1 A student determines the density of a ball.

(a) He places the ball between two wooden blocks, as seen from above in Fig. 1.1.

He takes two measurements, d_1 and d_2.

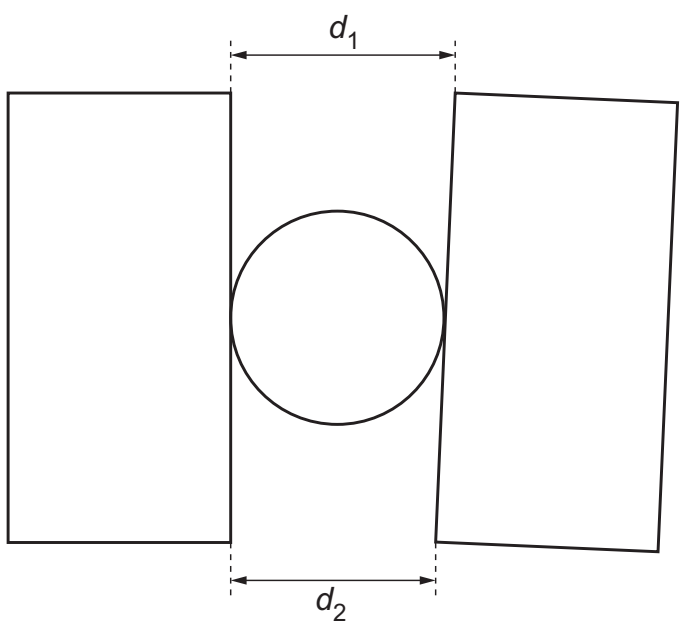

Fig. 1.1

(i) On Fig. 1.1, measure the lengths d_1 and d_2.

d_1 = ... cm

d_2 = ... cm
[1]

(ii) Using your measurements, calculate the diameter d of the ball. Show your working.

d = ... cm [1]

(iii) Explain why this method is used to measure the diameter of the ball.

.....

..... [2]

(b) Calculate the volume V of the ball using the equation $V = 0.52d^3$.

Include the unit.

V = ... [2]

(c) The student measures the mass m_D of a dish.

m_D = 102.5 g

He places the ball in the dish and measures the combined mass m_C of the dish and the ball.

Fig. 1.2 shows the dish and the ball on a balance.

Record the reading shown on the balance.

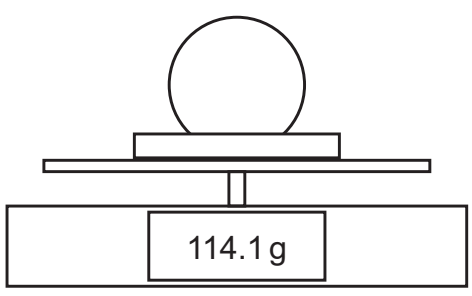

Fig. 1.2

m_C = ... g

Calculate the mass m_B of the ball. Show your working.

m_B = ... g
[2]

(d) Calculate the density ρ of the ball using the equation:

$$\rho = \frac{m_B}{V}.$$

Give your answer to a suitable number of significant figures for this experiment. Include the unit.

ρ = ... [3]

[Total: 11]