Year 8 Pressure and Rocks HW Questions

35 minutes

46 marks

Q1.   (a)   Helen weighed three pieces of rock and soaked them in water.
The next day, she weighed them again.
Her results are shown below.

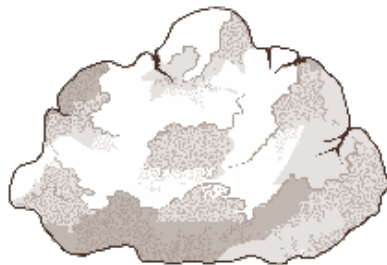| rock	mass before soaking in water (g)	mass after soaking in water (g)
granite	26.3	26.3
marble	20.4	20.4
sandstone	25.5	27.6

Rocks that have lots of small spaces are described as **porous**.

What evidence is there in the table that sandstone is porous, but granite and marble are **not** porous?

....

....

1 mark

(b)   Helen put the soaked sandstone into a freezer for 24 hours.

Water in the spaces in the sandstone froze and expanded.

(i)   What would happen to the sandstone as the water froze and expanded?

....

1 mark

(ii)   In the winter this process happens in rock in the countryside.

What is the name of this process?

....

1 mark

(c)   Helen placed fresh pieces of granite, marble and sandstone in beakers of dilute sulphuric acid. Only the marble reacted with the acid.
Only the marble reacted with the acid.

Use Helen's results to explain why granite is more suitable than marble for a statue in a city centre.

....

....

1 mark

(d) (i)   Draw a line from the name of each rock below to the group of rocks it belongs to.

(ii) Draw a line from each group of rocks below to the way the group of rocks was formed.

name of rock	group of rocks	way the group of rocks was formed
granite	sedimentary	the effect of high temperature and pressure on limestone
marble	igneous	formed when magma cools
sandstone	metamorphic	particles are deposited in layers

4 marks

maximum 8 marks

Q2.   The drawing below shows a gemstone set in a gold ring.

Crystals of gemstones are found in different rocks.

(a)   There are three groups of rocks:

igneous   metamorphic   sedimentary

(i)   Crystals can be found in rocks that have been changed into different rocks by high temperature and high pressure.

Which group of rocks is formed in this way?

....

1 mark

(ii) Crystals can be found in rocks formed by the cooling of hot magma.

Which group of rocks is formed in this way?

....

1 mark

(b) How does the rate at which magma cools affect the size of the crystals formed?

....

....

1 mark

(c) Gemstones called rubies are made from an aluminium compound with the formula Al_2O_3.

The chemical symbol for aluminium is Al.

(i) Give the name of the element that is combined with aluminium in this compound.

....

1 mark

(ii) Suggest the name of the compound with the formula Al_2O_3.

....

1 mark

(iii) How many atoms are there in the formula Al_2O_3?

....

1 mark

(d) (i) The gemstone in the drawing is set into a gold ring.
Gold is an element that is found in rocks.
Gold is never found combined with other elements.

Part of the reactivity series of metals is shown below.

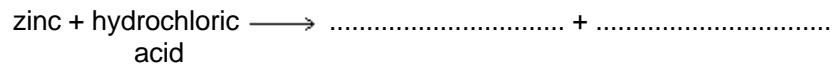more reactive   aluminium
zinc
lead
less reactive   copper

Where should gold be placed in this reactivity series?

....

1 mark

(ii)   The more reactive metals react with acids.

Complete the word equation for the reaction of zinc with hydrochloric acid.

zinc + hydrochloric ⟶ .... + ...
            acid

2 marks
maximum 9 marks

Q3.   The diagram below shows a section through a volcano.
Magma is moving up from a magma chamber.
Some of the magma erupts to form lava.
The liquid lava cools and becomes solid rock.
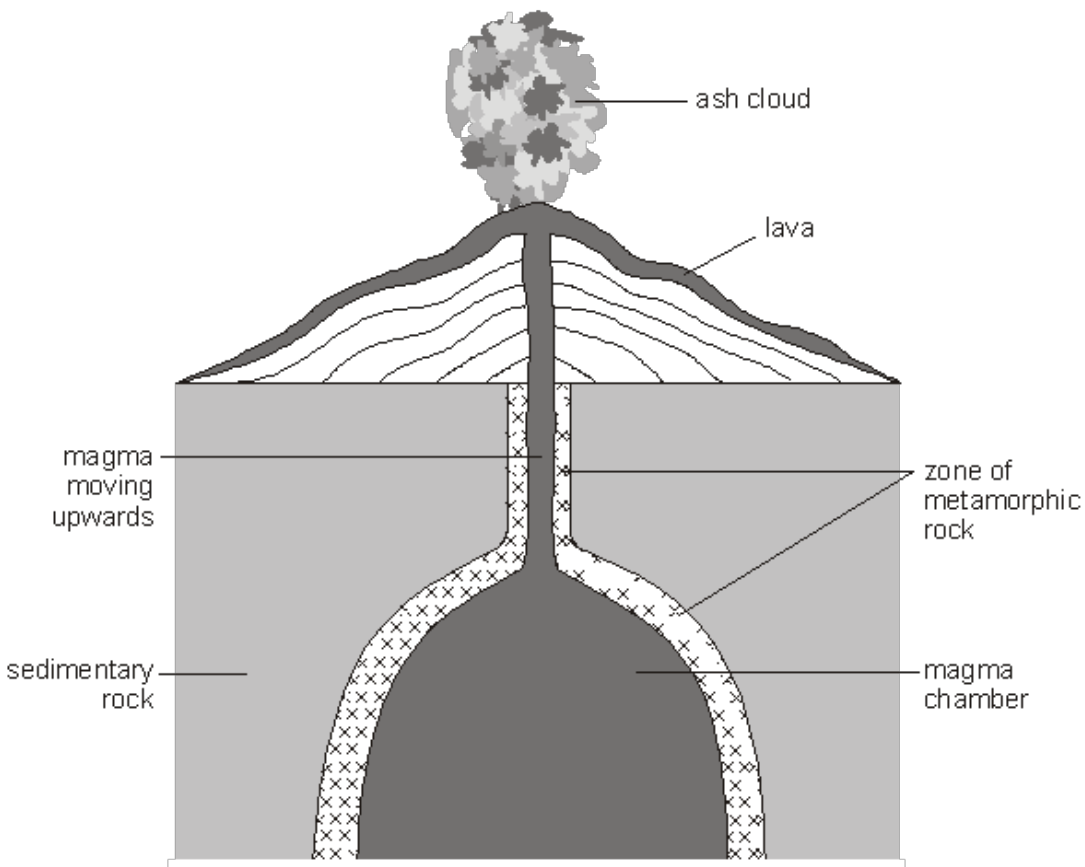
(a)   Explain why magma deep underground stays liquid longer than lava on the surface.

....

....

1 mark

(b)   As the magma cools underground, it solidifies and crystals are formed.

(i)   In what way will these crystals be different from the crystals formed when lava solidifies above ground?

....

1 mark

(ii)   Give the reason for your answer.

....

....

1 mark

(c)   A zone of rock surrounding the magma has become a metamorphic rock.

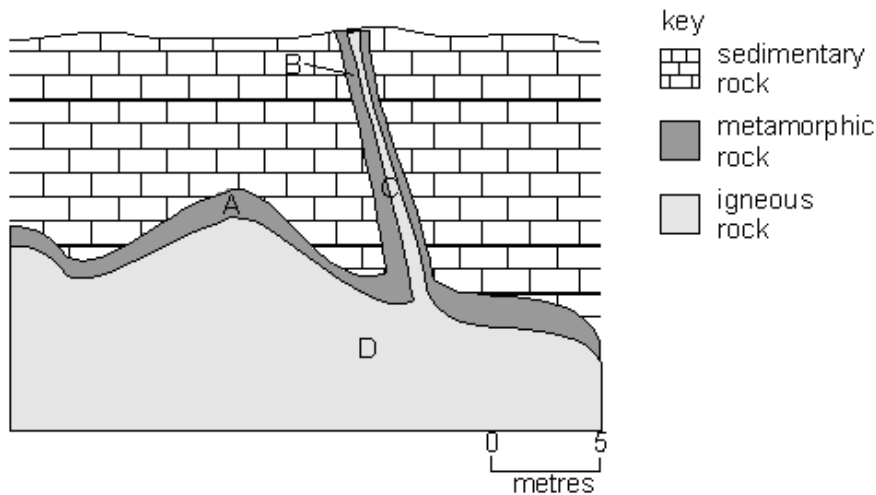(i)   What conditions would cause this to happen?

....

....

1 mark

(ii)   Give the name of the metamorphic rock which is formed from limestone in this way.

....

1 mark
maximum 5 marks

##

The diagram shows part of a rock face. The igneous rock was formed when magma intruded into the sedimentary rock. The metamorphic rock was formed from the sedimentary rock as a result of the magma cooling.

(a) What is the change of state when magma crystallises to form igneous rock?

From .... to ....

1 mark

(b) The magma cooled more quickly at point **C** than at point **D**. What effect did this have on the size of the crystals formed at point **C** compared to the crystals at point **D**?
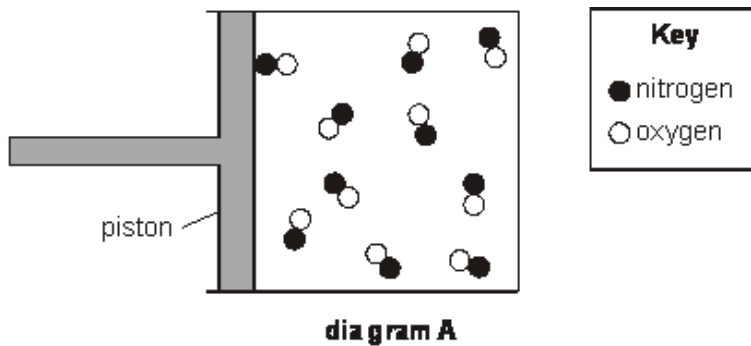
At point **C** ....

....

1 mark

(c) Explain why a thicker band of metamorphic rock has formed at point **A** than at point **B**.

It is thicker at point **A** because ....

....

....

1 mark

Maximum 3 marks

Q5. Diagram **A** represents a gas in a container.
The gas can be compressed by moving the piston to the right.

diagram A

(a) (i) How can you tell that the substance in the container is a gas?
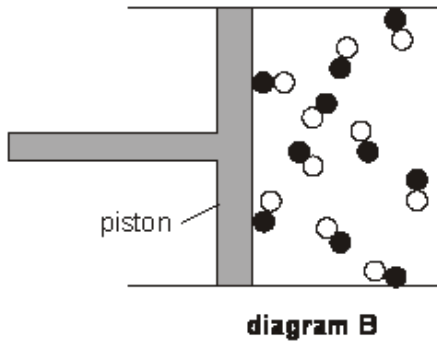
....

....

1 mark

(ii) How can you tell from the diagram that the gas is pure?

....

....

1 mark

(b)   The piston is moved to the right as shown in diagram **B**.

diagram B

How can you tell, from diagram **B**, that the pressure of the gas has increased?

....

....

1 mark

(c)   Diagram **C** shows what happened to the molecules after the gas was
compressed more.
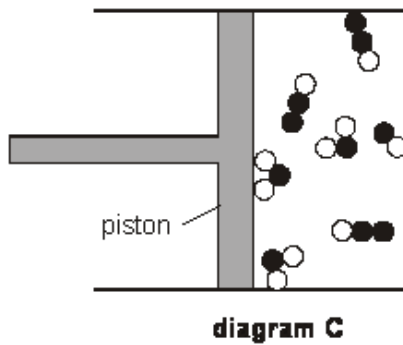
diagram C

(i)   How can you tell that a chemical reaction happened when the gas was
compressed?

....

....

1 mark

(ii)   The mass of the gas in both diagrams **B** and **C** was 0.3 g.

Why did the mass of the gas **not** change when it was compressed?

....

....

1 mark

(iii)   Complete the table below with the correct chemical formula of each substance. Use the key to help you.
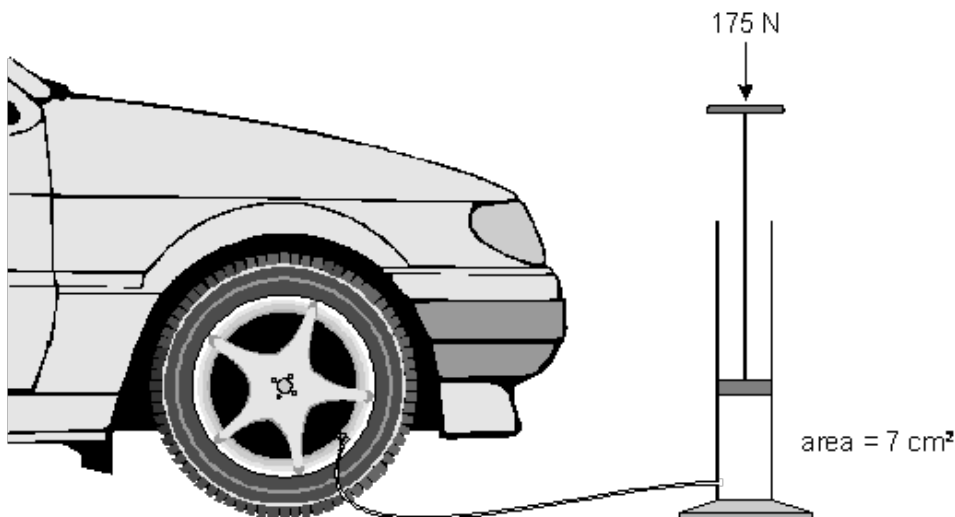
substance	formula
●○	
●●○	
(triangular cluster)	

Key
● nitrogen
○ oxygen

1 mark

(iv)   What is the **name** of the substance represented by the symbol ●○?

....

1 mark

maximum 7 marks

Q6.   Karen wants to pump up her car tyre.
Her pump has a piston with an area of 7 cm^2.

175 N

area = 7 cm^2

Karen pushes the handle down with a force of 175 N.

(a)   What pressure does she exert on the air in the pump?

....

.... N/cm^2

1 mark

(b)   The air pressure in the tyre is 27 N/cm^2.
        What pressure would be needed **in the pump** in order to pump more air into the tyre?

        ....

        ....

                                                                                            1 mark

(c)   Another of Karen's car tyres exerts a pressure of 30 N/cm^2 on the road. The area of the

        tyre in contact with the road is 95 cm^2
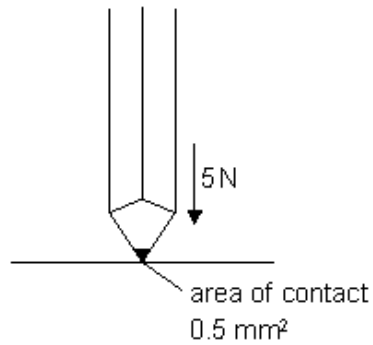   What is the force exerted by the tyre on the road?

        .... N

                                                                                            1 mark
                                                                                    Maximum 3 marks

Q7.   Jenny is doing her homework.

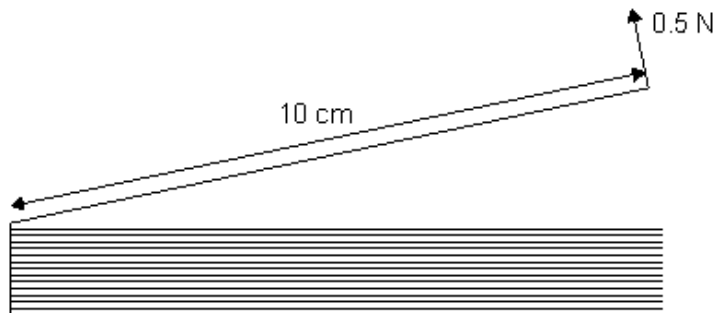(a)   When Jenny writes, the pencil exerts a force of 5N on the paper.

5N

area of contact
0.5 mm²

not to scale

The area of the pencil in contact with the paper is 0.5 mm².

Calculate the pressure of the pencil on the paper.
Give the unit.

....

....

2 marks

(b)   Jenny puts a book on her desk.
She lifts the cover up with her finger, using a force of 0.5 N.
The cover is 10 cm wide.

0.5 N

10 cm

Calculate the turning moment on the cover of the book.
Give the unit.

....

....
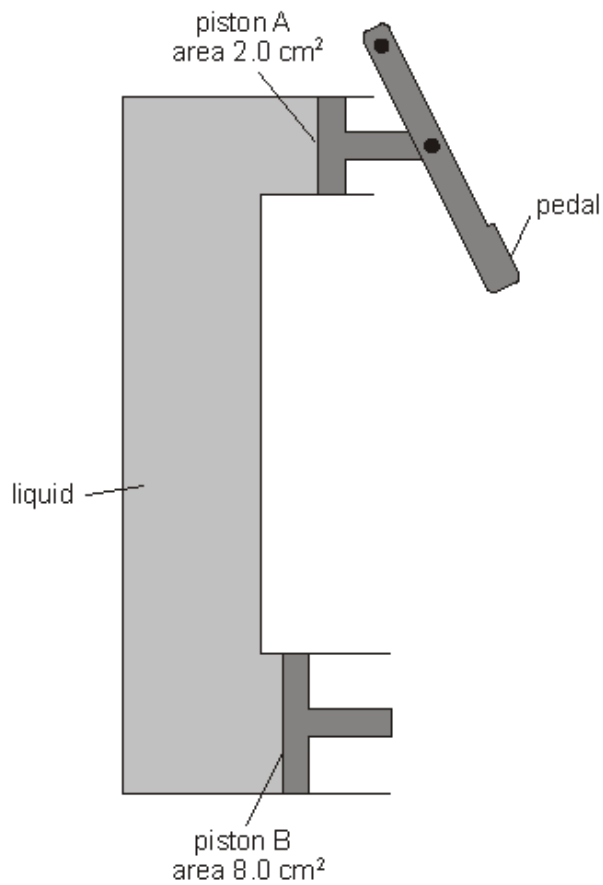
2 marks

(c)   Jenny's book has an area of 200 cm^2.
      It exerts a pressure of 0.05 N/cm^2 on the desk.

      What is the weight of the book?
      Use the space below to show your working.

_____ N

2 marks
maximum 6 marks

Q8.   The diagram below shows a container filled with a liquid.

piston A
area 2.0 cm²

pedal

liquid

piston B
area 8.0 cm²

At each end of the container there is a piston.
Piston A has a smaller area than piston B.

(a)   (i)   Rebekah pushes on the pedal. This produces a force of 200 N on piston A.

Calculate the pressure that piston A exerts on the liquid.
Give the unit.

....

....

2 marks

(ii)   The liquid in the container exerts the same pressure on piston B.

Use this pressure to calculate the force on piston B.

....

.... N

1 mark

(b)   Rebekah set up a different experiment as shown below.
She measured the volume of the liquid and the air in the
cylinders before and after a 200 g load was added to the piston.
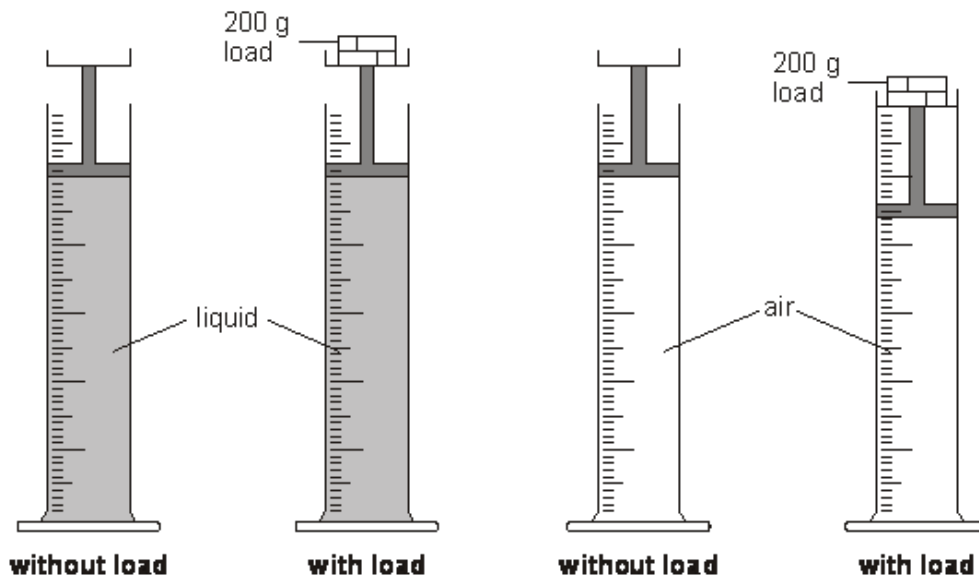
(i)   When the loads were added to the pistons, the volume of the liquid did **not**
change but the volume of the air decreased.

Explain why this happened.

....

....

1 mark

(ii) The diagram on the opposite page represents the way the brake system of
a car works.
The brake pedal pushes piston A.
Piston B pushes the brakes on.

If air bubbles get into the liquid, the brakes do **not** work properly.
Explain why.
Use the diagrams above to help you.

....

....

<div align="right">

1 mark
maximum 5 marks

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