Mass, Weight & Density

Question Paper

Course	CIE IGCSE Physics
Section	1. Motion, Forces & Energy
Topic	Mass, Weight & Density
Difficulty	Easy

Time Allowed 60

Score /45

Percentage /100

Question 1a

Fig. 1.1 shows a set of masses made from the same material.

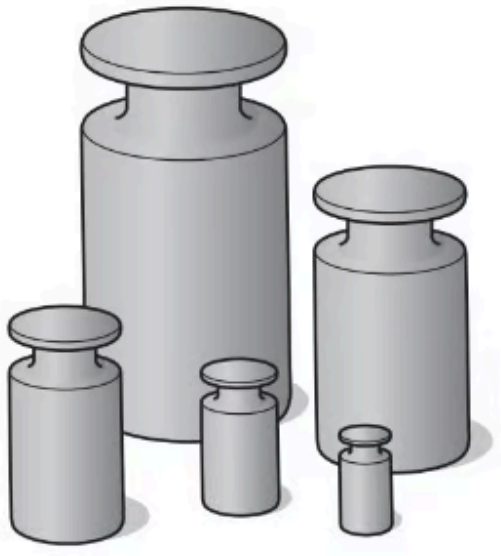

Fig. 1.1

Identify the quantity that is the same for all the masses.

Tick **one** box.

- ☐ density
- ☐ volume
- ☐ weight

[1 mark]

Question 1b

The largest mass is 2.5 kg.

State the number of grams in 2.5 kg.

2.5 kg = ... g

[1 mark]

Question 1c

The three largest masses are 2.5 kg, 1.0 kg and 0.5 kg.

Calculate the combined weight of these three masses. Include the unit.

weight = ...

[4 marks]

Question 2a

Fig. 2.1 shows a wooden raft. The raft is made from 8 logs.
The logs are all of the same type of wood.

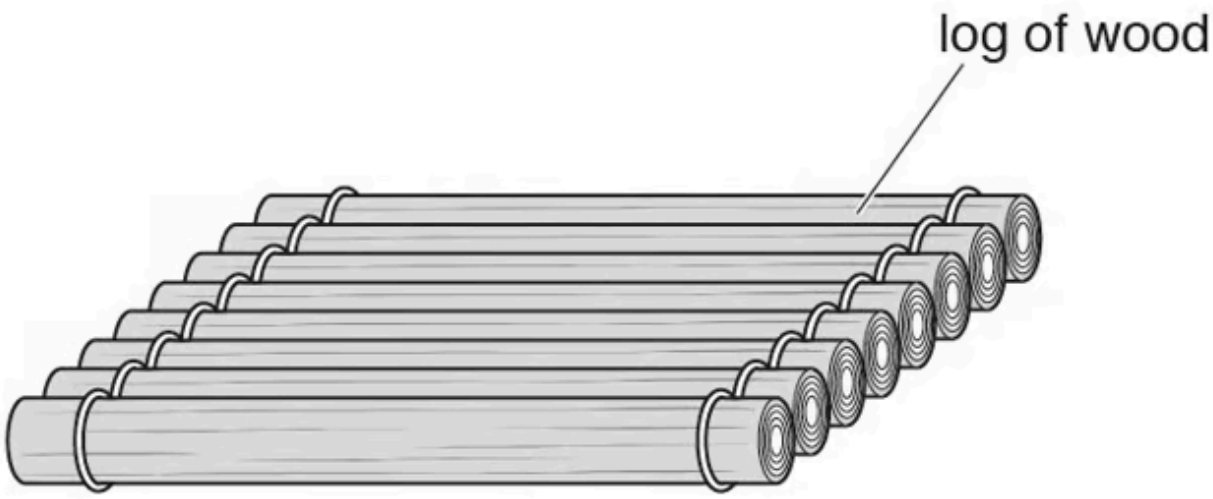

Fig. 2.1

The average mass of each log is 65.0kg.
Calculate the total weight of the raft.

total weight of the raft = ... N

[3 marks]

Question 2b

(i) The mass of one of the logs is 66.0kg. It is 3.0m long and has a cross sectional area of 0.040m^2.

Calculate the density of the wood in the log.

density = ... kg / m^3 [3]

(i) Explain why the log in **(b)(i)** floats on water.

[1]

[4 marks]

Question 3a

Identify the unit that is used for mass.

Tick **one** box.

- ☐ kg
- ☐ N
- ☐ m^3

[1 mark]

Question 3b

A student is asked to write definitions for mass and weight.

For each of their answers insert the missing word, selected from the list below.

force gravity kilogram mass matter newton rest

(i) Mass is a measure of the quantity of ..... in an object at ..... relative to an observer.

[2]

(ii) Weight is a gravitational ..... on an object that has .....

[2]

[4 marks]

Question 3c

A student needs to determine the density of a sample of oil.

They measure 0.001 m^3 of oil and find it has a mass of 0.75 kg.

(i) State the equipment the student uses to find the mass of oil.

[1]

(ii) Calculate the density of the oil.

[2]

[3 marks]

Question 3d

Extended tier only

The oil in part (c) is poured into a beaker of water.

Assuming that the liquids do not mix, explain which liquid floats.

[2 marks]

Question 4a

An astronaut travels from Earth to the Moon.

Gravitational field strength on Earth = 9.8 N/kg

Gravitational field strength on the Moon = 1.6 N/kg

Identify the quantity that is the different for the astronaut on the Moon compared to the Earth.

Tick **one** box.

- ☐ mass
- ☐ weight
- ☐ density

[1 mark]

Question 4b

The mass of the astronaut is 65 kg on Earth.

(i) Calculate the astronaut's weight on Earth.

[2]

(ii) Calculate the astronaut's weight on the Moon

[1]

[4 marks]

Question 4c

Complete the following sentence.

The astronaut's weight on Earth is more than their weight on the Moon because, although their ..... is the same, the ..... force on Earth is .....

[3 marks]

Question 4d

What piece of equipment can be used to compare the mass and weight of the astronaut while they are still on Earth?

[1 mark]

Question 5a

Fig. 1.1 shows laboratory equipment used to find the density of an irregularly shaped solid.

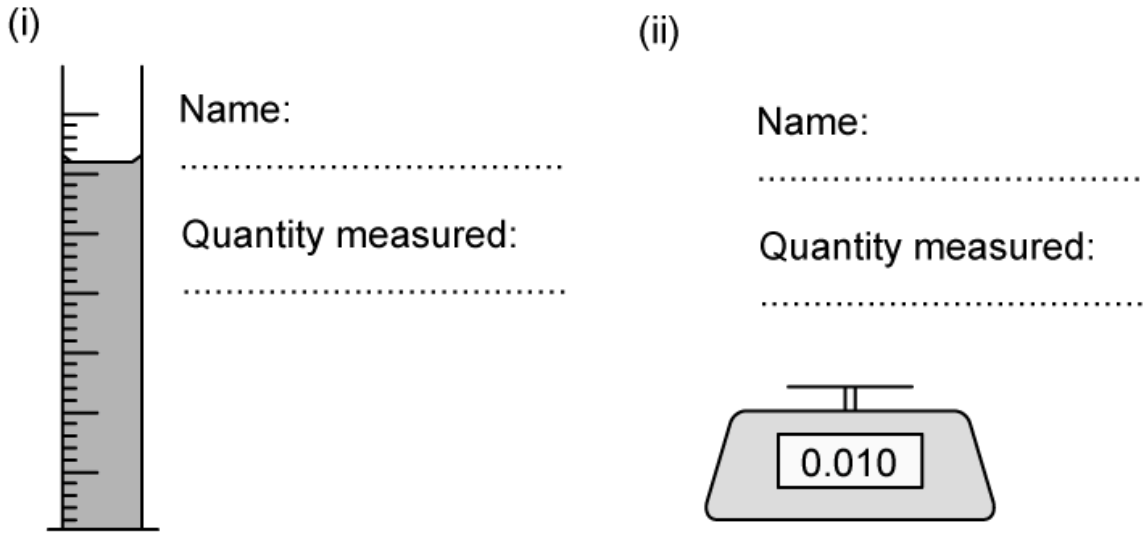

Fig. 1.1

For each piece of equipment add a label stating the name and the quantity measured.

[4 marks]

Question 5b

Explain how a student can find the volume of a piece of modelling clay of irregular shape using only the equipment in part (a)

[4 marks]

Question 5c

The volume of the modelling clay is found to be 64 cm^3.

State the volume in m^3.

[1 mark]

Question 5d

The mass of the modelling clay is 60 g.

(i) Determine the mass in kg.

[1]

(ii) Calculate the density of the modelling clay, stating your answer in terms of S.I. units.

[3]

[4 marks]