Physical Quantities & Measurement Techniques

Question Paper

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

Time Allowed 50

Score /40

Percentage /100

Question 1a

A student uses a stopwatch in a timing experiment.

Fig. 1.1 shows the stopwatch readings.

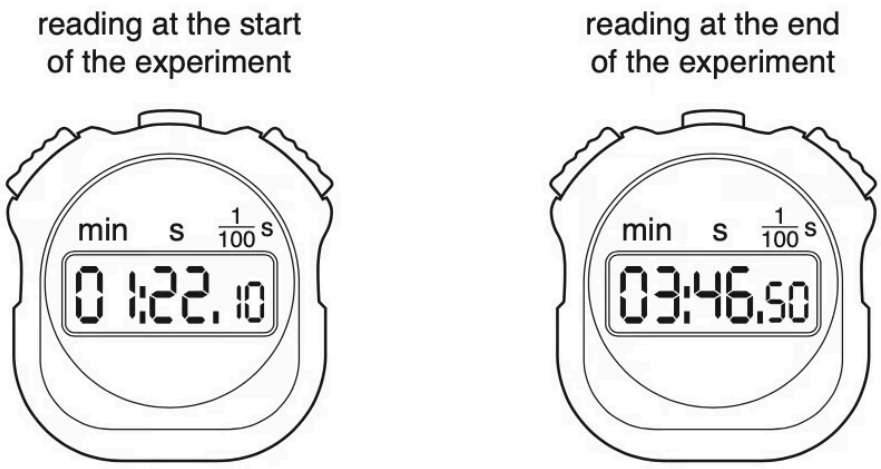

Fig. 1.1

Calculate the time interval between the two readings.

time interval = ... s

[2 marks]

Question 1b

A device has a light-emitting diode (LED) that flashes briefly at regular intervals.

Describe how to determine accurately the average time for each interval, using a stopwatch.

[4 marks]

Question 2a

A student places 8 similar coins in a pile, as shown in Fig. 1.1.

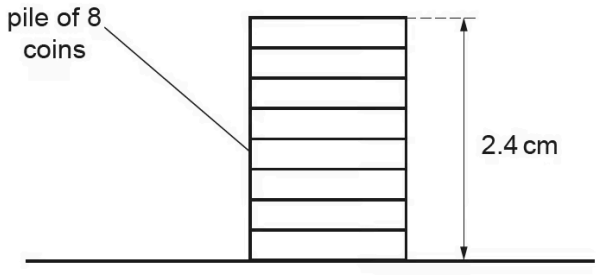

Fig. 1.1 (not to scale)

The height of the pile of coins is 2.4 cm.

Calculate the average thickness of one coin.

average thickness = ... cm

[2 marks]

Question 2b

Fig. 1.2 shows the pile of coins, a measuring cylinder and a beaker containing some water.

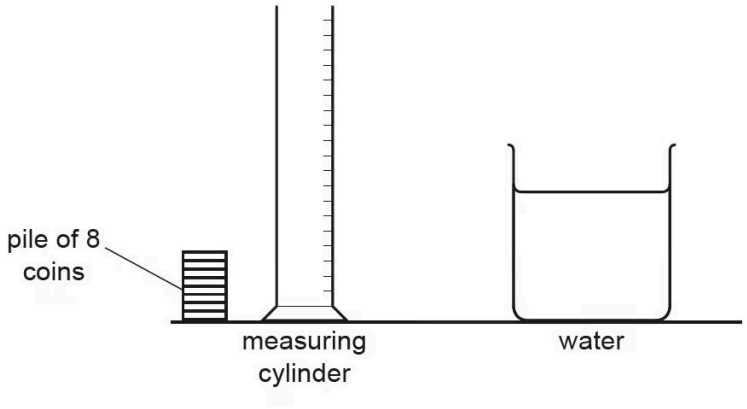

Fig. 1.2 (not to scale)

Describe how the student can measure the volume of one of the coins using the set-up shown in Fig. 1.2.

[4 marks]

Question 3a

Extended tier only

An object of weight W is suspended by two ropes from a beam, as shown in Fig. 1.1.

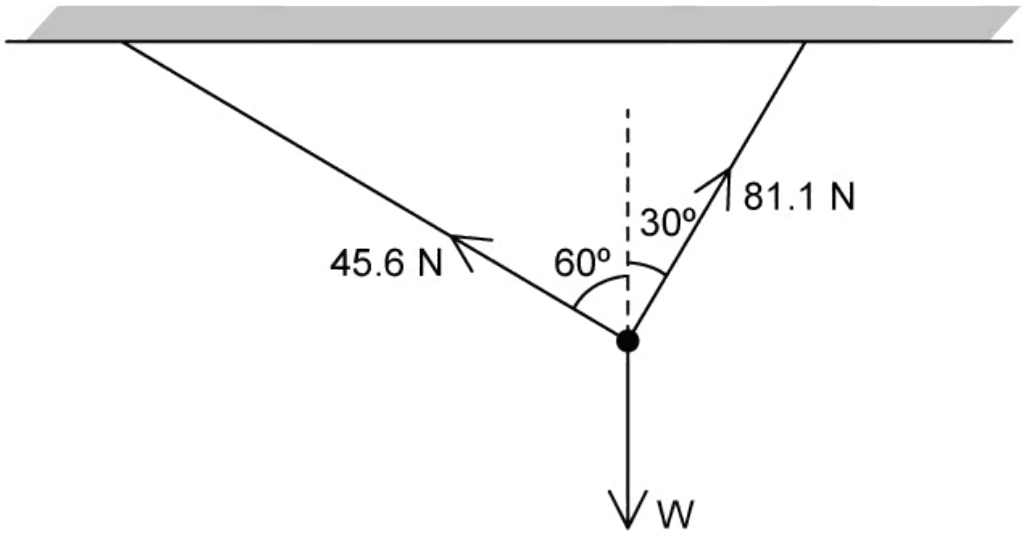

Fig. 1.1

The tensions in the ropes are 45.6 N and 81.1 N, as shown.

Using a scale of 1 cm = 10 N, make a scale drawing to show the resultant force of the two tensions.

Clearly label the resultant force.

[4 marks]

Question 3b

Extended tier only

Using your scale diagram from part (a), find the magnitude and direction of the resultant force.

magnitude of resultant force = ...

direction of resultant force = ...

[2 marks]

Question 3c

Extended tier only

State the value of *W*.

W = ...

[1 mark]

Question 3d

Extended tier only

State another vector quantity other than a type of force.

[1 mark]

Question 4a

Extended tier only

State the definition of a vector quantity.

[1 mark]

Question 4b

Extended tier only

A list of vector quantities and their SI units are given in the following table.

Quantity	SI unit
weight	
	m/s
	kg m/s
gravitational field strength	

Complete the information missing from the table.

[4 marks]

Question 4c

Extended tier only

A horizontal force of 136 N to the right, and a vertical downward force of 54 N act on an object perpendicularly to one another.

By use of a scale diagram (**not** by calculation) determine the magnitude of the resultant force.

magnitude of resultant force = ...

[4 marks]

Question 4d

Extended tier only

Using the information from part (c), determine the direction of the resultant force.

direction of resultant force = ... from the horizontal

[2 marks]

Question 5a

Extended tier only

A bucket of water hangs from a rope attached to a pole as shown in Fig. 1.1.

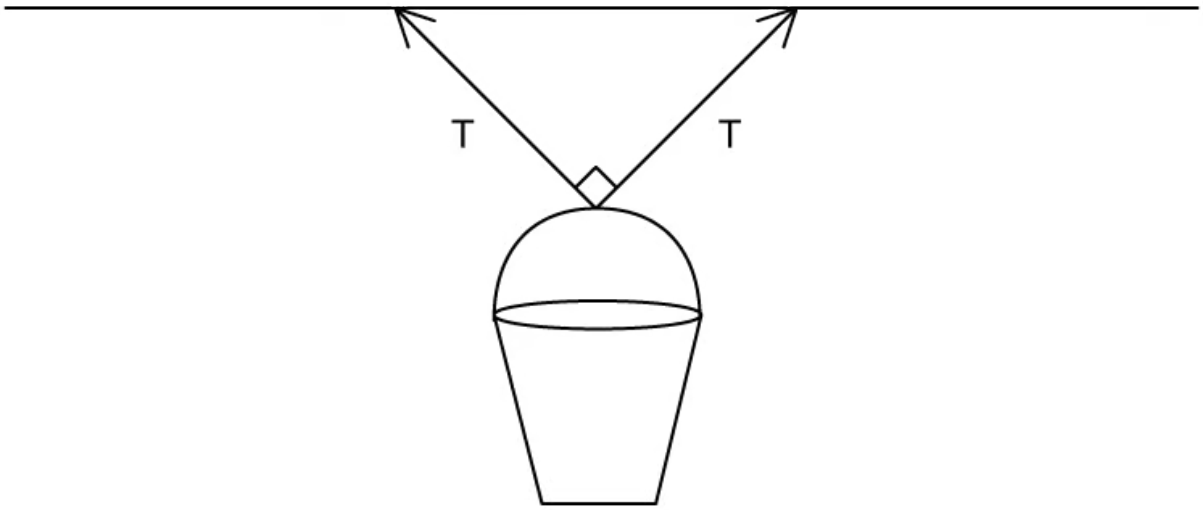

Fig. 1.1

The tension force, T = 31 N and the ropes are perpendicular to one another.

Calculate the magnitude of the downward force acting on the bucket of water.

magnitude of downward force = ...

[4 marks]

Question 5b

State the name of the downward force acting on the bucket.

[1 mark]

Question 5c

Extended tier only

Weight is a vector quantity. Name one other vector quantity.

[1 mark]

Question 5d

The bucket has a mass of 0.65 kg.

Calculate the mass of the water in the bucket.

[3 marks]