

# Mass, Weight & Density

## Question Paper

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

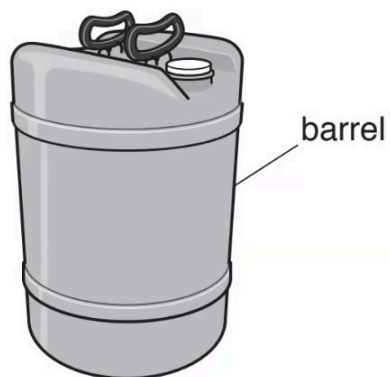
**Time Allowed**      **60**

**Score**                **/47**

**Percentage**        **/100**

**Question 1a**

Fig. 1.1 shows a plastic water barrel. The barrel is full of water.



**Fig. 1.1**

The water barrel contains  $0.050 \text{ m}^3$  of pure water. The density of pure water is  $1000 \text{ kg/m}^3$ .

Calculate the mass of pure water in the barrel.

mass of water = ..... kg  
[3 marks]

**Question 1b**

The density of sea water is  $1030\text{kg/m}^3$ . The density of the plastic is  $1000\text{kg/m}^3$ . Use this information and the information in (a) to state and explain whether the full barrel will float in sea water.

**[2 marks]****Question 2a**

A student has a metal object.

- (i) The student measures the mass of the object.

State the name of the equipment used to measure the mass.

**[1]**

- (ii) The mass of the metal object is  $1260\text{ g}$ . The volume of the metal is  $150\text{ cm}^3$ .

Calculate the density of the metal. Include the unit.

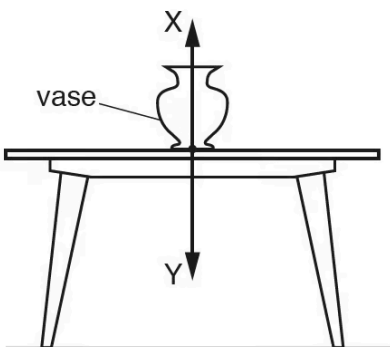
density = ..... **[4]**

- (iii) The mass of the metal object is given in grams. State the mass in kg.

mass = ..... kg **[1]**  
**[6 marks]**

**Question 2b**

A vase is placed on a table. Forces X and Y act on the vase, as shown in Fig. 1.1.



**Fig. 1.1**

The mass of the vase is 0.25 kg. The vase is not moving.

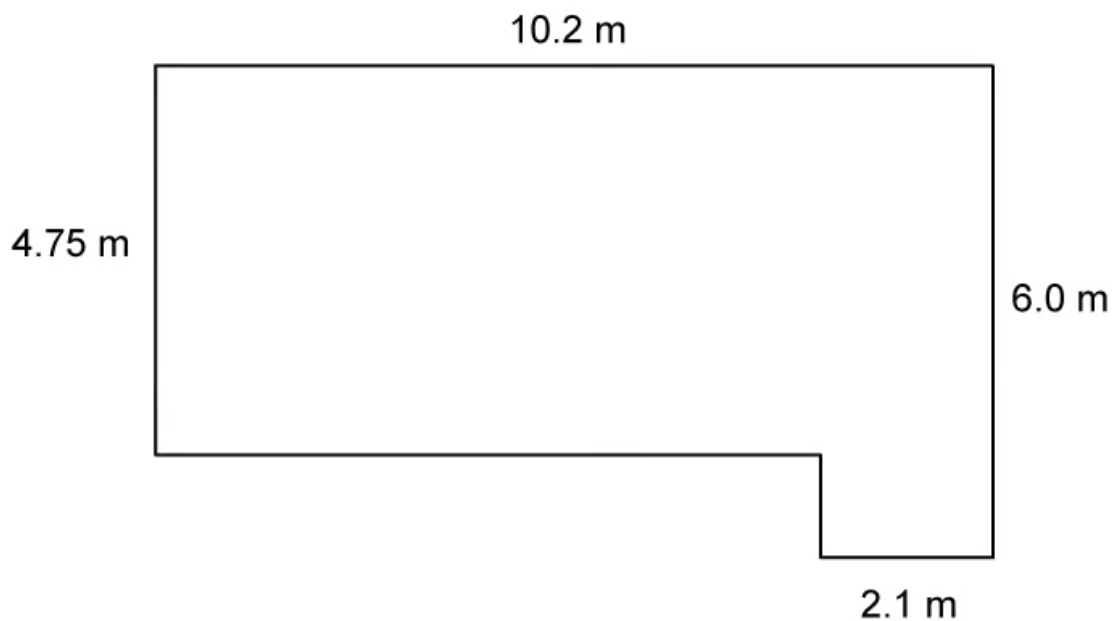
Calculate the value of force X and the value of force Y.

**[4 marks]**

**Question 3a**

A group of students are asked to find the volume of their Physics Laboratory.

Fig. 1.1 is a top view of the room and shows the measurements of each wall.



**Fig 1.1**

The lab has a ceiling which is at constant height, found to be 3.5 m.

- (i) State an instrument that would be suitable to make these measurements.
- (ii) Describe a method the students could use to reduce errors in their measurements.
- (iii) Explain how they should ensure the results are reliable.

[1]

[2]

[2]

**[5 marks]**

**Question 3b**

Calculate the volume of air in the room.

[4 marks]

**Question 3c**

The density of the air is  $1.2 \text{ kg / m}^3$ . Calculate the mass of air in the room.

[3 marks]

**Question 3d**

Describe a method the students could use to find the density of air. You do not need to include details of the calculation.

The students have been provided with the following equipment:

Balloon  
Large measuring cylinder  
Bucket  
Water  
Digital scales

[6 marks]

**Question 4a**

In a car boot sale a student sees what the seller says is a model soldier made from copper. The student buys the model, hoping that it is really made from gold.

At Science Club the student is allowed to investigate their theory.

Describe how the volume of the model could be measured.

You may use a diagram if you wish.

**[3 marks]****Question 4b**

The student used a force meter for the next stage of their investigation.

- (i) Describe how the force meter is used to find mass.
- (ii) Explain how the student reduces errors in their reading.

**[3]****[1]****[4 marks]**

**Question 4c**

The mass of the model is 625 g and the volume is 72 cm<sup>3</sup>.

The densities of various metals commonly used in model-making are:

brass	8.73 g/cm <sup>3</sup>
copper	9.0 g/cm <sup>3</sup>
gold	19 g/cm <sup>3</sup>
lead	11 g/cm <sup>3</sup>

By comparison with values in the data table, discuss the student's findings and whether the model is made from either copper or gold.

[4 marks]

**Question 4d**

Another student decides to find the density of a table-tennis ball using the same apparatus.

Discuss a change the student have to make before making their measurements.

[3 marks]