DENSITY OF A SET OF CARDS

1 The IGCSE class is determining the density of a sample of card.

Each student has a stack of ten pieces of card, as shown in Fig. 1.1.

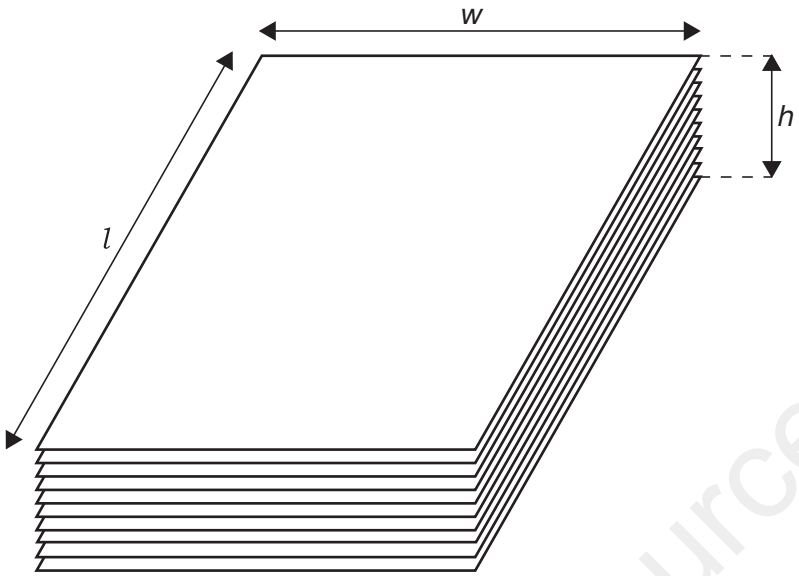

Fig. 1.1

(a) **(i)** On Fig. 1.1, measure the height h of the stack of card.

h = ... [1]

(ii) Calculate the average thickness t of one piece of card.

t = ... [2]

(b) **(i)** On Fig. 1.1, measure the length l and width w of the top piece of card.

l = ...

w = ... [1]

(ii) Calculate the volume V of one piece of card using the equation

$V = ltw$.

V = ... [2]

(c) Calculate the density d of the card using the equation

$$d = \frac{m}{V}$$

where the mass m of one piece of card is 1.3 g.

d = ... [2]

(d) A sample of corrugated card of the same length and width as the card in Fig. 1.1 consists of two thin sheets of card with an air gap in between. The sheets of card are separated by paper, as shown in the cross-section in Fig. 1.2. The thickness y of the air gap as shown in Fig. 1.2 is between 2 mm and 3 mm.

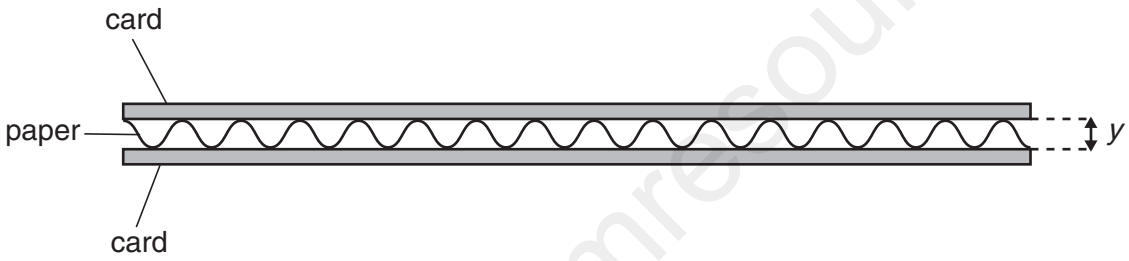

Fig. 1.2

Estimate the volume V_a of air trapped within the corrugated card shown in Fig. 1.2.

V_a = ... [1]

(a) (i) 1.6 (cm) 16 (mm) **[1]**

(ii) 0.16 (cm) 1.6 (mm) **[1]**
both in cm (or mm) **[1]**

(b) (i) 1 = 5.8 cm and w = 6.0 cm (58 mm, 60 mm) **[1]**

(ii) V = 5.568 (or 5.57) **[1]**
V in cm^3 (or mm^3) **[1]**

(c) d = 0.233 (2/3 sf) **[1]**
d in g/cm^3 (or g/mm^3) **[1]**

(d) V_a = 7/8/9/10 cm^3 **[1]**

TOTAL 9