1 **(a)** Make estimates of

(i) the mass, in kg, of a wooden metre rule,

mass = ... kg [1]

(ii) the volume, in cm^3, of a cricket ball or a tennis ball.

volume = ... cm^3 [1]

(b) A metal wire of length L has a circular cross-section of diameter d, as shown in Fig. 1.1.

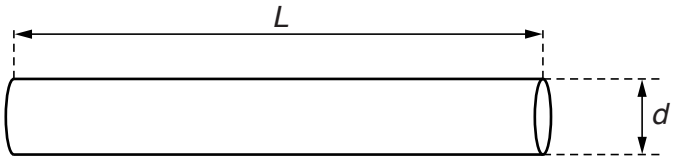

Fig. 1.1

The volume V of the wire is given by the expression

$$V = \frac{\pi d^2 L}{4}.$$

The diameter, length and mass M are measured to determine the density of the metal of the wire. The measured values are:

$d = 0.38 \pm 0.01$ mm,
$L = 25.0 \pm 0.1$ cm,
$M = 0.225 \pm 0.001$ g.

Calculate the density of the metal, with its absolute uncertainty. Give your answer to an appropriate number of significant figures.

density = ... ± ..... $kg\,m^{-3}$ [5]

[Total: 7]