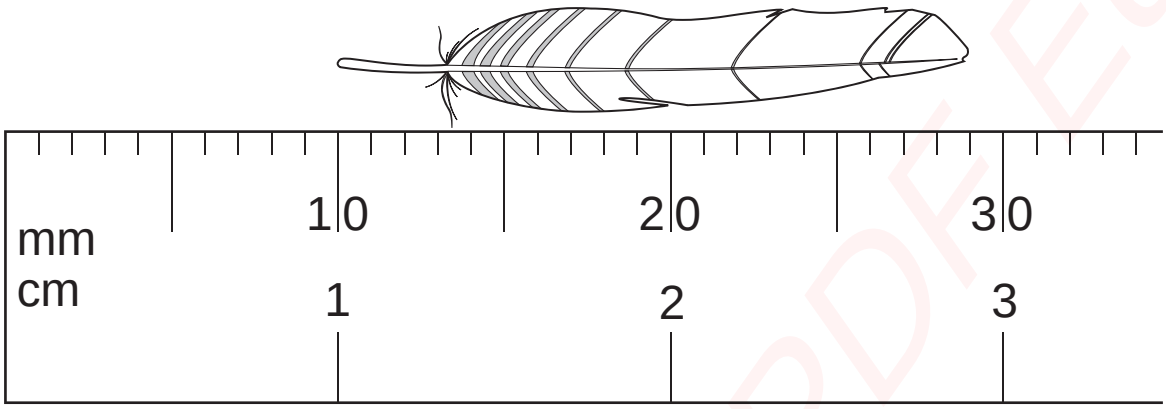
Name of Student:

1 The diagram shows an enlarged drawing of the end of a metre rule. 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

2 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?

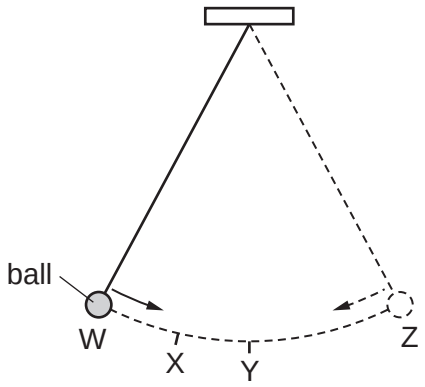
A neither the ruler nor the measuring cylinder

B the measuring cylinder only

C the ruler and the measuring cylinder

D the ruler only

3 The diagram shows a ball hanging on a string. The ball swings from point W to point Z and back to point W.



Which statement about the ball is correct?

A The kinetic energy of the ball is greatest at point W.

B The kinetic energy of the ball is greatest at point X.

C The kinetic energy of the ball is greatest at point Y.

D The kinetic energy of the ball is the same at all points of the swing.

4 A measuring cylinder is used to measure the volume of a quantity of water.

Which measuring technique would **not** improve the accuracy of the measurement?

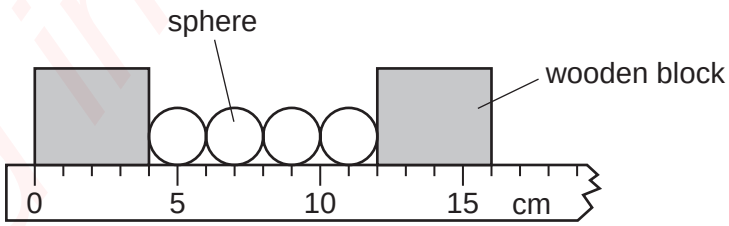
A making sure that the measuring cylinder is vertical

B making sure that the water surface is at eye level

C reading the top of the water meniscus

D using the smallest measuring cylinder available that will contain all the water

5 The diagram shows four identical spheres placed between two wooden blocks on a ruler.



What is the diameter of one sphere?

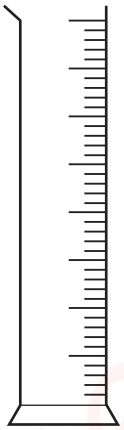
A 1.0 cm **B** 2.0 cm **C** 3.0 cm **D** 4.0 cm

6 A cook wants to prepare some food to be cooked by 1.15 p.m. He uses an oven with an automatic timer that can be set to switch on and off at certain times. The oven needs to be switched on for 2 hours 10 minutes.

At which time does the oven need to switch on?

A 11.05 a.m. **B** 11.25 a.m. **C** 3.05 p.m. **D** 3.25 p.m.

7 The diagram shows a measuring instrument.



Which quantity is this instrument used to measure?

A area

B density

C mass

D volume

8 Which option contains **only** apparatus that could be used to determine the volume of a small block of unknown material?

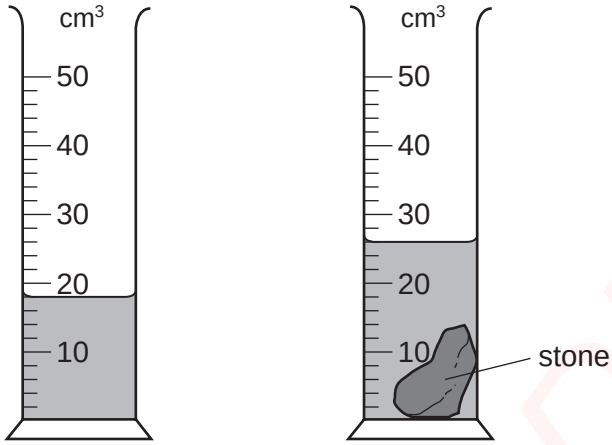
A measuring cylinder, metre rule

B measuring cylinder, stopwatch

C metre rule, balance

D metre rule, stopwatch

9 The diagram shows a measuring cylinder used to measure the volume of a small stone.



What is the volume of the stone?

A 8 cm^3 **B** 9 cm^3 **C** 14 cm^3 **D** 26 cm^3

10 A student uses a measuring cylinder to measure the volume of a quantity of water.

Which action would make her result **less** accurate?

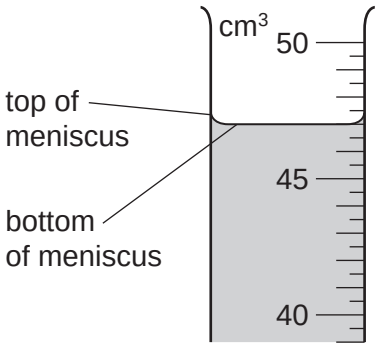
A making sure her eye is level with the water surface

B making sure the cylinder is vertical

C reading the bottom of the meniscus

D using the largest measuring cylinder possible

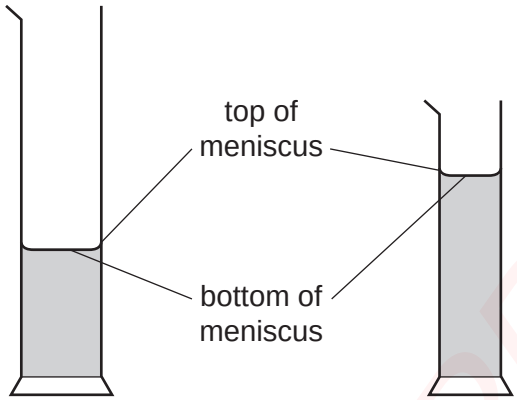
11 A student uses a measuring cylinder to measure the volume of some water. The diagram shows part of the measuring cylinder. The top and bottom of the meniscus are labelled.



What is the volume of the water?

A 47.0 cm^3 **B** 47.5 cm^3 **C** 49.0 cm^3 **D** 49.5 cm^3

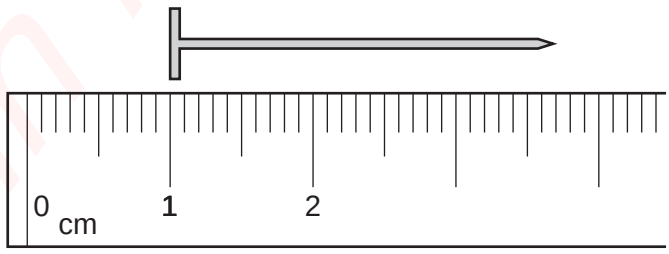
12 A student wishes to measure accurately the volume of approximately 40 cm^3 of water. She has two measuring cylinders, a larger one that can hold 100 cm^3, and a smaller one that can hold 50 cm^3. The water forms a meniscus where it touches the glass.



Which cylinder should the student use and which water level should she 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

13 The diagram shows part of a ruler. The ruler is used to find the length of a nail.



What is the length of the nail?

A 2.2 cm **B** 2.7 cm **C** 3.2 cm **D** 3.7 cm

14 Which instrument is used to compare the masses of objects?

A a balance

B a barometer

C a manometer

D a measuring cylinder

15 Diagram 1 shows a measuring cylinder containing water.

Five identical steel balls are now lowered into the measuring cylinder. Diagram 2 shows the new water level in the cylinder.

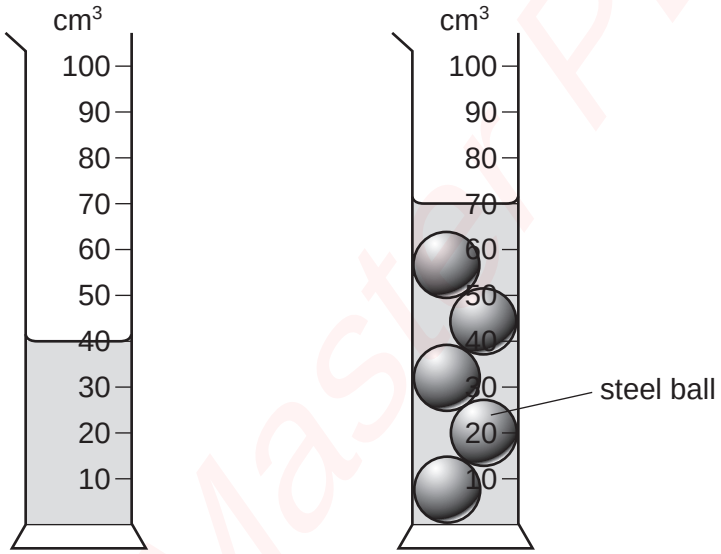
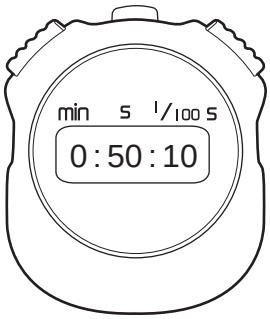


diagram 1 diagram 2

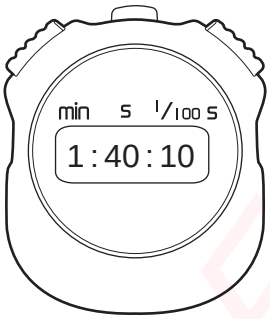
What is the volume of each steel ball?

A 6 cm^3 **B** 14 cm^3 **C** 30 cm^3 **D** 70 cm^3

16 A stopwatch is used to time a runner in a race. The diagrams show the stopwatch at the start and at the end of a lap of the race.



start of lap



end of lap

How long did the runner take to finish the lap of the race?

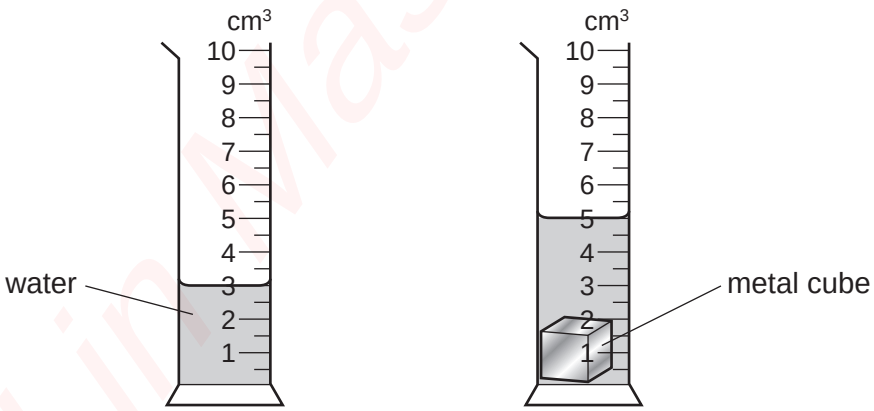
A 50.00 seconds

B 50.10 seconds

C 90.00 seconds

D 100.10 seconds

17 The diagrams show the readings on a measuring cylinder before and after a small metal cube is added.

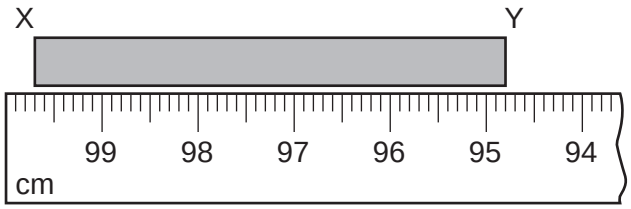


before after

How many more identical cubes can be added to the cylinder, without causing the water to overflow? Do not include the cube already in the cylinder.

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

18 A student measures the length of a rod XY by holding it next to a metre rule.



The student writes down the length as 94.8 cm.

Which statement is correct?

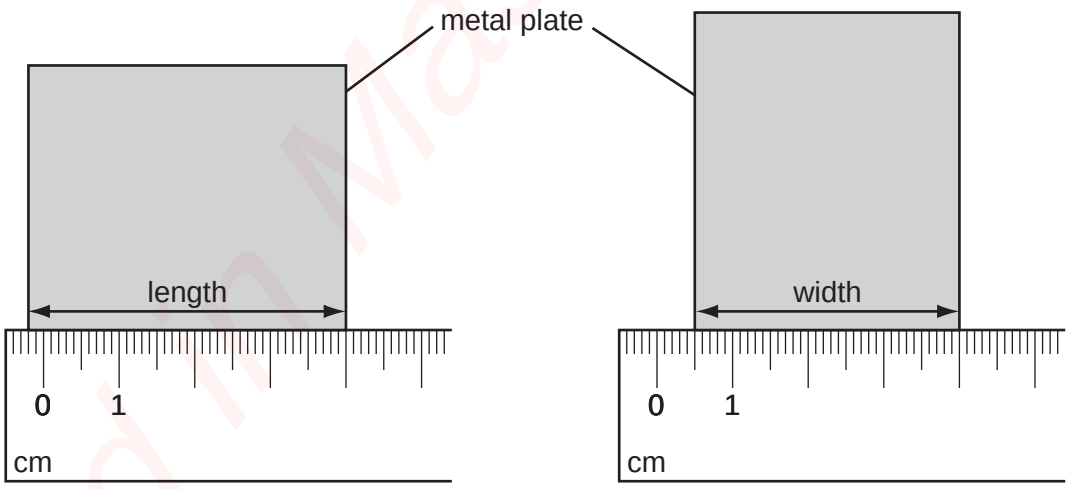
A The value is correct.

B The value is incorrect because it should be 95.2 cm.

C The value is incorrect because it should be in millimetres.

D The value is incorrect because the student should subtract the reading for end Y from the reading for end X.

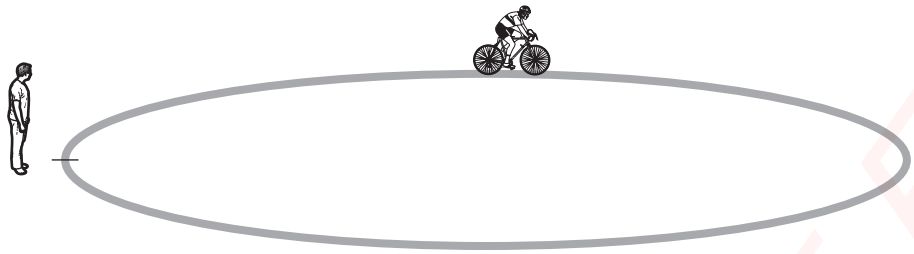
19 A student uses a ruler to measure the length and the width of a small rectangular metal plate.



What is the area of the plate?

A 14.0 cm^2 **B** 14.7 cm^2 **C** 16.0 cm^2 **D** 16.8 cm^2

20 A cyclist rides round a track three times.



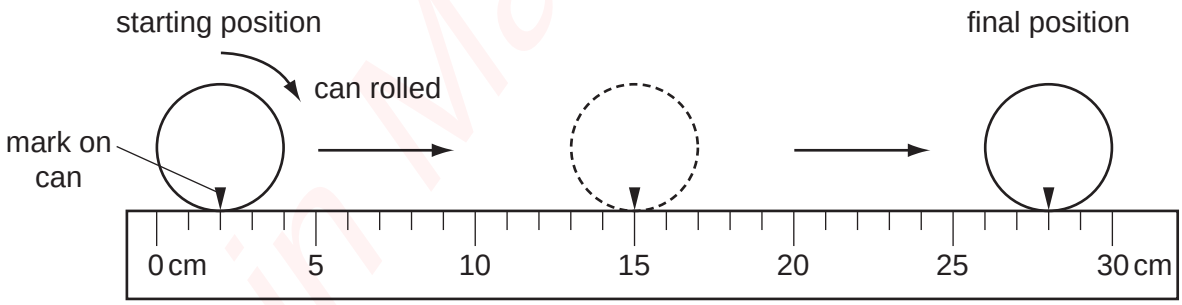
Her friend uses a stopwatch to record the time at the start of the ride, after one circuit, and at the end of the three circuits. The readings from the stopwatch are shown.

at the start | after one circuit | at the end of three circuits

What is the average time for one circuit of the track?

A 174 s **B** 180 s **C** 198 s **D** 200 s

21 A cylindrical can is rolled along the ruler shown in the diagram.

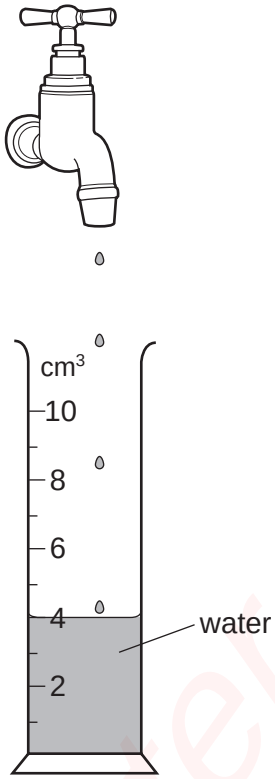


The can rolls over twice.

What is the circumference (distance all round) of the can?

A 13 cm **B** 14 cm **C** 26 cm **D** 28 cm

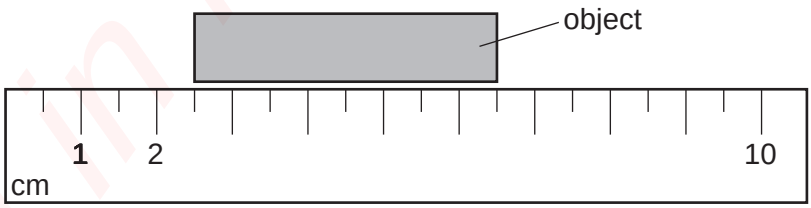
22 Drops of water are dripping steadily from a tap (faucet). The diagram shows a measuring cylinder which has collected 120 drops of water.



How many drops in total will have been collected when the measuring cylinder reads 10 cm^3?

A 48 **B** 60 **C** 180 **D** 300

23 A ruler is used to measure the length of an object.



What is the length of the object?

A 3.0 cm **B** 4.0 cm **C** 5.0 cm **D** 6.5 cm

24 The diameter of a copper wire is thought to be approximately 0.3 mm.

Which instrument should be used to obtain a more accurate measurement of the diameter of the wire?

A measuring tape

B metre rule

C micrometer

D ruler

25 Which measurement can be made using a micrometer screw gauge?

A the air pressure of a tyre

B the diameter of a wire

C the turning effect of a spanner

D the wavelength of microwaves

1 A surveyor measures the dimensions of a room of constant height. Fig. 2.1 is a top view of the room and shows the measurements taken.

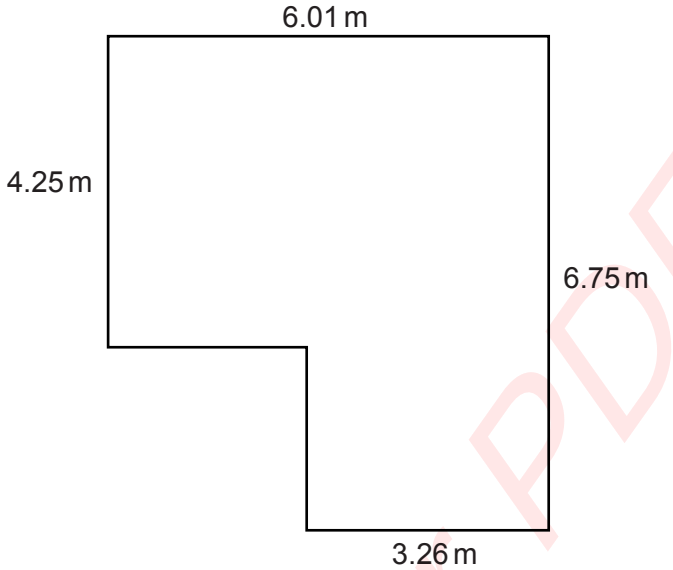


Fig. 2.1

(a) State an instrument that would be suitable to take these measurements.

..... [1]

(b) The volume of air in the room is 76.4 m^3. The density of the air is 1.2 kg/m^3.

Calculate the mass of air in the room.

mass = ... [2]

(c) A window in the room is open. The next day, the temperature of the room has increased, but the pressure of the air has stayed the same.

State and explain what has happened to the mass of air in the room.

.....

.....

.....

..... [3]

[Total: 6]

2 The period of the vertical oscillations of a mass hanging from a spring is known to be constant.

(a) A student times single oscillations with a stopwatch. In 10 separate measurements, the stopwatch readings were:

1.8 s, 1.9 s, 1.7 s, 1.9 s, 1.8 s, 1.8 s, 1.9 s, 1.7 s, 1.8 s, 1.8 s.

What is the best value obtainable from these readings for the time of one oscillation? Explain how you arrive at your answer.

best value = ...

explanation .....

.....

..... [1]

(b) Describe how, using the same stopwatch, the student can find the period of oscillation more accurately.

.....

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..... [4]

[Total: 5]

3 Fig 1.1 shows part of a measuring instrument.

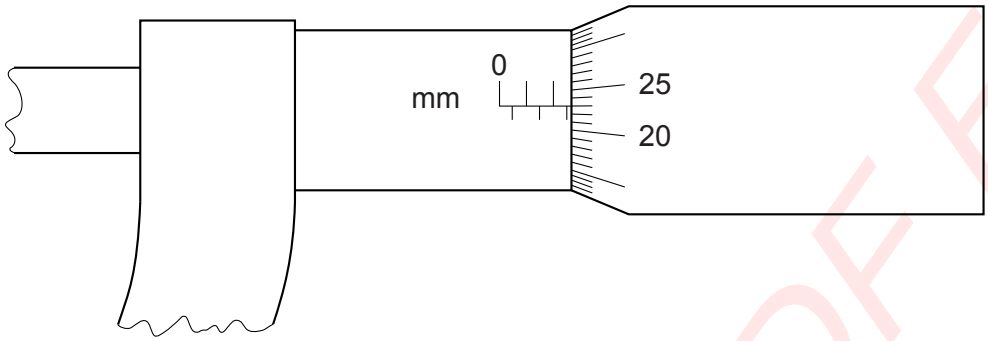

Fig. 1.1

(a) State the name of this instrument.

..... [1]

(b) Record the reading shown in Fig. 1.1.

..... [1]

(c) Describe how you would find the thickness of a sheet of paper used in a magazine.

.....

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.....

.....

..... [3]

[Total: 5]

4 A weight attached to one end of a short length of string is swinging from side to side. The highest points in the swing are A and B, as shown in Fig. 1.1.

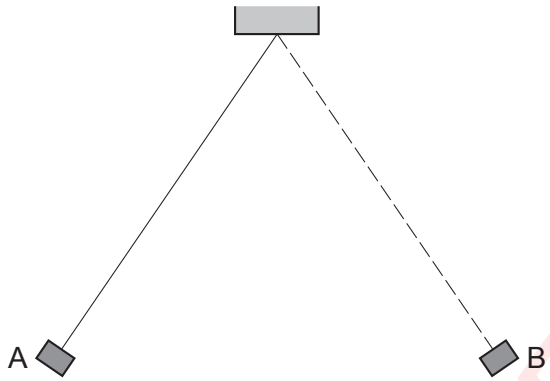

Fig. 1.1

(a) With reference to Fig. 1.1, state what is meant by the amplitude of the oscillations.

..... [2]

(b) Describe how the amplitude of the oscillations could be measured.

.....

.....

.....

.....

..... [3]

[Total: 5]

5 A weight attached to one end of a short length of string is swinging from side to side. The highest points in the swing are A and B, as shown in Fig. 1.1.

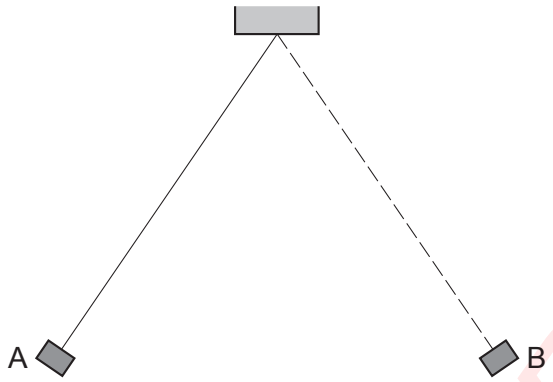

Fig. 1.1

(a) With reference to Fig. 1.1, state what is meant by the amplitude of the oscillations.

..... [2]

(b) Describe how the amplitude of the oscillations could be measured.

.....

.....

.....

.....

..... [3]

[Total: 5]

6 A student wishes to find the volume of a piece of wood of irregular shape. Her experiment requires the use of a small brass object of mass 200 g.

(a) Calculate the volume of the brass object. The density of brass is 8.4 g / cm^3.

volume = ...[2]

(b) To find the volume of the piece of wood, the student has a measuring cylinder, a supply of water and the brass object in **(a)**. The piece of wood and the brass object are small enough to be placed in the measuring cylinder.

(i) The piece of wood does not sink in water.

Suggest why.

.....[1]

(ii) Describe what the student does to find the volume of the piece of wood, stating the measurements that she makes and any calculations required.

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.....

.....[4]

[Total: 7]

7 A student has 500 identical, rectangular sheets of paper. The mass of 1.0 m^2 of the paper is 0.080 kg.

(a) Using a metre rule, she measures the length of one sheet of paper and its width. The length is 0.300 m and the width is 0.210 m.

(i) Calculate the mass of one sheet of paper.

mass = ...[1]

(ii) The student makes a single pile of the 500 sheets of paper.

With a metre rule, she measures the height of the pile. The height of the pile is 0.048 m.

Calculate the density of the paper.

density = ...[3]

(b) A second student has only 5 sheets of the same type of paper.

Suggest how this student determines the density of the paper to a similar accuracy. Additional apparatus may be used.

.....

.....

.....

.....[2]

[Total: 6]

8 A student has a large number of coins of different diameters, all made of the same metal. She wishes to find the density of the metal by a method involving placing the coins in water.

(a) State the formula needed to calculate the density.

..... [1]

(b) Describe how the measurements of the required quantities are carried out.

.....

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..... [5]

(c) State **one** precaution taken when carrying out the measurements in **(b)** to ensure that the result is as accurate as possible.

.....

..... [1]

[Total: 7]

9 A student wishes to determine the density of a small, irregularly shaped stone.

(a) With the aid of a labelled diagram, describe an experiment to determine the volume of the stone.

.....

.....

.....

.....

..... [4]

(b) **(i)** State the other quantity, apart from the volume, that must be measured in order to determine the density.

..... [1]

(ii) State the formula that is used to calculate the density.

.....

..... [1]

(c) The student now wishes to determine the volume of a small, irregularly shaped piece of wood that floats in water. He notices that a small lead weight tied to the wood makes it sink in water.

Describe how the student can adapt the experiment in **(a)** to determine the volume of the wood. You may draw a diagram.

.....

.....

.....

.....

.....

.....

..... [2]

[Total: 8]

10 **(a)** Define *density*.

.....

.....[1]

(b) The density of aluminium is $2.70\,g/cm^3$. The thickness of a rectangular sheet of aluminium foil varies, but is much less than 1 mm.

A student wishes to find the average thickness. She obtains the following measurements.

mass of sheet = 60.7 g
length of sheet = 50.0 cm
width of sheet = 30.0 cm

Calculate the student's values for

(i) the volume of the sheet,

volume = ...[2]

(ii) the average thickness of the sheet.

thickness = ...[2]

(c) Another student, provided with a means of cutting the sheet, decides to find its average thickness using a single measuring instrument. Assume the surfaces of the sheet are perfectly smooth.

(i) Name a measuring instrument she could use.

.....[1]