Q1.

Some students measure the volume of a lump of modelling clay using a measuring jug, as shown in Figure 5.
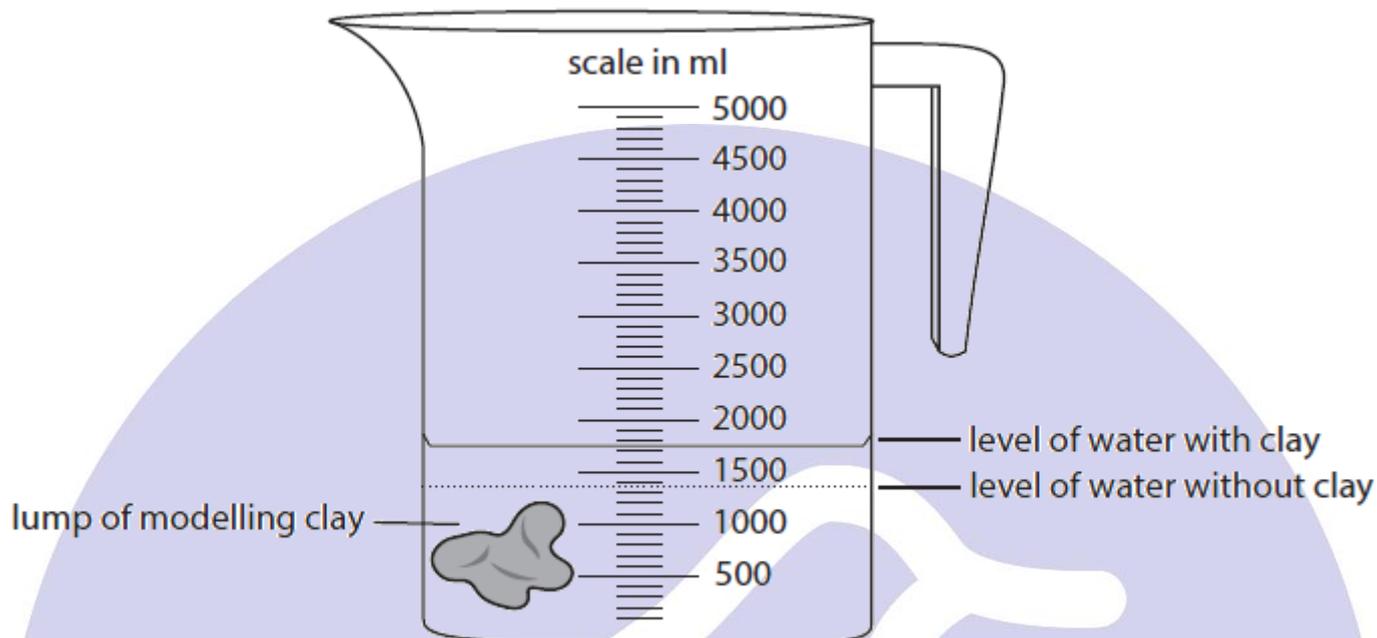

Figure 5

Using Figure 5, estimate the volume of the modelling clay in cm^3.

You may assume that 1 litre = 1000 cm^3.

(2)

volume = ... cm^3

(Total for question = 2 marks)

Q2.

Answer the question with a cross in the box you think is correct ⊠. If you change your mind about an answer, put a line through the box ⊠ and then mark your new answer with a cross ⊠.

A student determines the density of a liquid.

The student puts an empty measuring cylinder on a balance (Figure 5a).
The student then adds liquid to the measuring cylinder (Figure 5b).

Figure 5a   Figure 5b
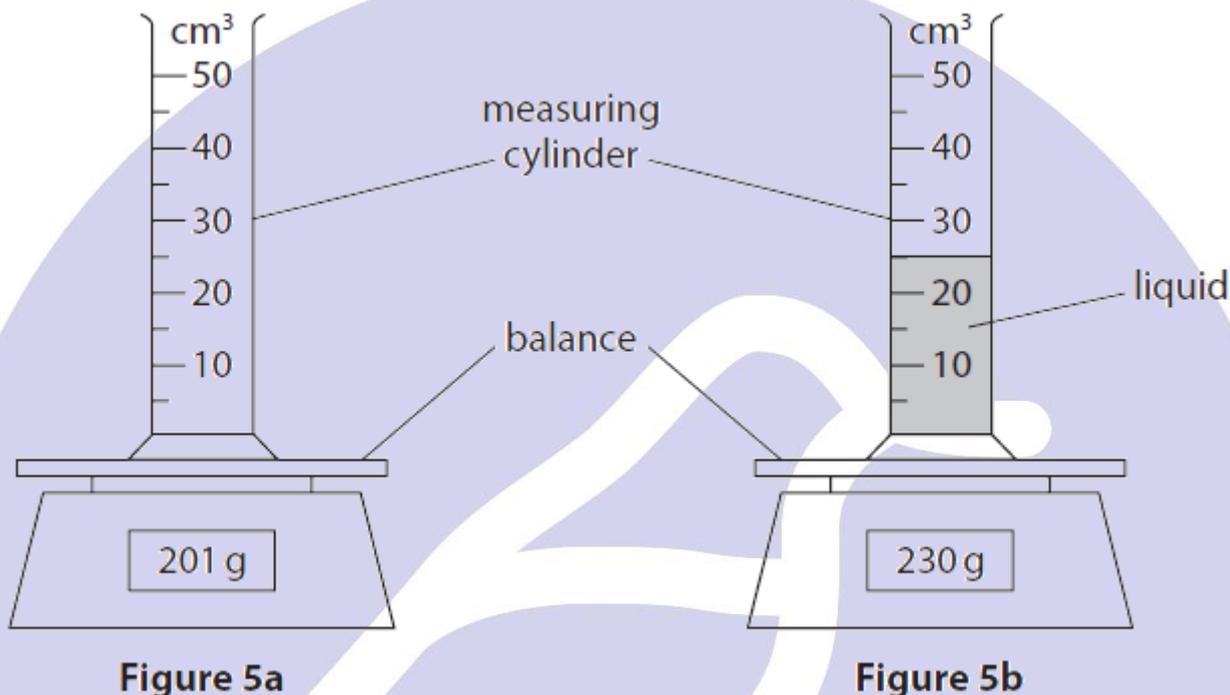
Calculate the mass of liquid added and the volume of liquid added.

Use the information in Figures 5a and 5b.

(i)   mass of liquid added = ... g

(1)

(ii)   volume of liquid added = ... cm³

(1)

(iii)   Which equation should the student use to calculate the density of the liquid?

(1)

    ⊠ **A** density = mass + volume

    ⊠ **B** density = mass − volume

    ⊠ **C** density = mass × volume

    ⊠ **D** density = $\dfrac{\text{mass}}{\text{volume}}$

(iv) State **two** improvements the student could make to this investigation.

(2)

1 ....

....

2 ....

....

(Total for question = 5 marks)

Q3.

Figure 11 shows some water in a measuring cylinder and a lump of iron.

cm³

—1000
900
800
700
600
500
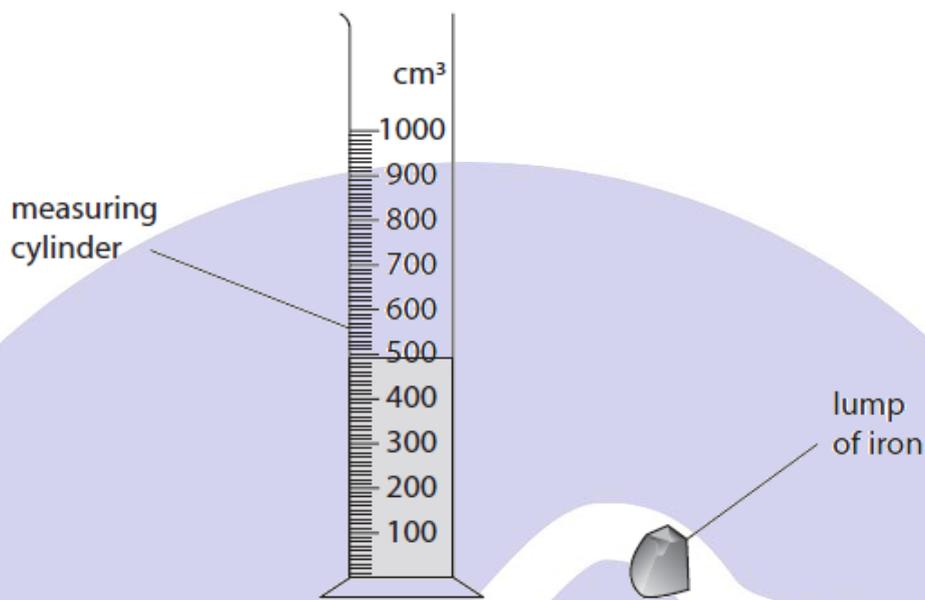400
300
200
100

measuring cylinder

lump of iron

Figure 11

The lump of iron is lowered fully into the water.

The water level in the measuring cylinder rises to 530 cm³.

The density of iron is 7.9 g / cm³.

To find the mass of the lump of iron.

You would use the equation

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

A piece of wood has a similar shape and volume to the lump of iron.

The density of the wood is 0.82 g / cm³.

The density of water is 1.00 g / cm³

Explain why the method used for the lump of iron cannot be used to determine the mass of the piece of wood.

(2)

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(Total for question = 2 marks)

Q4.

A student determines the volume of a piece of metal by measuring the volume of water that it displaces.

The student wrote the following in his notebook.

> I put some water into a measuring cylinder.
> I put the piece of metal into the water in the measuring cylinder.
> I took the reading of the new water level in the measuring cylinder.
> This was the volume of the piece of metal.

The student's description is incomplete.

Suggest **two** sentences that the student could have included to provide a more complete description of the correct procedure.

(2)

1 ....

....

2 ....

....

(Total for question = 2 marks)

Q5.

A student investigates the density of a copper block and the density of a small stone, as shown in Figure 2.
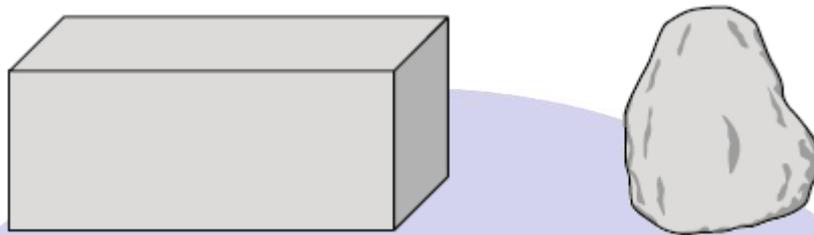
Figure 2

The student found the volume of the copper block by multiplying the area of its base by its height.

The small stone does not have straight sides.

Describe how the student could measure the volume of the small stone. You may use a diagram if it helps your answer.

(3)

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(Total for question = 3 marks)

Q6.

Figure 9 shows a small piece of copper about 3 cm high.

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Figure 9

A student wants to determine the density of copper.

The student uses a balance to measure the mass of the piece of copper.

(i)   Explain how the student could measure the volume of the piece of copper.

(3)

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(Total for question = 3 marks)

Q7.

A student measures the density of glass.

The student has

− a bag of marbles, all made from the same type of glass

− a weighing balance

− a plastic measuring cylinder containing water

Describe how the student could find, as accurately as possible, the density of the glass used for the marbles.

(4)

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....

(Total for question = 4 marks)

Q8.

* A student has two metal strips and a ruler, as shown in Figure 15.

A teacher tells the student that

- one metal strip is made of aluminium
- the other metal strip is made of stainless steel.

The student looks up data in a reference book, finding some density values:

density of aluminium = 2710 kg / m^3

density of stainless steel = 7850 kg / m^3

The student has access to more of the same metal strips, if needed, and may ask for any extra measuring devices.
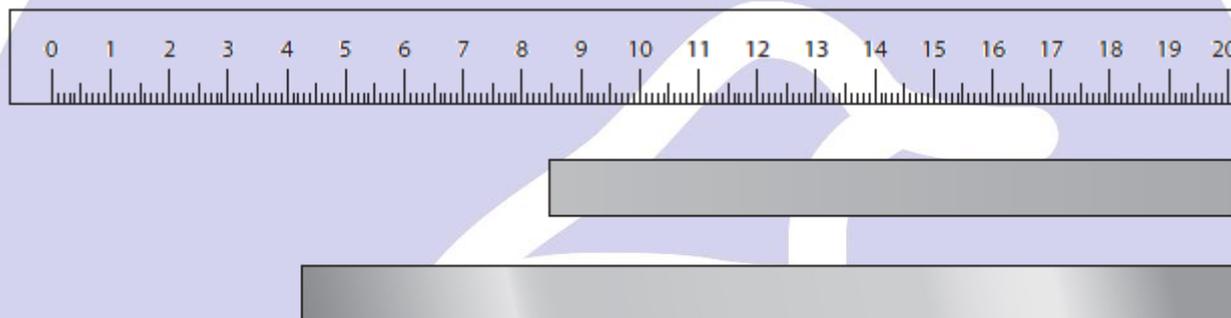

Figure 15

Plan how the student could confirm the teacher's statements, by determining the density of each of the strips as accurately as possible.

(6)

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(Total for question = 6 marks)