Mass, Weight & Density

Question Paper

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

Time Allowed 60

Score /42

Percentage /100

Question 1a

Fig. 1.1 shows a coil of wire.

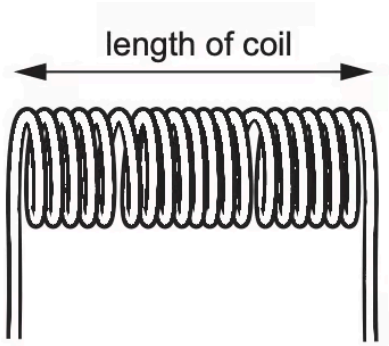

Fig. 1.1 (not to scale)

A student measures the length of the coil using a ruler. His measurement is 3.8 cm.

There are 20 turns of wire in the coil. The student uses his measurement to calculate the average thickness of the wire.

(i) Show that the average thickness of the wire is about 0.2 cm.

average thickness of wire = ... cm [2]

(ii) The student's measurement of 3.8cm is inaccurate.

Suggest one reason why the measurement is inaccurate.

[1]

[3 marks]

Question 1b

The volume of the wire in the coil is 16.6 cm^3 and its mass is 148 g.

Calculate the density of the metal used for the wire in the coil.

density = ... g/cm^3

[3 marks]

Question 1c

The student has a measuring cylinder and a beaker of water, as shown in Fig. 1.2.

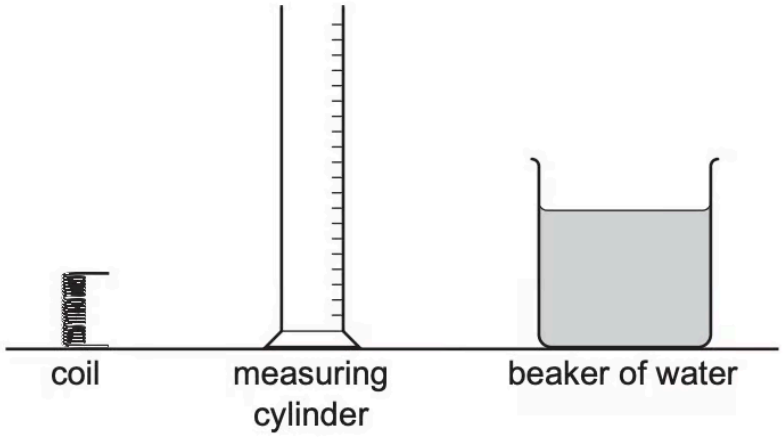

Fig. 1.2

Describe how the student can determine the volume of the coil by using the equipment shown in Fig. 1.2.

[4 marks]

Question 2a

A 250 cm^3 beaker containing some liquid is shown in Fig. 2.1.

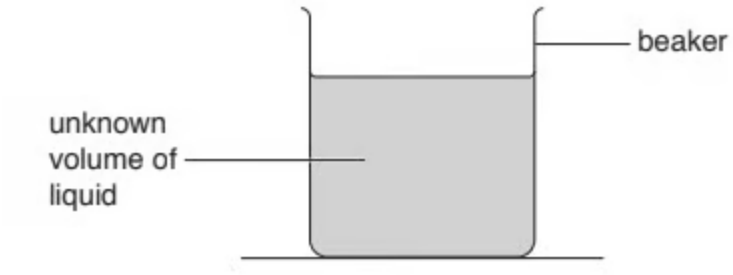

Fig. 2.1

(i) A student has a measuring cylinder and a balance.

Describe an experiment to determine the density of the liquid.

[5]

(ii) Suggest the unit of density used by the student.

[1]

[6 marks]

Question 2b

Fig. 2.2 shows a block of polythene.

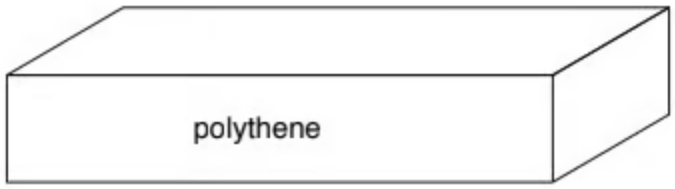

Fig. 2.2

(i) Polythene floats in water. Explain why polythene floats.

[1]

(ii) The weight of the polythene block is 0.84 N.

Calculate the mass of the block.

mass = ... kg [3]

[4 marks]

Question 3a

A student has an irregularly shaped piece of metal, a beaker of water and a measuring cylinder, as shown in Fig. 2.1.

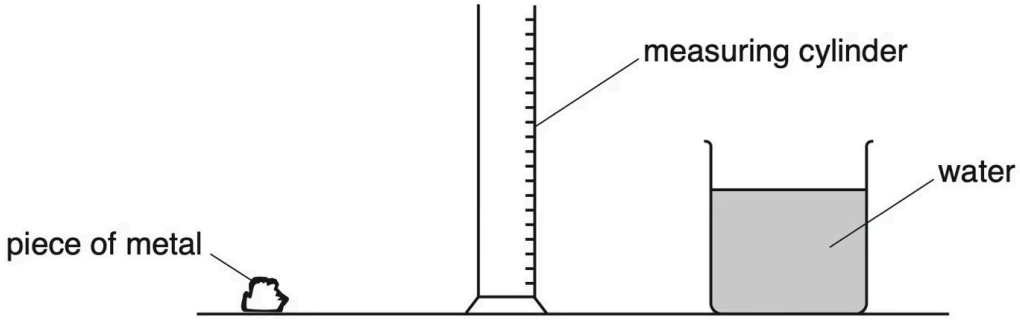

Fig. 2.1

Describe how the student can accurately determine the volume of the piece of metal using the equipment provided.

[4 marks]

Question 3b

The student measures the mass of the piece of metal. Its mass is 146 g.

(i) State the name of the instrument used to measure the mass.

[1]

(ii) The volume of the piece of metal is 20 cm^3.
Calculate the density of the metal. State the unit.

density = ... [4]

[5 marks]

Question 4a

Fig. 2.1 shows a raft floating on water.

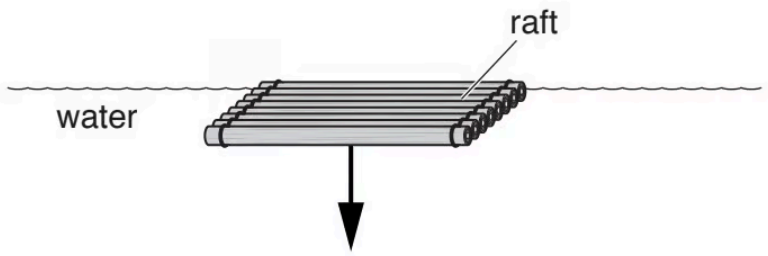

Fig. 2.1

A force of 20 000 N acts on the raft in the direction of the arrow shown in Fig. 2.1.

(i) State the name given to the force shown in Fig. 2.1.

[1]

(ii) Calculate the mass of the raft.

mass = ...kg [3]

[4 marks]

Question 4b

A sail is added to the raft, as shown in Fig. 2.2.

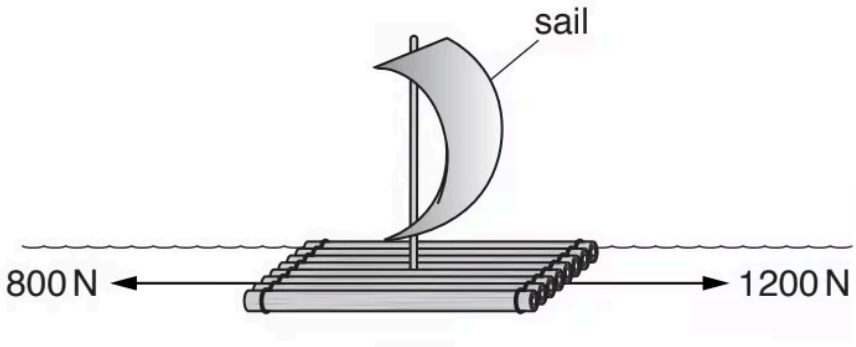

Fig. 2.2

Fig. 2.2 shows the horizontal forces acting on the raft at one moment.

Calculate the resultant horizontal force acting on the raft and state the direction of this force.

force = ... N

direction = ...

[2 marks]

Question 5a

Explain, in terms of their molecules, why the density of water is greater than that of oil.

[1 mark]

Question 5b

State the difference between mass and weight.

[1 mark]

Question 5c

The mass of a bucket is 1.2 kg.

When the bucket is filled with oil the total mass is found to be 14.1 kg.

Calculate the weight of the oil.

weight of oil =.....

[3 marks]

Question 5d

The volume of the oil in the bucket is 0.0163 m^3.

Calculate the density of the oil.

density = ...

[2 marks]