1 A student set up the circuit shown in **Fig. 1.1** to determine the resistance R of a wire and hence the resistivity ρ of the metal of the wire.

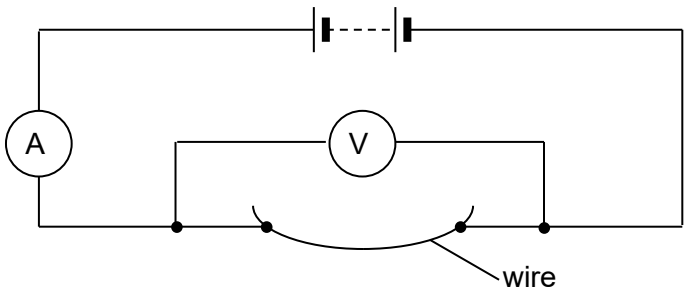

Fig. 1.1

The following readings were obtained for the experiment.

Reading of voltmeter = 1.30 ± 0.01 V

Reading of ammeter = 0.76 ± 0.01 A

Length L of wire = 75.4 ± 0.2 cm

Diameter d of wire = 0.54 ± 0.02 mm

(a) Calculate the percentage uncertainty of the resistance R from his measurements.

Percentage uncertainty = ……. % [2]

(b) The resistivity ρ of the metal of the wire is given by the expression

$$\rho = \frac{\text{Resistance of wire} \times \text{Cross - sectional area of wire}}{\text{Length of wire}}.$$

Calculate, with its actual uncertainty, the value of the resistivity ρ of the metal of the wire.

resistivity = ……. Ω m [5]

(c) A unit for resistivity is Ω m. Express this in base units.