1. Motion, forces and energy

1.3 Mass and weight

Paper 3 and 4

Question Paper

Paper 3

Questions are applicable for both core and extended candidates

1 **(a)** A student has an object with a mass of 5.0 kg.

Calculate the weight of the object.

weight of object = ... N [2]

(b) The student lifts the 5.0 kg object from the floor onto a table. He does 75 J of work on the object in lifting it onto the table.

State the amount of gravitational potential energy gained by the object due to being lifted onto the table.

gravitational potential energy gained by object = ... J [1]

2 Fig. 2.1 shows a closed textbook.

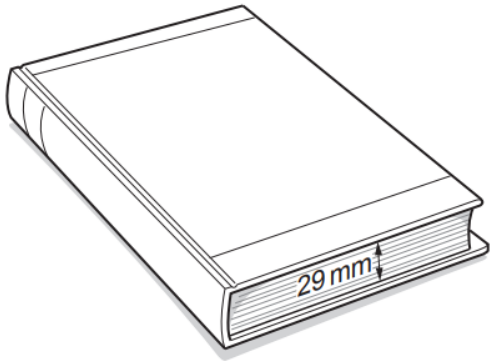

Fig. 2.1

(a) There are 270 sheets of paper in the textbook. The total thickness of the sheets is 29 mm.

Calculate the average thickness of **one** sheet of paper.

average thickness of one sheet = ... mm [3]

(b) The mass of the textbook is 1300 g.

Calculate the weight of the textbook.

weight = ... N [3]

[Total: 6]

3 **(a)** A teacher wants to measure the mass of a block of metal. She also wants to measure the length, width and height of the block.

Fig. 4.1 shows the block of metal.

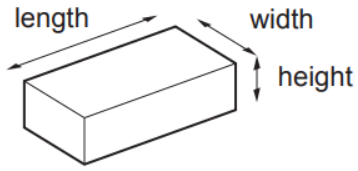

Fig. 4.1

Complete each sentence using a word from the list.

balance **barometer** **protractor** **ruler** **voltmeter**

(i) To find the mass of the metal block, the teacher uses a ..... [1]

(ii) To measure the length, width and height of the metal block, she uses a ..... [1]

(b) The mass of the block is 5000 g.

Calculate the weight of the block.

weight = ... N [3]

(c) Fig. 4.2 shows another block of metal on a solid surface.

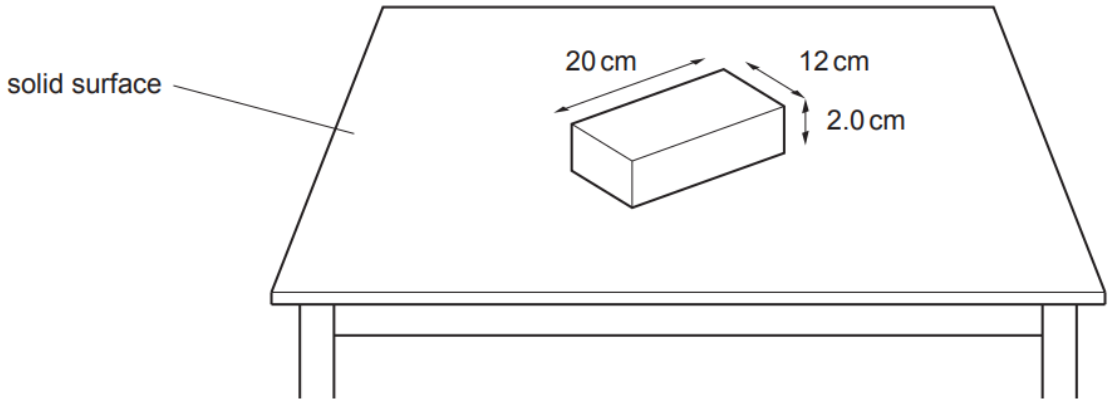

Fig. 4.2 (not to scale)

(i) Calculate the area of the block of metal in contact with the solid surface.

area = ... cm^2 [1]

(ii) The weight of the block of metal in Fig. 4.2 is 60 N.

Calculate the pressure of the block of metal on the solid surface.

pressure = ... N/cm^2 [3]

[Total: 9]

4 Fig. 2.1 shows a beaker containing liquid on a top pan balance.

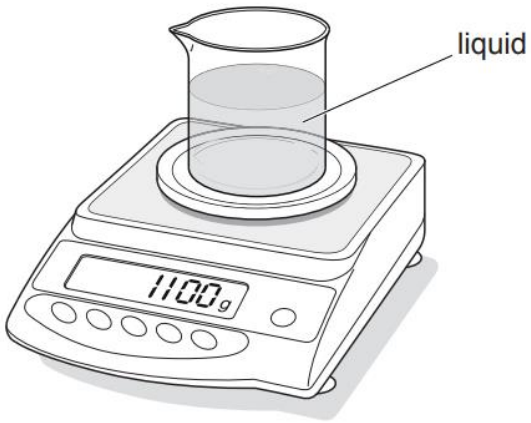

Fig. 2.1

The mass of the empty beaker is 400 g.

(a) Using the information in Fig. 2.1, determine the mass of the liquid in the beaker.

mass = ... g [1]

(b) The beaker contains 750 cm^3 of liquid.

Calculate the density of the liquid.

density = ... g/cm^3 [3]

(c) Calculate the weight of the empty beaker.

weight = ... N [4]

[Total: 8]

5 A student is studying elephants. Fig. 2.1 shows an elephant.

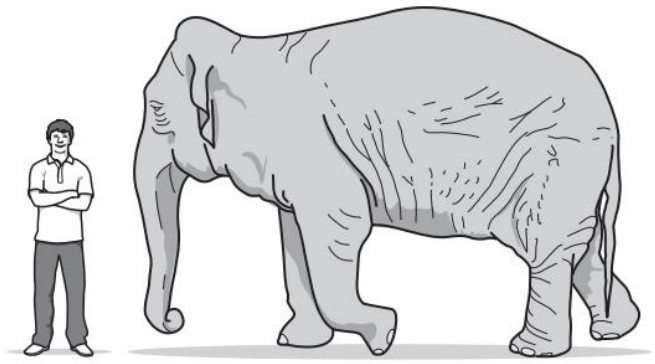

Fig. 2.1

(a) The student measures the elephant and records the values, as shown in the table.

Complete the table by adding a suitable unit for each measurement. Choose the units from those shown in the box.

m^2	kg	cm	mm^2	g	m	cm^2	mg	mm

measurements	value	unit
mass of elephant	4000	
height of elephant	3.0	
average area of an elephant's foot	0.125	

[2]

(b) Using information from the table in **(a)**:

(i) Calculate the weight of the elephant.

weight = ... N [3]

(ii) Calculate the pressure the elephant exerts on the ground when it is standing on four feet. Include a unit.

pressure = ... [4]

[Total: 9]

Paper 4

Questions are applicable for both core and extended candidates unless indicated in the question

6 **(a)** A rocket has an initial mass of 7.4×10^6 kg.

(i) Calculate the initial weight of the rocket.

weight = ... [1]

(ii) Define, in words, the term weight.

.....

..... [1]

7 Fig. 2.1 shows a sign that extends over a road.

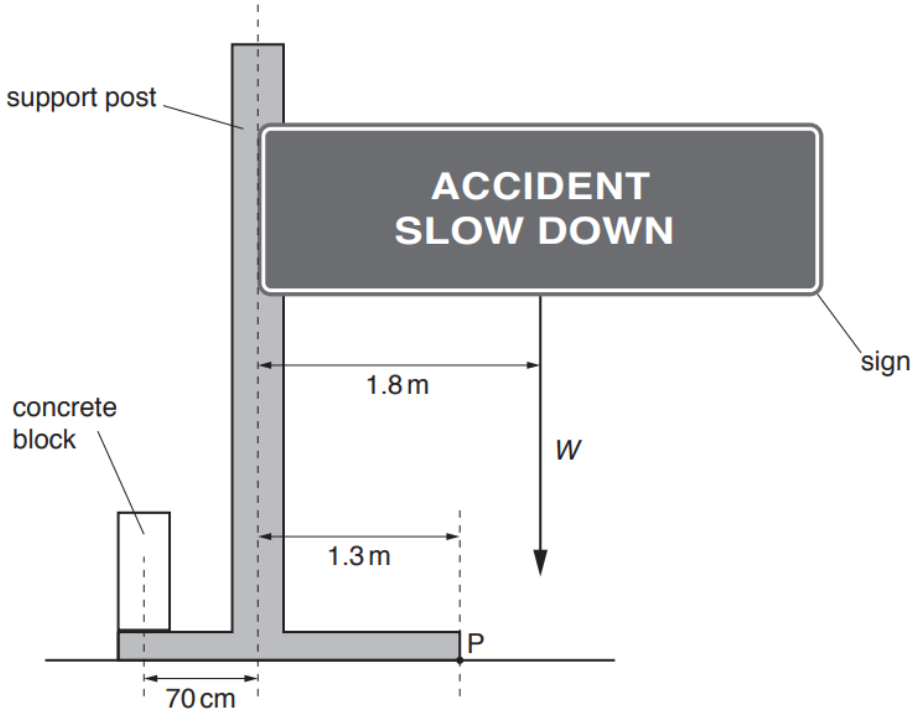

Fig. 2.1

The mass of the sign is 3.4×10^3 kg.

(a) Calculate the weight W of the sign.

W = ... [2]