Physical Quantities & Measurement Techniques

Question Paper

Course	CIE IGCSE Physics
Section	1. Motion, Forces & Energy
Topic	Physical Quantities & Measurement Techniques
Difficulty	Easy

Time Allowed 50

Score /35

Percentage /100

Question 1a

Some students observe drops of water falling from a tap that leaks, as shown in Fig. 1.1.

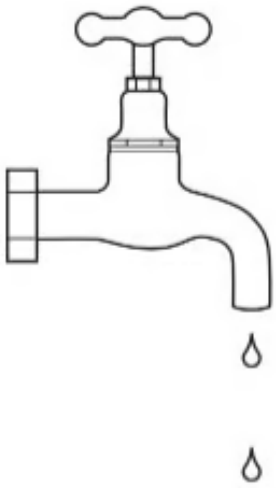

Fig. 1.1

The students measure the time for 50 drops to fall from the tap. The time for 50 drops to fall is 20 s.

Calculate the average time between two drops falling.

average time = ... s

[2 marks]

Question 1b

The students collect some drops of water.

(i) The students measure the volume of the water they collect.

State the term for the equipment that is suitable for measuring the volume accurately.

[1]

(ii) In a similar experiment, another student collects 0.21 kg of water.

Calculate the weight of this water.

weight of water = ... N [3]

[4 marks]

Question 2a

Four students P, Q, R and S each attempt to measure the time period (the time for one complete oscillation) of a pendulum. The arrows in Fig. 2.1 show the movements of the pendulum that each student times.

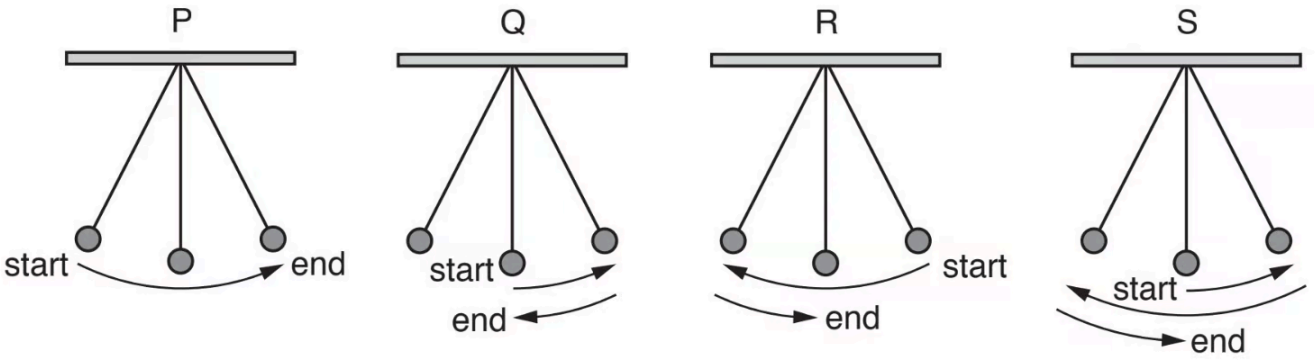

Fig. 2.1

State the student who has chosen the correct movement for one period of a pendulum.

[1 mark]

Question 2b

Another student uses a stopwatch to measure the time taken for 50 periods of a pendulum.

Fig. 2.2 shows the time taken on the stopwatch.

Fig. 2.2

Calculate the time for one period of the pendulum. Give your answer to 3 significant figures.

time for one period = ... s

[3 marks]

Question 2c

The student measures the displacement of the pendulum bob from its rest position. The displacement is 16.5cm, as shown in Fig. 2.3.

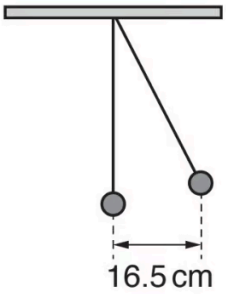

Fig. 2.3

State the displacement in millimetres.

displacement = ... mm

[1 mark]

Question 3a

A student measures the length of the sides of a metal cuboid using a 30 cm ruler.

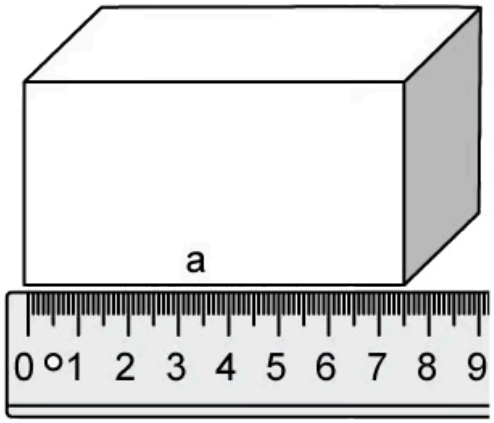

Fig. 1.1

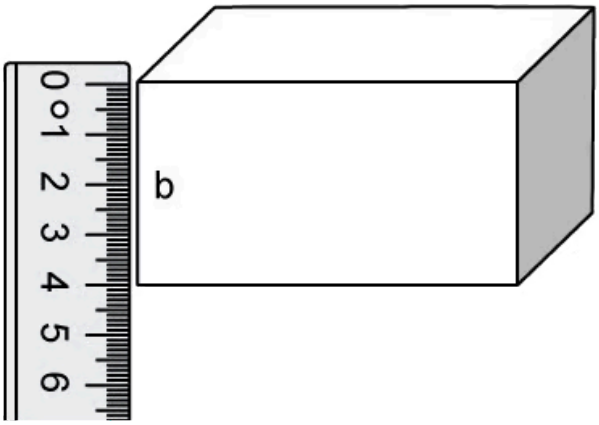

Fig. 1.2

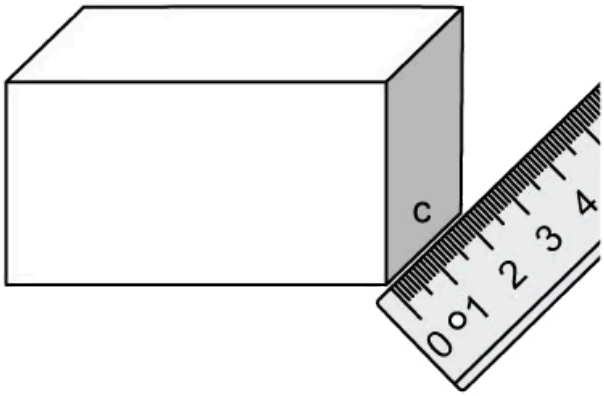

Fig. 1.3

State the measured lengths of the following sides.

Include the appropriate units in your answer.

(i) Side A in Fig. 1.1

length of side A = ... [1]

(ii) Side B in Fig 1.2

length of side B = ... [1]

(iii) Side C in Fig 1.3

length of side C = ... [1]

[3 marks]

Question 3b

Calculate the volume of the metal cuboid. Give your answer in cubic metres.

volume = ... m^3

[3 marks]

Question 3c

The student measures the mass of the metal cuboid on a scale. The measurement is shown in Figure 1.4.

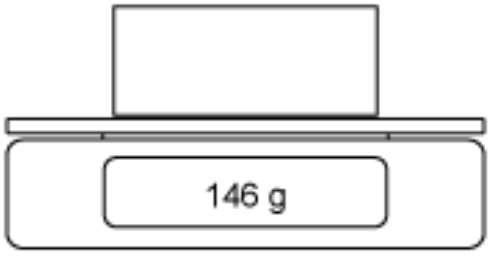

Fig. 1.4

State the reading for mass. Give your answer in kg.

mass = ... kg

[1 mark]

Question 3d

The densities of different metals are listed in the following table:

Metal	Density kg/m^3
Iron	7870
Magnesium	1740
Titanium	4510
Aluminium	2600

Use the information in the table to identify the type of metal which the cuboid is made of.

[3 marks]

Question 4a

Extended tier only

Identify the unit of velocity.

Tick **one** box.

- ☐ m
- ☐ m/s
- ☐ m/s^2

[1 mark]

Question 4b

Extended tier only

Explain how a scalar quantity is different to a vector quantity.

[2 marks]

Question 4c

Extended tier only

Fig. 1.1 shows a vector diagram for two component velocities.

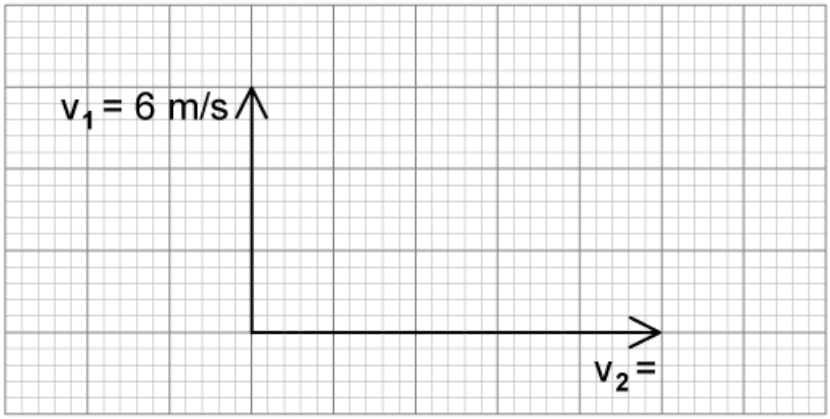

Fig. 1.1

Determine the velocity of the vector labelled v_2.

[1 mark]

Question 4d

Extended tier only

Calculate the magnitude of the resultant velocity of the components shown in Fig. 1.1.

Give your answer to 2 significant figures.

[2 marks]

Question 5a

Extended tier only

Explain the difference between speed and velocity.

[2 marks]

Question 5b

Extended tier only

Identify the scalar quantities.

Tick **all** the boxes that apply.

- ☐ time
- ☐ weight
- ☐ acceleration
- ☐ distance

[2 marks]

Question 5c

Extended tier only

State another example of a vector quantity and a scalar quantity.

[2 marks]

Question 5d

Extended Only

Fig. 1.1 shows a vector diagram for the effects of two forces.

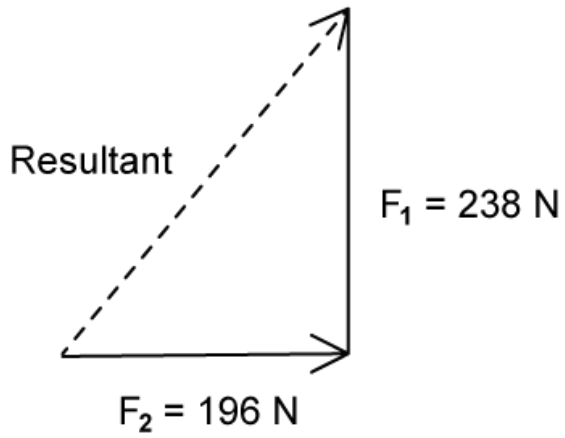

Fig. 1.1

Calculate the resultant force.

resultant force = ...

[2 marks]