Cambridge Assessment International Education

Cambridge™ IGCSE

Chapter 01: Making Measurements

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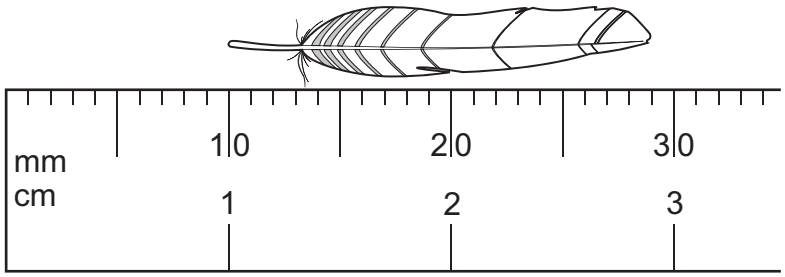
28.09.2024

0625/11 May/June 2024

1 The diagram shows an enlarged drawing of the end of a metre ruler. It is being used to measure the length of a small feather.

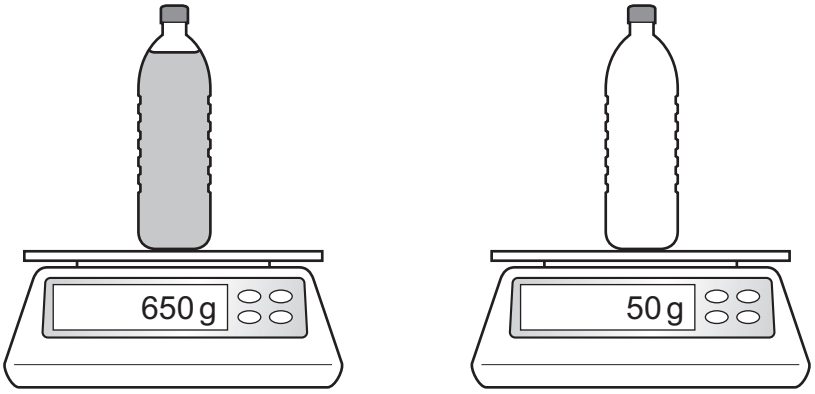


What is the length of the feather?

A 19 mm **B** 29 mm **C** 19 cm **D** 29 cm

Answer: A

3 A plastic bottle contains 750 cm^3 of oil. The diagram shows the mass of the bottle being measured when it is full and then when it is empty.



What is the density of the oil?

A 0.80 g / cm^3 **B** 0.93 g / cm^3 **C** 1.1 g / cm^3 **D** 1.3 g / cm^3

Answer: A

0625/12 May/June 2024

1 Four athletes run twice around a track. The table shows their times at the end of each lap.

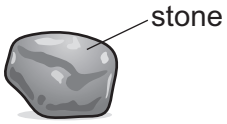
Which athlete runs the second lap the fastest?

	time at end of first lap / s	time at end of second lap / s
A	22.99	47.04
B	23.04	47.00
C	23.16	47.18
D	23.39	47.24

Answer: D

0625/13 May/June 2024

1 A student wishes to find the volume of a small, irregularly shaped stone.



A ruler and a measuring cylinder containing some water are available.

Which apparatus is needed?

A neither the ruler nor the measuring cylinder

B the measuring cylinder only

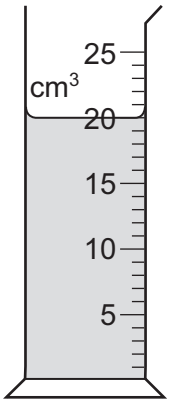
C the ruler and the measuring cylinder

D the ruler only

Answer: B

5 The diagram shows some liquid in a measuring cylinder.

The mass of the liquid is 16 g.



What is the density of the liquid?

A $0.80\,g/cm^3$ **B** $1.3\,g/cm^3$ **C** $36\,g/cm^3$ **D** $320\,g/cm^3$

Answer: A

0625/21 May/June 2024

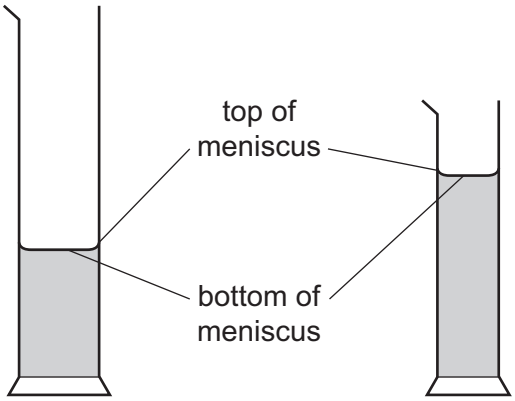
1 In which row are quantities correctly categorised into scalar quantities and vector quantities?

	scalar quantities	vector quantities
A	mass and energy	weight and acceleration
B	gravitational field strength and time	force and electric field strength
C	speed and momentum	distance and force
D	distance and energy	velocity and temperature

Answer: A

0625/22 May/June 2024

1 A student wishes to measure accurately the volume of approximately 40 cm^3 of water. She has two measuring cylinders, a larger one that can hold 100 cm^3, and a smaller one that can hold 50 cm^3. The water forms a meniscus where it touches the glass.



Which cylinder and which water level does the student use to ensure an accurate result?

	cylinder	water level
A	larger one	bottom of meniscus
B	larger one	top of meniscus
C	smaller one	bottom of meniscus
D	smaller one	top of meniscus

Answer: C

4 A sealed container of volume 2000 cm^3 contains air at high pressure.

The container is placed on a top-pan balance.

The balance reads 200.00 g.

All the air is removed by a vacuum pump and the balance reading changes to 196.00 g.

What was the density of the pressurised air?

A 0.00200 g/cm^3

B 0.098 g/cm^3

C 4.00 g/cm^3

D 10.2 g/cm^3

Answer: A

0625/23 May/June 2024

1 A student measures the volume of a small, irregularly shaped stone.

Which apparatus must be used?

A a ruler and a measuring cylinder containing water

B a measuring cylinder containing water only

C a ruler and an empty measuring cylinder

D a ruler only

Answer: B

2 Which quantity is a vector?

A electric field strength

B energy

C mass

D temperature

Answer: A

0625/11 October/November 2023

1 In order to determine the period of a pendulum, a student times one complete swing of the pendulum using an analogue stop-watch with a second hand.

Which change of method produces the greatest improvement in accuracy?

A asking a friend with a shorter reaction time to take the measurement

B measuring the time for 100 swings of the pendulum and dividing it by 100

C measuring the time for a half swing of the pendulum and doubling it

D using a digital timer

Answer: B

0625/12 October/November 2023

1 A student investigates the oscillation of a mass suspended from a spring.

The student pulls the mass down from its rest position P and then releases it so that it oscillates vertically.

The student then follows the instructions listed to find the period of the oscillating mass.

1 Count 10 complete oscillations.

2 Divide the time on the stop-watch by 10.

3 Start the stop-watch as the mass passes upwards through point P.

4 Stop the stop-watch.

What is the correct order of these instructions?

A $1 \rightarrow 3 \rightarrow 4 \rightarrow 2$

B $3 \rightarrow 1 \rightarrow 4 \rightarrow 2$

C $3 \rightarrow 4 \rightarrow 1 \rightarrow 2$

D $4 \rightarrow 3 \rightarrow 2 \rightarrow 1$

Answer: B

5 Which equation is correct?

A density = mass × volume

B density = weight × volume

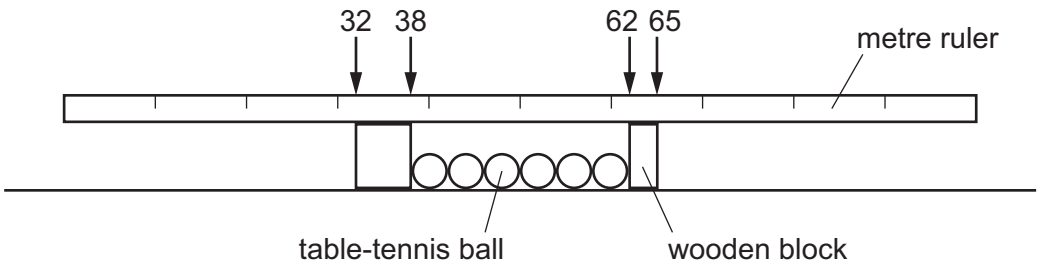
C mass = density × volume

D weight = density × volume

Answer: C

0625/13 October/November 2023

1 A student uses a metre ruler to measure the length of six identical table-tennis balls placed between two wooden blocks.



What is the diameter of one ball?

A 4 cm **B** 5 cm **C** 6 cm **D** 8 cm

Answer: A

0625/21 October/November 2023

1 Which is a vector quantity?

A density

B mass

C pressure

D weight

Answer: D

4 The table shows the mass and volume of three different liquids, X, Y and Z.

liquid	mass / g	volume / cm^3
X	120	200
Y	80	67
Z	100	120

The liquids are placed in the same container. The liquids do not mix.

Which liquid is at the top of the container and which liquid is at the bottom?

	liquid at top	liquid at bottom
A	X	Y
B	X	Z
C	Y	X
D	Y	Z

Answer: A

0625/22 October/November 2023

1 Which quantity is a scalar quantity?

A acceleration

B force

C time

D velocity

Answer: C

4 A plastic ball has a mass of 4.0 g and a volume of 20 cm^3.

There is a crack in the ball's surface.

The ball is placed in a bath of water. Water leaks into the ball without changing the volume of the ball and eventually the ball sinks.

The density of water = 1.0 g / cm^3.

Which mass of water has entered the ball when the top of the ball is first level with the water surface?

A 5.0 g **B** 16 g **C** 20 g **D** 24 g

Answer: B

0625/23 October/November 2023

1 How many of the quantities shown are scalars?

mass momentum density energy

A 1 **B** 2 **C** 3 **D** 4

Answer: C

0625/11 May/June 2023

1 Which unit is a unit of weight?

A kilogram

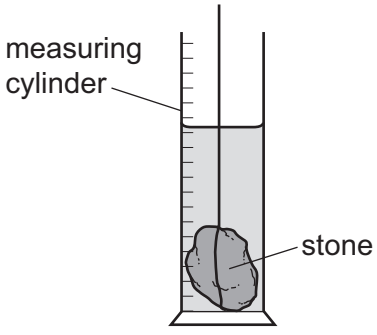
B kilojoule

C kilometre

D kilonewton

Answer: D

6 A student determines the density of an irregularly shaped stone. The stone is slowly lowered into a measuring cylinder partly filled with water.



Which other apparatus does the student need to calculate the density of the irregularly shaped stone?

A a balance

B a thermometer

C a metre rule

D a stop-watch

Answer: A

0625/12 May/June 2023

1 Which single apparatus is used to find the volume of a solid cube and which single apparatus is used to find the volume of a quantity of liquid?

	volume of solid cube	volume of liquid
A	balance	balance
B	balance	measuring cylinder
C	ruler	balance
D	ruler	measuring cylinder

Answer: D

5 Which two quantities must be known to determine the density of a material?

A mass and area

B mass and volume

C weight and area

D weight and volume

Answer: B

0625/13 May/June 2023

1 Which piece of apparatus is used to measure the length of a copper rod of length approximately 2 cm?

A digital timer

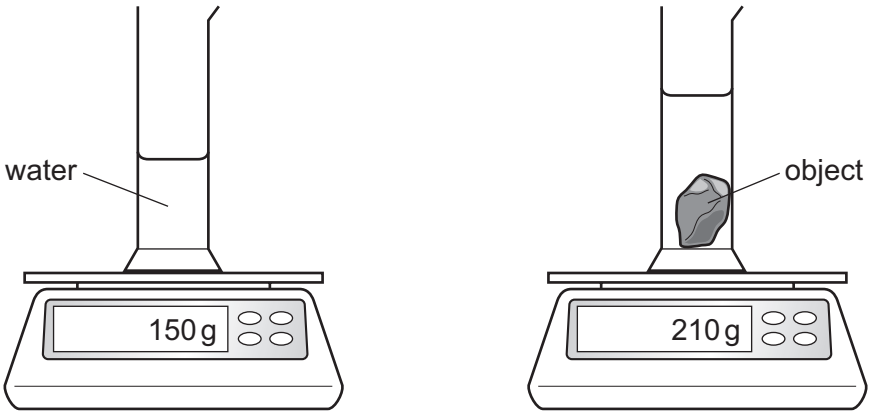
B measuring cylinder

C ruler

D balance

Answer: C

5 A measuring cylinder containing 50 cm^3 of water is put on a balance.



A solid object is put in the cylinder and the water level rises to 75 cm^3.

What is the density of the object?

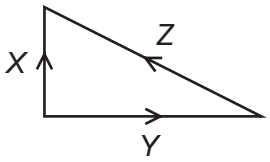
A 0.80 g / cm^3 **B** 2.4 g / cm^3 **C** 2.8 g / cm^3 **D** 8.4 g / cm^3

Answer: B

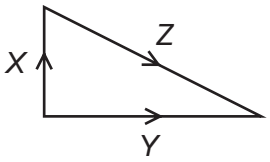
0625/21 May/June 2023

1 Which vector diagram correctly shows the force *Z* as the resultant of forces *X* and *Y*?

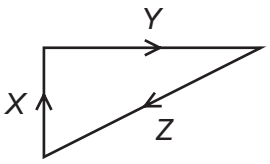
A



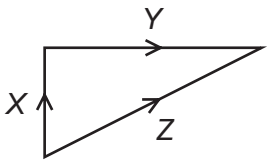
B



C

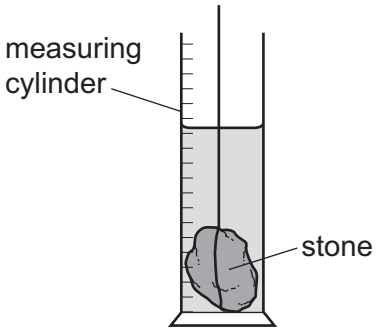


D



Answer: D

6 A student determines the density of an irregularly shaped stone. The stone is slowly lowered into a measuring cylinder partly filled with water.



Which other apparatus does the student need to calculate the density of the irregularly shaped stone?

A a balance

B a thermometer

C a metre rule

D a stop-watch

Answer: A

0625/11 October/November 2022

1 The times for 10 swings of a pendulum are measured.

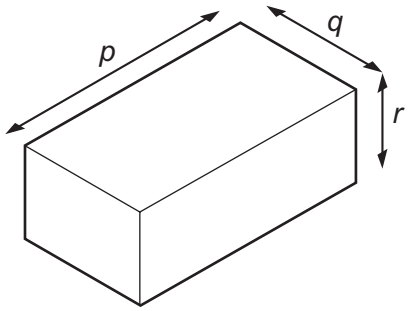
measurement	time for 10 swings / s
1	10.12
2	10.48
3	10.24

What is the average time for **one** swing?

A 1.028 s **B** 1.036 s **C** 1.042 s **D** 10.28 s

Answer: A

4 The diagram shows the dimensions of a solid rectangular block of metal of mass *m*.



Which expression is used to calculate the density of the metal?

A $\frac{m}{(p \times q)}$

B $\frac{m}{(p \times q \times r)}$

C $m \times p \times q$

D $m \times p \times q \times r$

Answer: B

0625/12 October/November 2022

1 Which measuring instrument can be used to find the volume of a small stone?

A measuring cylinder partly filled with water

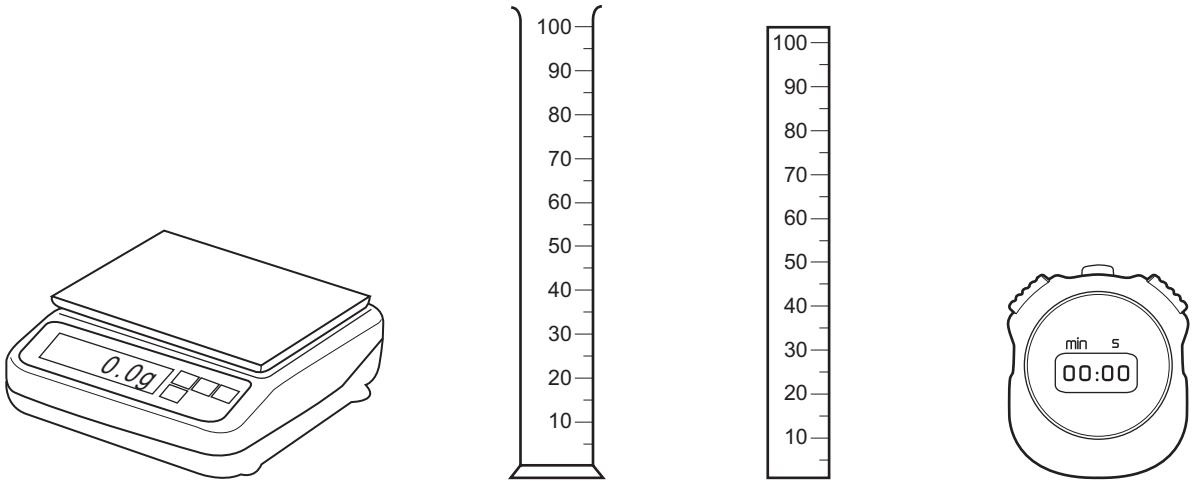
B measuring tape

C metre rule

D protractor

Answer: A

4 The diagram shows four pieces of laboratory apparatus.



balance | measuring cylinder | ruler | stop-watch

Which pieces of apparatus are used to find the density of a liquid?

A balance and stop-watch

B balance and measuring cylinder

C measuring cylinder and ruler

D stop-watch and ruler

Answer: B

0625/13 October/November 2022

1 A student uses a ruler to measure the length of a spring.

His results are shown.

14.9 cm 14.8 cm 14.8 cm 14.7 cm

What is the average length of the spring to three significant figures?

A 14.8 cm **B** 14.9 cm **C** 15.0 cm **D** 15 cm

Answer: A

0625/21 October/November 2022

1 Which measuring instrument is used to measure the diameter of a thin metal wire?

A 30 cm rule

B measuring tape

C metre rule

D micrometre screw gauge

Answer: D

0625/22 October/November 2022

1 Which measuring devices are most suitable to determine the volume of about 200 ml of liquid and the diameter of a thin wire?

	volume of about 200 ml of liquid	diameter of a thin wire
A	measuring cylinder	micrometer screw gauge
B	measuring cylinder	ruler
C	ruler	measuring cylinder
D	ruler	micrometer screw gauge

Answer: A

0625/22 October/November 2022

1 A wire is approximately 48 cm long and has an approximate diameter of 0.3 mm.

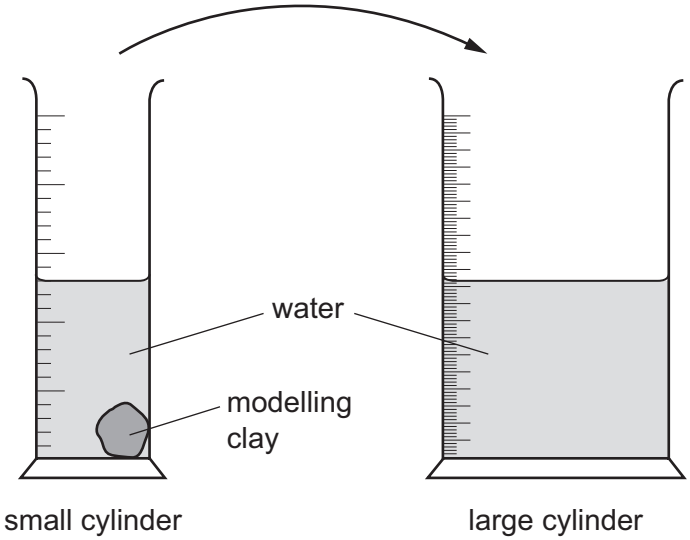
Which measuring instruments can be used to obtain more precise values of the dimensions of the wire?

	length of the wire	diameter of the wire
A	30 cm ruler	micrometer
B	half-metre rule	30 cm rule
C	half-metre rule	micrometer
D	micrometer	half-metre rule

Answer: C

0625/11 May/June 2022

1 A lump of modelling clay is moved from a small measuring cylinder to a large measuring cylinder that has twice the diameter.



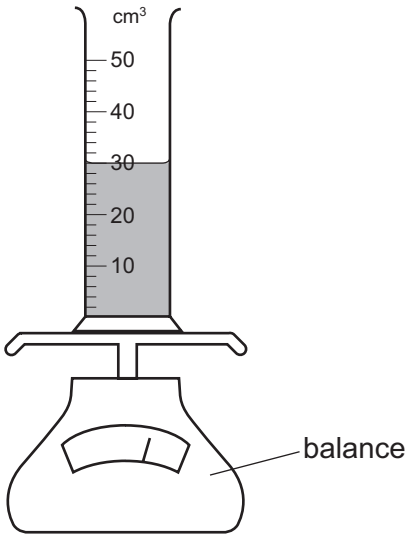
The reading on the small measuring cylinder goes down by 20 cm^3.

By how much does the reading on the large cylinder go up?

A 10 cm^3 **B** 20 cm^3 **C** 40 cm^3 **D** 80 cm^3

Answer: B

5 A measuring cylinder contains 30 cm^3 of a liquid.



Some more of the liquid is added until the liquid level reaches the 50 cm^3 mark.

The reading on the balance increases by 30 g.

What is the density of the liquid?

A 0.60 g / cm^3 **B** 0.67 g / cm^3 **C** 1.5 g / cm^3 **D** 1.7 g / cm^3

Answer: C

0625/21 May/June 2022

1 Which measuring devices are most suitable for determining the length of a swimming pool and the thickness of aluminium foil?

	length of a swimming pool	thickness of aluminium foil
A	ruler	measuring cylinder
B	tape measure	micrometer screw gauge
C	tape measure	ruler
D	ruler	micrometer screw gauge

Answer: B

0625/22 May/June 2022

1 Very small values of which quantity are measured using a micrometer screw gauge?

A time

B pressure

C moment

D distance

Answer: D

0625/23 May/June 2022

1 What is a micrometer screw gauge used to measure?

A very small currents

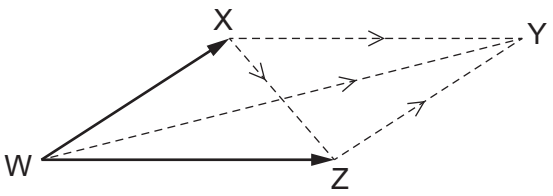
B very small distances

C very small forces

D very small pressures

Answer: B

8 Two vectors, WX and WZ, are as shown.



What is the resultant of the vectors?

A WY **B** XY **C** XZ **D** ZY

Answer: B

0625/11 October/November 2021

1 A student measures the volume of a quantity of water.

Which apparatus is suitable?

A a balance

B a measuring cylinder

C a ruler

D a thermometer

Answer: B

0625/12 October/November 2021

1 Which list places units of length in increasing order of magnitude (size)?

A cm → mm → m

B mm → cm → m

C mm → m → cm

D m → mm → cm

Answer: B

4 Which substance in the table has the lowest density?

	substance	mass / g	volume / cm^3
A	nylon	1.2	1.0
B	cotton	1.5	1.0
C	olive oil	1.8	2.0
D	water	2.0	2.0

Answer: C

0625/13 October/November 2021

1 A teacher asks a student to measure the volume of a pencil sharpener.

Which piece of apparatus would **not** be useful?

A beaker

B displacement can

C balance

D measuring cylinder

Answer: C

0625/21 October/November 2021

1 Which instrument is most suitable for measuring the thickness of a single sheet of paper?

A 15 cm rule

B balance

C metre rule

D micrometer screw gauge

Answer: D

0625/22 October/November 2021

1 A student is taking some measurements.

Which measurement is taken directly using a micrometer screw gauge?

A $0.52\,g/mm^2$ **B** $0.52\,g/mm^3$ **C** $0.52\,mm$ **D** $0.52\,mm^2$

Answer: C

0625/23 October/November 2021

1 For which purpose is a micrometer screw gauge suitable?

A measuring the current in a coil that is known to be about 3×10^{-6} A

B measuring the diameter of a ball bearing that is known to be about 3×10^{-3} m

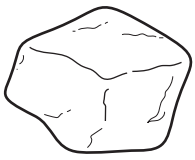
C measuring the mass of a grain of sand that is known to be about 3×10^{-3} g

D measuring the moment used to turn a screw that is known to be about 3×10^{-6} N m

Answer: B

0625/11 May/June 2021

1 The diagram shows a stone of irregular shape.



Which property of the stone can be found by lowering it into a measuring cylinder half-filled with water?

A length

B mass

C volume

D weight

Answer: C

6 The mass of an empty flask is 34 g.

The volume of liquid added to the flask is 20 cm^3.

The total mass of the flask and the liquid is 50 g.

What is the density of the liquid?

A 0.80 g / cm^3 **B** 1.25 g / cm^3 **C** 2.50 g / cm^3 **D** 4.20 g / cm^3

Answer: A

0625/12 May/June 2021

1 Which piece of apparatus is the most suitable for measuring the mass of a pencil sharpener?

A digital balance

B measuring cylinder

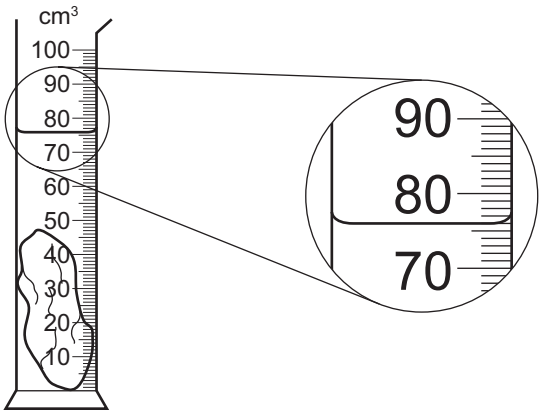
C newton meter

D ruler

Answer: A

6 A measuring cylinder contains 40 cm^3 of water.

A stone of mass 94 g is lowered into the water so that it is fully submerged as shown.



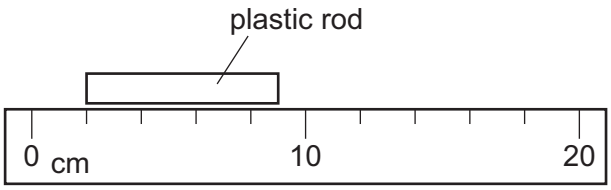
What is the density of the stone?

A 1.1 g / cm^3 **B** 1.2 g / cm^3 **C** 2.1 g / cm^3 **D** 2.6 g / cm^3

Answer: D

0625/13 May/June 2021

1 The diagram shows a plastic rod alongside a ruler.



What is the length of the rod?

A 2.5 cm **B** 3.5 cm **C** 7.0 cm **D** 9.0 cm

Answer: C

2 A student places six 100 g masses in a stack, as shown in Fig. 2.1.

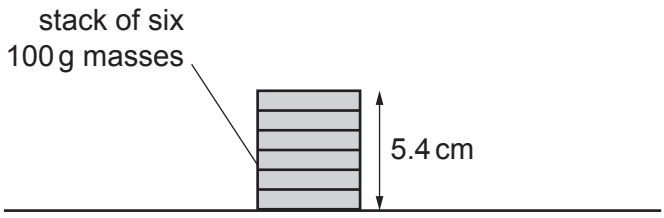


Fig. 2.1 (not to scale)

(a) The height of the stack of masses is 5.4 cm.

Calculate the average thickness of **one** mass.

average thickness of **one** mass = ... cm [2]

(b) Fig. 2.2 shows the masses, a measuring cylinder and a beaker containing some water.

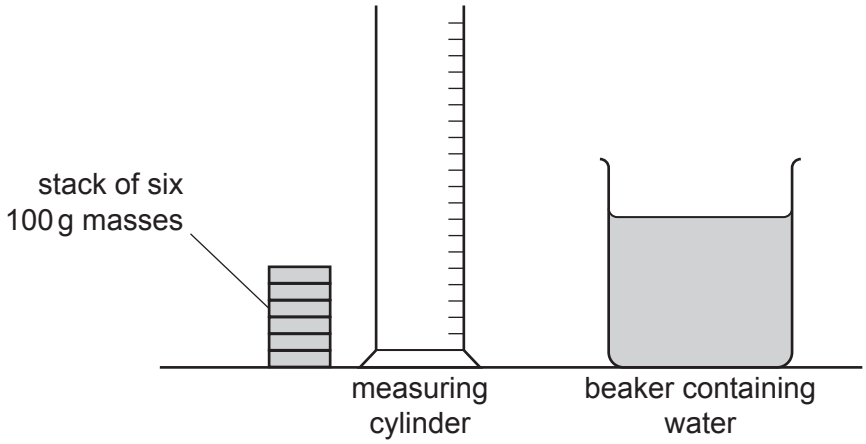


Fig. 2.2

The student uses the equipment in Fig. 2.2 to determine the total volume of the six masses.

Describe a method that the student uses.

.....

.....

.....

.....

..... [3]

[Total: 5]

2 A student wants to find the volume of a piece of metal. The student can use any of the items of equipment shown in Fig. 2.1.

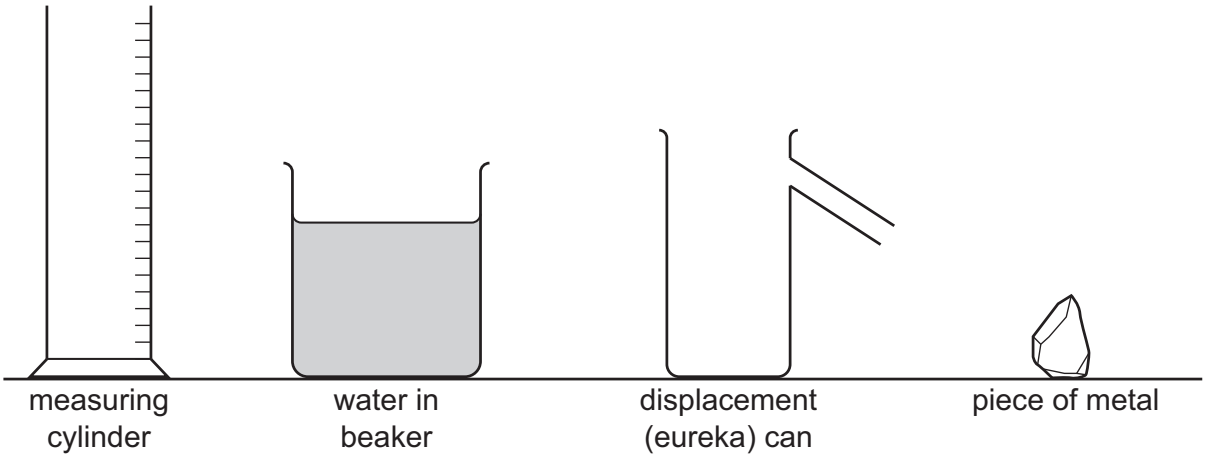


Fig. 2.1

(a) Describe how the student can find the volume of the piece of metal by using equipment from Fig. 2.1.

.....

.....

.....

.....

.....

..... [4]

(b) The volume of a different piece of metal is 30 cm^3. The mass of this piece of metal is 192 g.

Calculate the density of the metal. Include the unit.

density of the metal = ...

unit .....

[4]

Question	Answer	Mark
2(a)	any **three** from: • measuring cylinder (part) filled with water • volume of water measured or recorded/noted/read • metal submerged / placed in water owtte • new volume read / noted / measured / recorded	**B3**
	volume of metal = difference in volumes	**B1**
2(b)	(ρ =) 6	**A3**
	(ρ =) 192 ÷ 30	(C2)

0625/43 October/November 2023

1 **(a)** Oil of density 0.80 g / cm^3 is poured gently onto the surface of water of density 1.0 g / cm^3. The oil and the water do **not** mix.

Describe and explain the final position of the oil relative to the water.

description .....

.....

explanation .....

.....

[2]

(b) An irregularly shaped solid object has a density of 2.7 g / cm^3.

(i) Describe a method to measure the volume of the irregularly shaped solid object.

.....

.....

..... [2]

(ii) The volume of the object is 83 cm^3.

Calculate the mass of the object.

mass = ... [3]

[Total: 7]

Question	Answer	Marks
1(a)	(oil) stays on surface / floats on the water	**B1**
	(oil has) lower density than water **OR** liquids of lower density float on liquids of higher density	**B1**
1(b)(i)	measure (initial) volume of liquid / water AND immerse object **OR** immerse object in a known / measured volume of liquid / water	**B1**
	subtract initial / start volume from final / new volume **OR** calculate the difference in volume **OR** measure change in volume	**B1**
	OR (alternative answer)	
	fill displacement can / container with water **AND** immerse object	**(B1)**
	measure volume of displaced water	**(B1)**
1(b)(ii)	220 g	**A3**
	$\rho = m / V$ **OR** (m =) ρV **OR** 2.7×83	C1
	(m =) 2.7×83 **OR** 2.2×10^{n}	C1

1 A student measures the diameter of some identical steel balls. Fig. 1.1 shows the arrangement she uses.

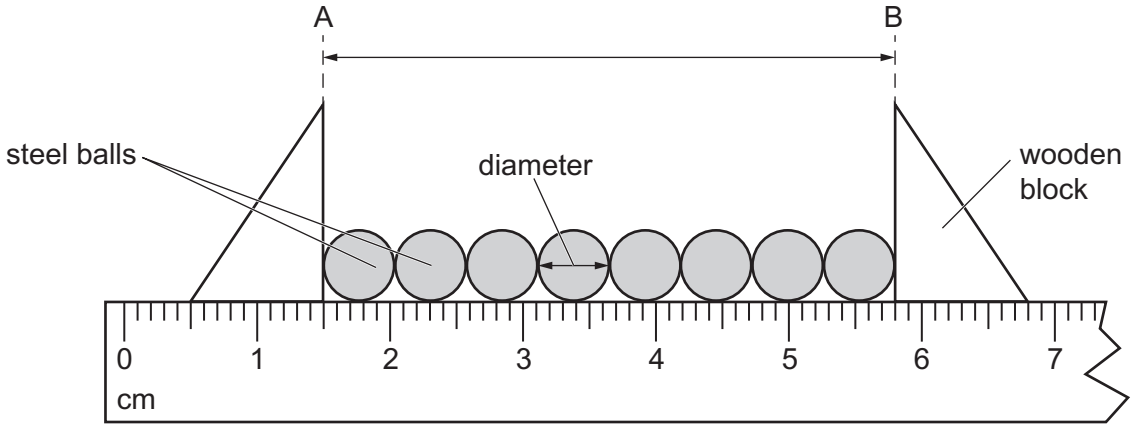


Fig. 1.1 (not to scale)

(a) (i) Using the ruler in Fig. 1.1, determine the distance AB on Fig. 1.1.

distance AB = ... cm [2]

(ii) Use the distance AB to determine the diameter of one steel ball.

diameter of one steel ball = ... cm [2]

(b) The mass of some steel balls is 54 g and the total volume of these steel balls is 6.9 cm^3.

Calculate the density of the steel.

density of steel = ... g/cm^3 [3]

[Total: 7]

Question	Answer	Marks
1(a)(i)	4.3 (cm)	**A2**
	5.8 (– 1.5)	**C1**
1(a)(ii)	**(a)(i)** ÷ 8 correctly evaluated (0.54 (cm) if 4.3 cm used)	**A2**
	(a)(i) ÷ 8	(C1)
1(b)	7.8 (g / cm^3)	**A3**
	54 ÷ 6.9	(C2)
	$D = m \div v$ in any form	(C1)

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1 Fig. 1.1 shows a measuring cylinder containing some water.

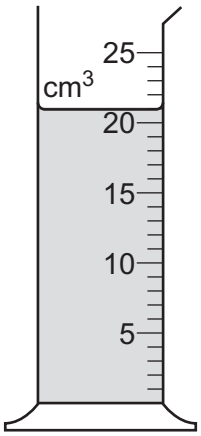

Fig. 1.1

(a) State the volume of the water in the measuring cylinder.

volume = ... cm^3 [1]

(b) A student adds 20 drops of water to the water that is in the measuring cylinder in Fig. 1.1. The new volume of water in the measuring cylinder is 25 cm^3.

Calculate the average volume of one drop of water.

average volume of one drop = ... cm^3 [4]

(c) A student has a measuring cylinder and a small, irregularly shaped piece of metal. The piece of metal can easily fit into the measuring cylinder.

Describe how the student can use the measuring cylinder and some water to find the volume of the metal.

.....

.....

.....

Question	Answer	Marks
1(a)	21 (cm^3)	**B1**
1(b)	0.2(0) (cm^3)	**A4**
	(average volume of one drop) = 4(.0) / 20	C3
	(volume = 25 – 21 =) 4(.0) (cm^3)	C1
	total volume = number of drops × (average) volume of one drop	C1
1(c)	any **four** from: • measure volume of water (in a measuring cylinder) • add metal to water in the measuring cylinder • so that metal is completely submerged • measure (new) volume of water in a measuring cylinder (with metal) • find the difference between the two volumes.	**B4**

2 A builder buys some tiles to repair a floor. He checks that the new tiles are the same size as the tiles on the floor.

The dimensions of the tiles on the floor are 25 cm × 20 cm × 0.30 cm.

The new tiles are shown in Fig. 2.1.

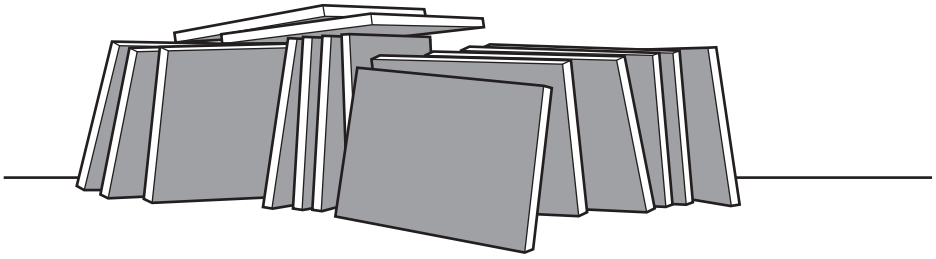

Fig. 2.1

(a) (i) State the name of a suitable instrument for measuring the length and width of each tile.

..... [1]

(ii) Describe how to determine the average thickness of **one** new tile.

.....

.....

..... [3]

(b) The dimensions of a tile are 25 cm × 20 cm × 0.30 cm.

The mass of the tile is 410 g.

(i) Calculate the volume of the tile.

volume = ... cm^3 [1]

(ii) Calculate the density of the tile. Include the unit in your answer.

density = ... unit ..... [4]

(iii) Calculate the weight of the tile.

weight = ... N [3]

Question	Answer	Marks
2(a)(i)	rule(r) / metre stick / tape measure	**B1**
2(a)(ii)	place n tiles on top of each other owtte AND n = 10 or more	**B1**
	measure the (total) thickness of more than one tile	**B1**
	divide by n AND n = 2 or more	**B1**
2(b)(i)	(volume =) (25 × 20 × 0.30 =) 150 (cm^3)	**B1**
2(b)(ii)	2.7	**A3**
	410 ÷ 150 OR 410 ÷ (their ans **(b)(i)**)	(C2)
	density = mass ÷ volume in any form	(C1)
	g / cm^3	**B1**
2(b)(iii)	4.1(0) (N)	**A3**
	0.41(0)	(C1)
	(W =) m × g OR m × 10 in any form	(C1)

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2 **(a)** A pendulum swings with a time period of approximately one second.

Describe how to use a stop-watch to determine the time period of the pendulum.

.....

.....

.....

..... [3]

(b) Complete Table 2.1 by writing in each space of the right-hand column which **one** of the following devices is used to measure the quantity in the left-hand column.

digital balance | measuring cylinder | metre rule

micrometer screw gauge | stop-watch | thermocouple

Table 2.1

quantity	device
volume of water in a glass	
width of a small swimming pool	
thickness of a piece of aluminium foil	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(a)</td><td>(use stop-watch to) time oscillations</td><td>B1</td></tr>
<tr><td></td><td>(use of fiduciary) aid to determine a complete cycle</td><td>B1</td></tr>
<tr><td></td><td>(use of) multiple oscillations AND division (to determine period)</td><td>B1</td></tr>
<tr><td>2(b)</td><td><table><tr><td>quantity</td><td>device</td></tr><tr><td>volume of water in a glass</td><td>measuring cylinder</td></tr><tr><td>width of a small swimming pool</td><td>metre rule</td></tr><tr><td>thickness of a piece of aluminium foil</td><td>micrometer screw gauge</td></tr></table>1 mark for each correct response</td><td>B3</td></tr>
</table>

0625/31 May/June 2022

1 Fig. 1.1 shows a dripping tap and a measuring cylinder. The water drops all have the same volume. The drops fall from the tap at equal time intervals.

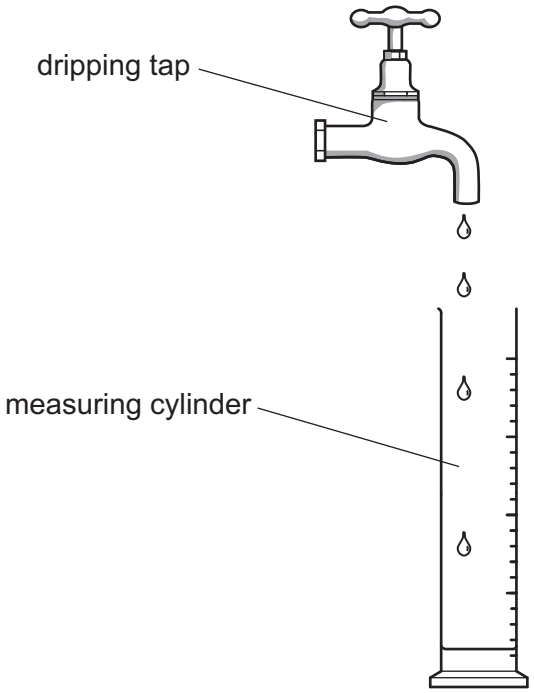

Fig. 1.1 (not to scale)

(a) (i) The student collects 200 of the drops in a measuring cylinder. The total volume collected is 60 cm^3.

Calculate the average volume of **one** drop of water.

volume = ... cm^3 [3]

(ii) Another student uses a stop-watch to measure the time taken for the tap to produce 200 drops. Fig. 1.2 shows the time reading on the stop-watch.

Fig. 1.2

Determine the time, in seconds, for the tap to produce 200 drops.

time = ... s [2]

(iii) Determine the average time interval between one drop starting to fall and the next drop starting to fall.

time interval = ... s [2]

(b) Fig. 1.3 shows the volume of water collected in the measuring cylinder by another student.

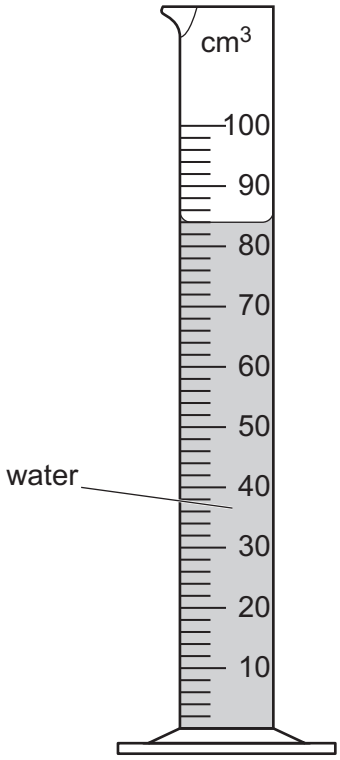

Fig. 1.3

Determine the volume of water in the measuring cylinder in Fig. 1.3.

volume = ... cm^3 [1]

Question	Answer	Marks
1(a)(i)	0.3(0) (cm^3)	**A3**
	(average volume of one drop) = 60 ÷ 200	**(C2)**
	total volume = number of drops × (average) volume of one drop	**(C1)**
1(a)(ii)	226.5 (s)	**A2**
	180 (+ 46.5 =)	**(C1)**
1(a)(iii)	1.1 (s)	**A2**
	time for one drop = total time ÷ no of intervals	**(C1)**
1(b)	84 (cm^3)	**B1**

0625/32 May/June 2022

2 Fig. 2.1 shows a closed textbook.

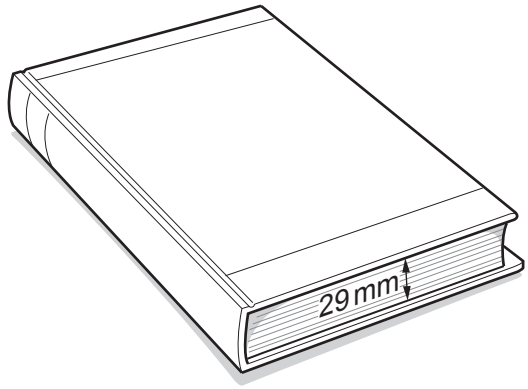

Fig. 2.1

(a) There are 270 sheets of paper in the textbook. The total thickness of the sheets is 29 mm.

Calculate the average thickness of **one** sheet of paper.

average thickness of one sheet = ... mm [3]

(b) The mass of the textbook is 1300 g.

Calculate the weight of the textbook.

weight = ... N [3]

Question	Answer	Marks
2(a)	0.11 (mm)	**A3**
	(average thickness =) 29 ÷ 270	**(C2)**
	(average thickness =) total thickness ÷ number of sheets	**(C1)**
2(b)	(1300 g =) 1.3 kg	**(B1)**
	(weight =) 13(.0) N	**A3**
	(weight =) mass × g OR mass × 10	**(C1)**

1 Fig. 1.1 shows children about to run a race. They have to run 25 m, pick up a small plastic ring and run back to the base line. Each child finishes when they cross the base line holding the plastic ring.

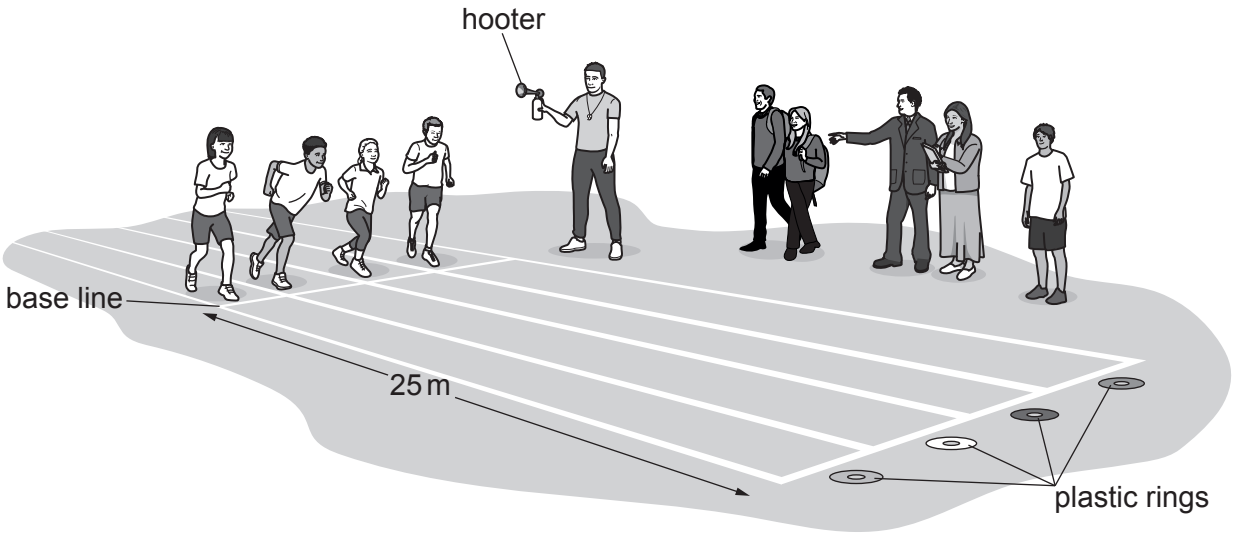

Fig. 1.1

(a) (i) Suggest what equipment the teacher uses to measure the length of 25 m.

..... [1]

(ii) Determine the total distance for the race.

distance = ... m [1]

Question	Answer	Marks
1(a)(i)	metre rule	**B1**
1(a)(ii)	50 (m)	**B1**
1(b)	graph starts at origin	**B1**
	speed = 0 at 9.0 s	**B1**
	highest speed at 17 s	**B1**
1(c)(i)	260 (s)	**B1**
1(c)(ii)	1.9 (m/s)	**A3**
	500 ÷ 260 OR 500 ÷ **(c)(i)**	**(C2)**
	(speed =) distance ÷ time in any form	**(C1)**

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1 A student uses a ruler to measure the length of a piece of wire, as shown in Fig. 1.1.

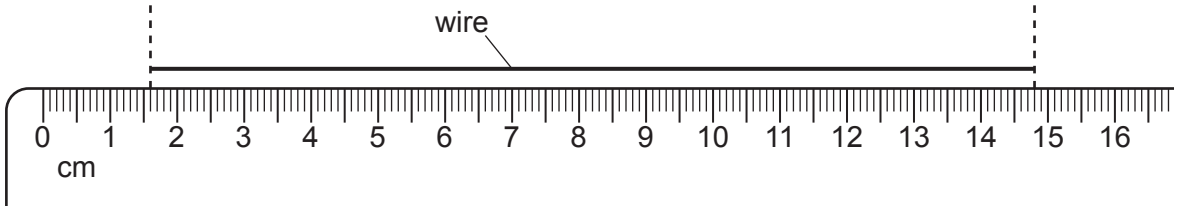

Fig. 1.1 (not to scale)

(a) Use the ruler in Fig. 1.1 to determine the length of the piece of wire.

length of wire = ... cm [2]

(b) The student folds the piece of wire and measures its mass.

(i) State the name of an instrument the student can use to measure mass.

..... [1]

(ii) The student determines the volume of the wire.

He uses a measuring cylinder part-filled with water and places the wire in it, as shown in Fig. 1.2.

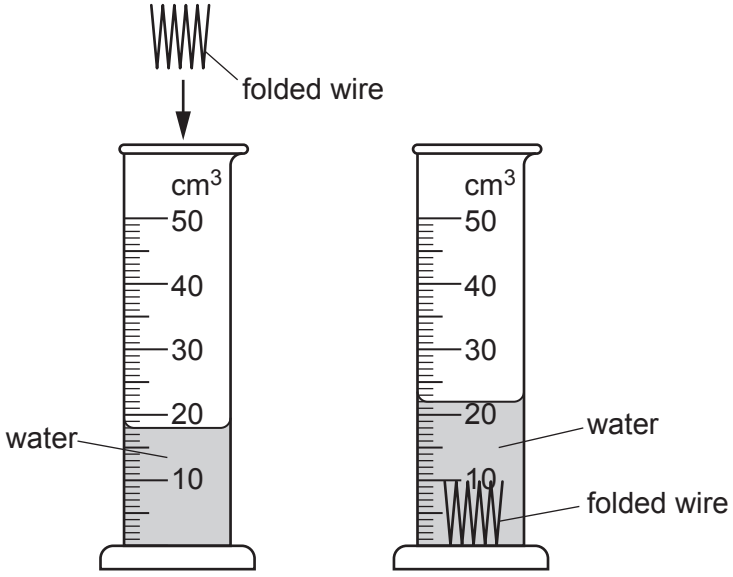

Fig. 1.2

Determine the volume of the wire by using information in Fig. 1.2.

volume of wire = ...cm^3 [2]

(c) The student measures the mass and the volume of a piece of metal.
The mass of the piece of metal is 93.6 g and its volume is 12 cm^3.

Calculate the density of the metal.

density of metal = ... g / cm^3 [3]

Question	Answer	Marks
1(a)	1.6 (cm) OR 14.8 (cm) seen OR used	**C1**
	13.2 (cm)	**A1**
1(b)(i)	(top pan / chemical / beam) balance	**B1**
1(b)(ii)	22 (cm^3) OR 18 (cm^3) seen OR used	**C1**
	4(.0) (cm^3)	**A1**
1(c)	(density =) mass ÷ volume OR (d =) m ÷ v in any form	**C1**
	93.6 ÷ 12	**C1**
	7.8 (g / cm^3)	**A1**

2 **(a)** A coin collector has 19 identical coins, as shown in Fig. 2.1.

Fig. 2.1

Fig. 2.2 shows one of the coins in the coin collector's hand.

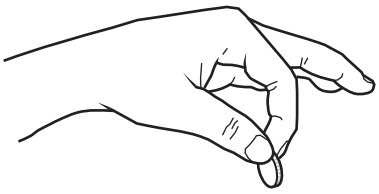

Fig. 2.2

The coin collector wants to check the thickness of one coin. She has a 30 cm ruler.

Describe how she can use the 30 cm ruler to determine the thickness of one coin accurately.

You may include a diagram if you wish.

.....

.....

.....

..... [3]

(b) The coin collector finds another coin. She thinks this coin is made of gold.

She performs an experiment to find the coin's density.

She obtains the following results:

mass of coin = 52.5 g

volume of coin = 5.4 cm^3

(i) Show that the density of this coin is about 10 g / cm^3.

[3]

(ii) The density of liquid mercury is 13.6 g / cm^3. State and explain whether the coin in **(b)(i)** floats on liquid mercury.

.....

..... [1]

Question	Answer	Marks
2(a)	any **three** from: (put some coins) on top of each other OR in a stack idea measure the (total) thickness (of stack) 10 or more coins thickness (of one coin) = total thickness / 'length' ÷ number of coins	**B3**
2(b)(i)	(D) = M ÷ V in any form	**C1**
	52.5 ÷ 5.4	**C1**
	9.7(2) (g / cm^3)	**A1**
2(b)(ii)	floats AND coin is less dense (than mercury) ora	**B1**

2 Fig. 2.1 shows a pea plant. One of the pods is open, showing the peas inside.

Fig. 2.1

(a) A food scientist needs to find the average diameter of a pea.
She places 14 peas against a ruler, as shown in Fig. 2.2.

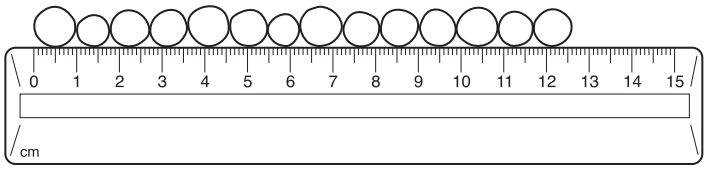

Fig. 2.2

Use information from Fig. 2.2 to determine the average diameter of **one** pea.

average diameter of one pea = ... cm [3]

(b) The food scientist needs to find the average density of some peas.

She uses the following values:

mass of peas = 183 g
volume of peas = 250 cm^3.

Calculate the average density of these peas.

average density = ... g/cm^3 [3]

(c) A different variety of pea has a density of 0.89 g/cm^3. One pea of this variety is placed in salt water. The density of the salt water is 1.02 g/cm^3.

State whether this pea floats or sinks in the salt water. Give a reason for your answer.

answer .....

reason .....
[1]

Question	Answer	Marks
2(a)	12.6	**C1**
	12.6 ÷ 14	**C1**
	0.9(0) (cm)	**A1**
2(b)	(D =) M ÷ V in any form	**C1**
	183 ÷ 250	**C1**
	0.73 (g/cm^3)	**A1**
2(c)	float AND (peas / it) less dense (than salt water)	**B1**