Q having

(i) zero resistance,

power = ... W [1]

(ii) infinite resistance.

power = ... W [1]