DENSITY OF AN OBJECT

1 The IGCSE class has been asked to determine the density of an object.
One student is finding the volume of the object using a measuring cylinder containing water in which the object is to be placed.

The measuring cylinder containing only water is shown in Fig. 4.1.

The measuring cylinder after the object has been placed in the water is shown in Fig. 4.2.

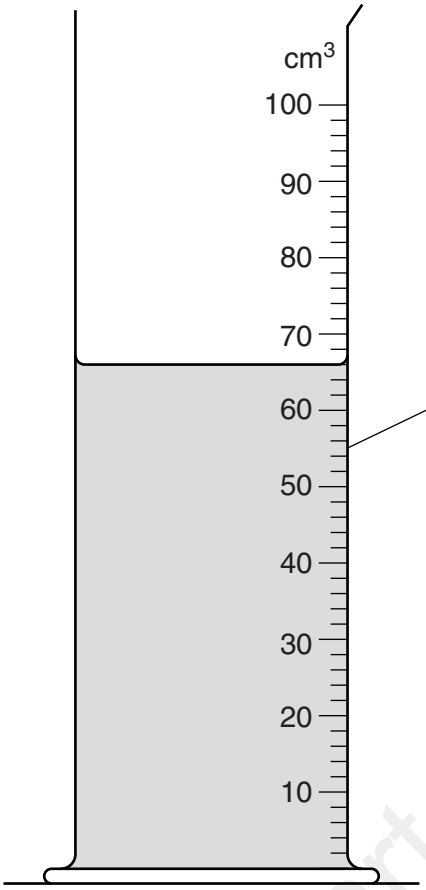

Fig. 4.1

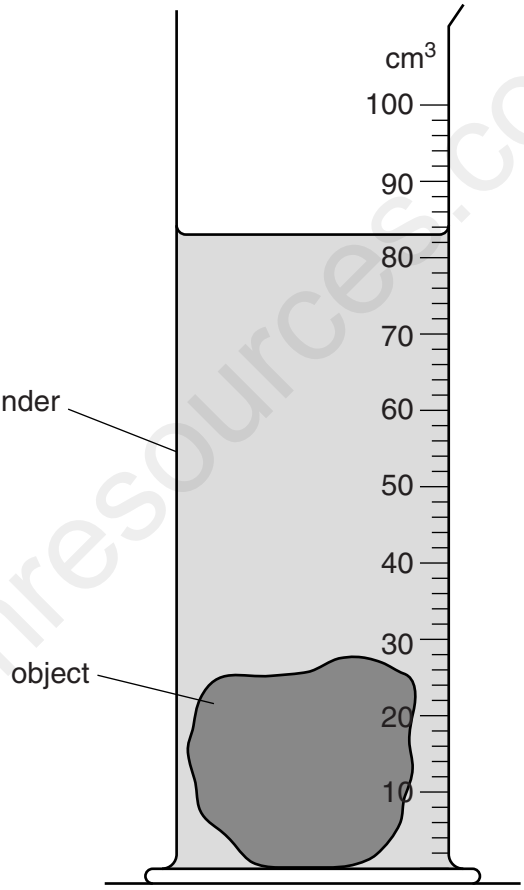

Fig. 4.2

(a) (i) Read and record the volume V_1 of the water in the measuring cylinder shown in Fig. 4.1.

V_1 = ...

(ii) Read and record the volume V_2 of the water in the measuring cylinder shown in Fig. 4.2.

V_2 = ...
[2]

(b) The student then uses a balance to measure the mass *m* of the object, as shown in Fig. 4.3.

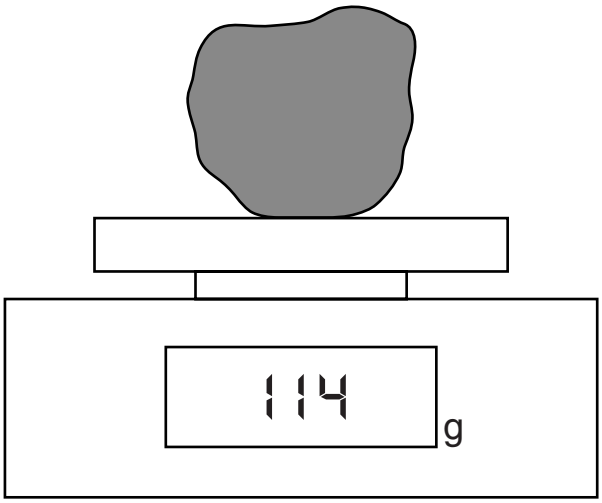

Fig. 4.3

Calculate the density of the object using the equation

$$\text{density} = \frac{m}{(V_2 - V_1)} .$$

density = ...[2]

(c) Suggest a possible practical cause of inaccuracy in this method.

.....

.....

.....[1]

[Total: 5]

(a) $V_1 = 66\,(cm^3)$ [1]
$V_2 = 83\,(cm^3)$ [1]

(b) density = 6.7 or 6.71 / allow e.c.f. [1]
unit g/cm^3 [1]

(c) suitable cause:
e.g. object not dried before measuring mass
mass measured after immersion
measuring cylinder not read at eye-level / parallax explained
measuring cylinder not read at meniscus (o.w.t.t.e.)
zero reading on balance not allowed for [1]

[Total: 5]