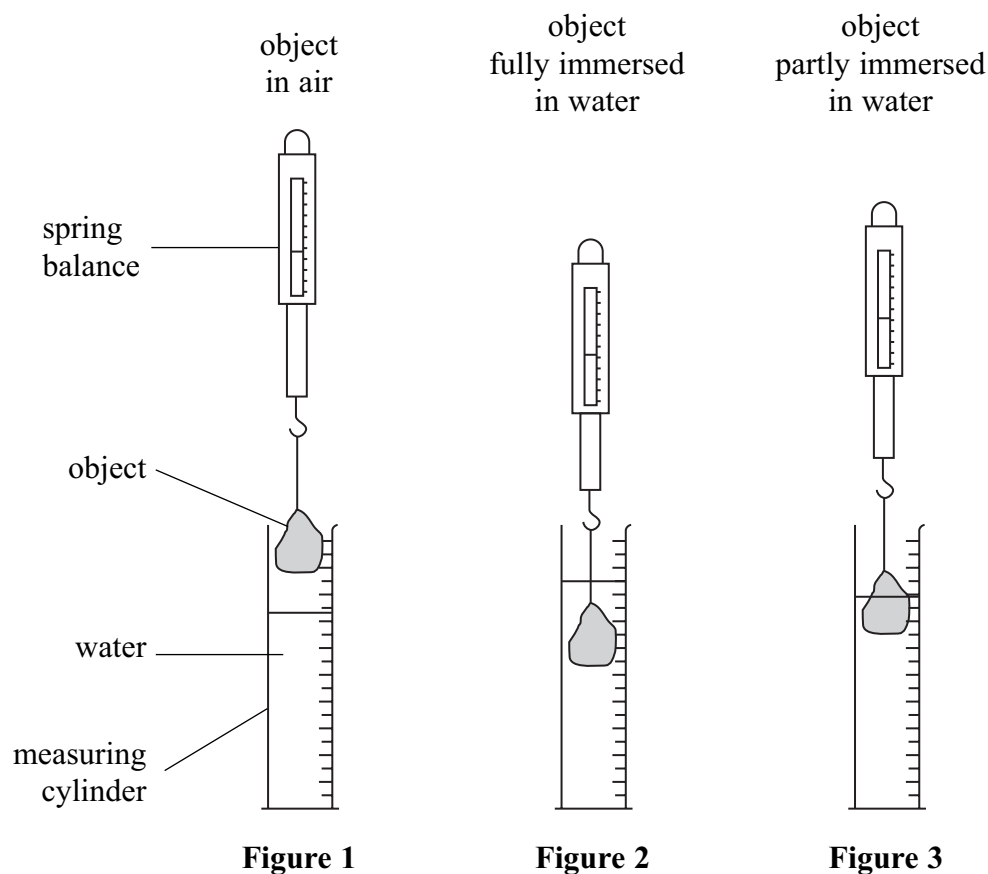


2. A teacher sets up a demonstration and takes readings of mass and volume for an irregularly-shaped solid object.

The object is attached to a spring balance. A 100 cm³ measuring cylinder is partly filled with water.

Figures 1, 2 and 3 show the object in air, fully immersed in water and partly immersed in water.



The table shows the readings of the spring balance and the measuring cylinder. The spring balance is calibrated in grams.

	Figure 1	Figure 2	Figure 3
Mass in g (spring balance)	68	56	62
Volume in cm ³ (measuring cylinder)	73	85	79



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- (a) (i) From which Figure, 1, 2 or 3, would you take a reading to find the mass of the object?

Figure
(1)

- (ii) Explain your answer.

.....
.....
(1)

- (iii) State the mass in g of the object.

Mass = g
(1)

- (b) (i) From which two figures would you take readings to find the volume of the object?

Figures and
(1)

- (ii) Explain your answer.

.....
.....
.....
(1)

- (iii) Calculate the volume in cm^3 of the object.

Volume = cm^3
(2)



(c) (i) $\text{density} = \frac{\text{mass}}{\text{volume}}$

Calculate the density in g/cm^3 of the object. Give your answer to an appropriate number of significant figures.

.....
.....
.....

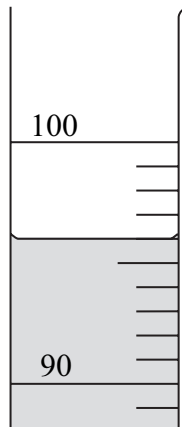
Density = g/cm^3
(3)

(ii) Justify the number of significant figures for your calculated value of density.

.....
.....

(1)

(d) The diagram shows a 100 cm^3 measuring cylinder with a different quantity of water. Explain why it would not be possible to use it to find the volume of the object.



.....
.....
.....
.....

(2)



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- (e) (i) A regularly-shaped solid object is shown below. Briefly describe a different way to find its volume.



.....
.....
.....

(2)

- (ii) Name the piece of equipment that would be needed.

.....

(1)

Q2

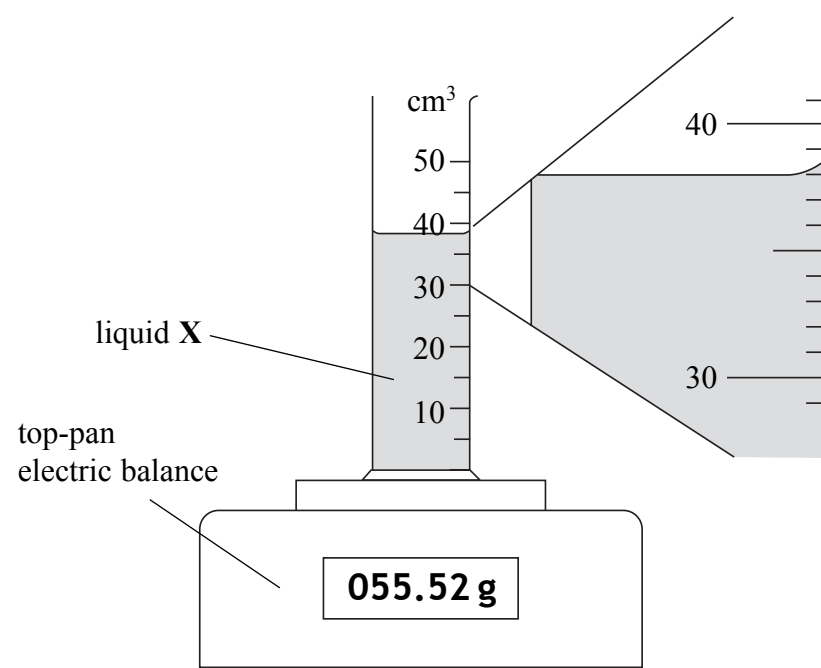
(Total 16 marks)



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2. (a) A student investigates a liquid X.
She adds some of the liquid to a container and then puts the container on a top-pan electric balance.



- (i) Name the container.

..... (1)

- (ii) What is the volume, to the nearest cm³, of liquid X?

Volume = cm³
(1)

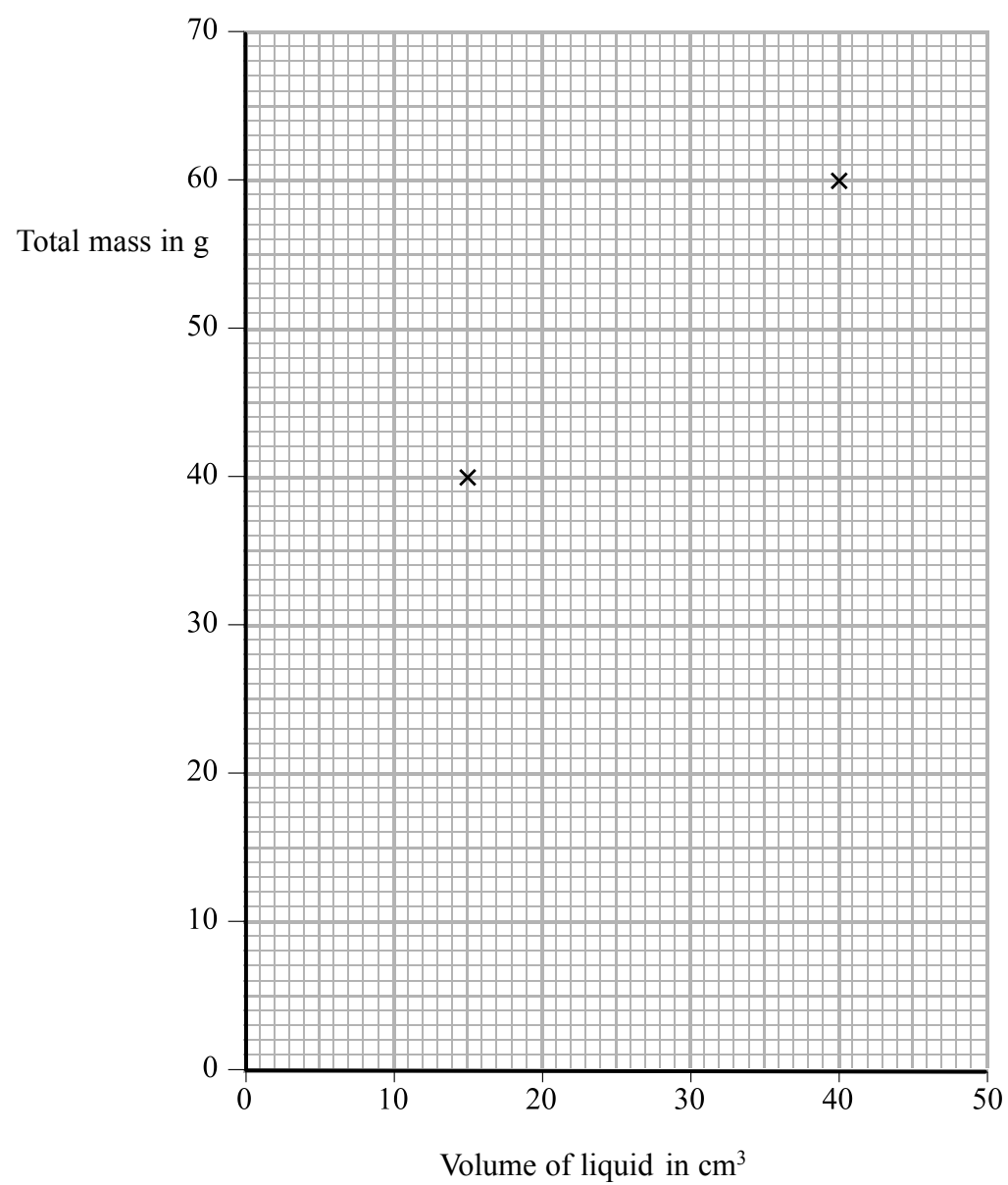
- (iii) What is the reading, to the nearest gram, on the top-pan electric balance?

Reading = g
(1)

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- (b) Another student carries out a similar investigation but he uses liquid Y.
He records two results for volume and total mass.
He plots these results on a graph.



- (i) Draw a straight line through the points.
Use the line to find the mass, in grams, of the empty container.

Mass of container = g
(2)

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(ii) In this investigation the density of liquid Y is given by the equation

$$\text{density in g/cm}^3 = \text{slope of the graph}$$

Use the graph to calculate the density of liquid Y.

.....

.....

$$\text{density} = \text{..... g/cm}^3$$

(2)

(iii) Explain the advantages of taking more than two results.

.....

.....

.....

.....

.....

.....

(3)

Q2

(Total 10 marks)