Topic 4 Mass, Weight and Density

PAPER 1

MULTIPLE-CHOICE QUESTIONS

For each question, there are four possible answers. Choose the one you consider correct and record your choice (A, B, C or D) in the brackets provided.

1. Four students make statements about mass and weight.

   Which statement is correct? (2011/P1/Q4)

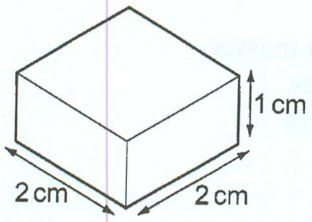
   A Mass is a force, measured in kilograms.
   B Mass is a force, measured in newtons.
   C Weight is a force, measured in kilograms.
   D Weight is a force, measured in newtons.

   ( )

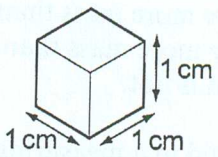
2. Each of the solids shown below has the same mass.

   Which solid has the greatest density? (2011/P1/Q5)

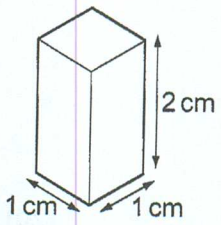
   A

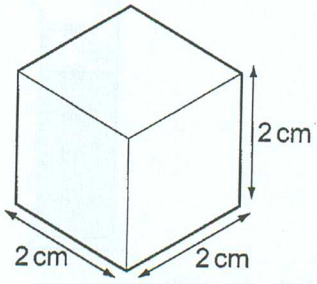
   B

   C

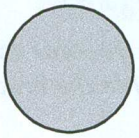
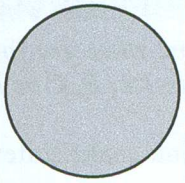
   

   D

   ( )

3. Which sphere has the greatest density? (2012/P1/Q4)

	A	B	C	D
				
mass / g	10	60	210	500
volume / cm^3	1	8	27	64

( )

4. Which row in the table is correct? (2012/P1/Q5)

	mass	weight
A	a force	a force
B	a force	not a force
C	not a force	a force
D	not a force	not a force

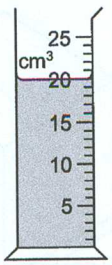
( )

5. Which statement about the masses and weights of objects on the Earth is correct? (2013/P1/Q4)

A A balance can only be used to compare weights, not masses.
B Heavy objects always have more mass than light ones.
C Large objects always have more mass than small ones.
D Mass is a force but weight is not. ( )

6. The diagram shows some liquid in a measuring cylinder.

The mass of the liquid is 16 g.



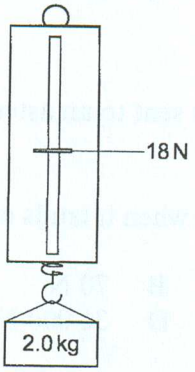
What is the density of the liquid? (2013/P1/Q5)

A 320 g/cm^3 **B** 36 g/cm^3
C 1.25 g/cm^3 **D** 0.80 g/cm^3 ( )

7. The table shows the weight in newtons of a 10 kg mass on each of four planets.

planet	weight of a 10 kg mass / N
Earth	100
Jupiter	250
Mercury	40
Venus	90

The diagram shows a force meter (spring balance) being used on one of these planets.



On which planet is the force meter (spring balance) being used? (2014/P1/Q4)

A Earth
B Jupiter
C Mercury
D Venus

( )

8. The table shows the density of various substances.

substance	density / g/cm^3
copper	8.9
iron	7.9
kerosene	0.87
mercury	13.6
water	1.0

Which statement is correct? (2014/P1/Q5 / 2017/P1/Q5)

A 1 cm^3 of mercury has a greater mass than 1 cm^3 of any other substance in this table.
B 1 cm^3 of water has a smaller mass than 1 cm^3 of any other substance in this table.
C 1 g of iron has a smaller volume than 1 g of copper.
D 1 g of mercury has a greater mass than 1 g of copper.

( )

9. The weights of different masses on four planets are shown.

Which row shows the planet with the greatest gravitational field strength?
(2015/P1/Q5 / 2018/P1/Q5)

	mass / kg	weight / N
A	3.0	15
B	4.0	40
C	5.0	30
D	6.0	48

( )

10. A space probe of mass 500 kg is sent to an asteroid which has a gravitational field strength of 0.014 N/kg.

What is the weight of the probe when it lands on the asteroid? (2016/P1/Q4)

A 7.0 N **B** 70 N
C 3600 N **D** 36 000 N ( )

11. Which property of a body resists a change in its motion? (2017/P1/Q4)

A density **B** mass
C volume **D** weight ( )

12. Which quantity describes the property of a body that resists a change in its motion?
(2018/P1/Q4)

A density **B** inertia
C moment **D** weight ( )

13. A rocket has a mass of 15 000 kg.

When it is on the Moon it experiences the Moon's gravitational field strength of 1.50 N/kg.

What is the weight of the rocket on the Moon? (2019/P1/Q5)

A 1000 N
B 2250 N
C 10000 N
D 22 500 N ( )

PAPER 2

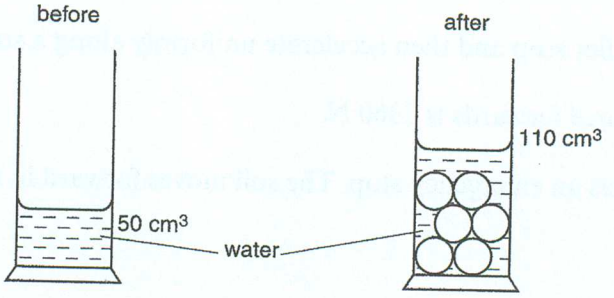
STRUCTURED QUESTIONS

Section A

Answer the following questions.

1. A student drops six identical aluminium balls, each of mass 27 g, into a measuring cylinder containing water.

   The diagram shows the measuring cylinder before and after adding the balls.

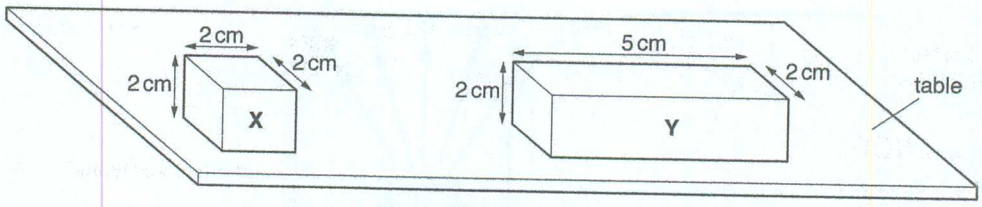


   Calculate the density of aluminium.

   [2]
   (2015/P2/A3)

2. Two blocks, **X** and **Y**, are resting on a table. The dimensions of the blocks are shown in centimetres, cm.

   Each block weighs 0.5 N.

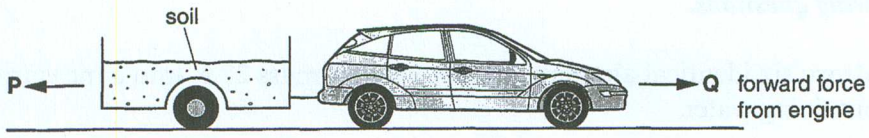


   Calculate the density of block **Y**.

   [2]
   (2017/P2/A1b)

Section B
Answer the following questions.

1. A moving car is pulling a trailer full of soil.



The car has a mass of 1000 kg. The trailer and soil have a total mass of 180 kg.

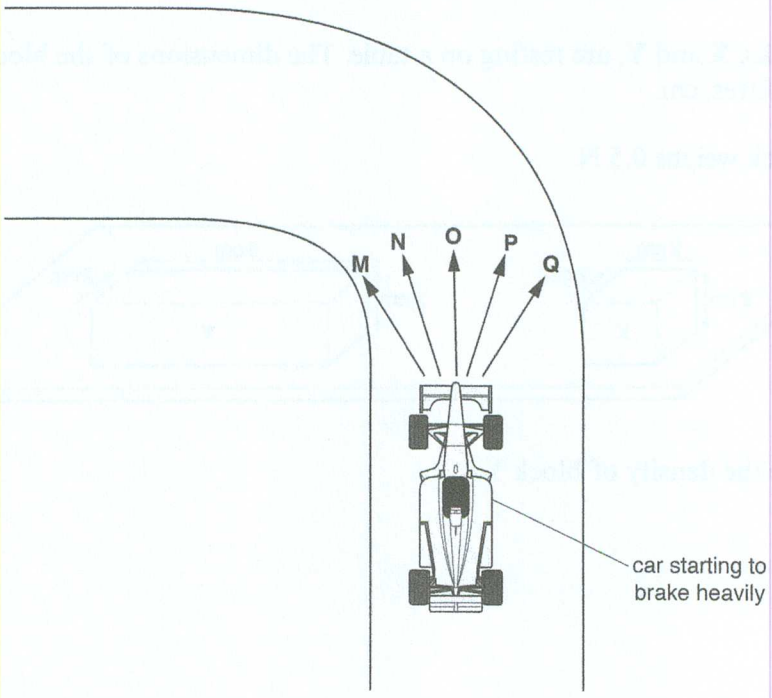
The car and trailer stop and then accelerate uniformly along a straight road for 6 s.

The resultant force forwards is 2360 N.

The driver makes an emergency stop. The soil moves forward in the trailer. State why this happens. [1]
(2014/P2/B7e)

2. A racing car takes 1.25 hours to complete a 350 kilometre race.

During the race it begins to rain and a car brakes heavily as it approaches a bend.



(a) In which direction, **M**, **N**, **O**, **P** or **Q**, is the car most likely to travel when the brakes are applied and all four tyres lose all their grip at the same time on the wet surface? [1]
(b) Explain your choice in (a). [2]
(2017/P2/B7b)