Year 8 Physics Homework

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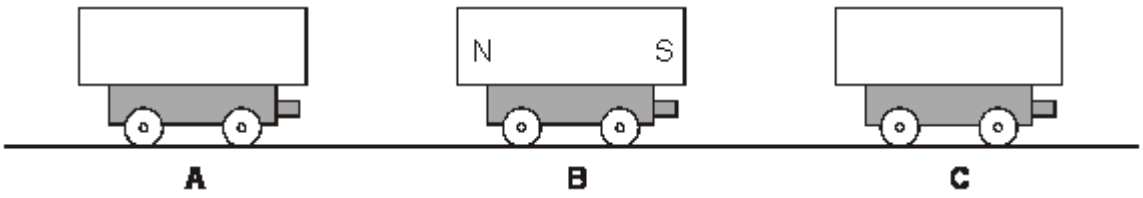
7 8 ELECTRICITY AND MAGNETISM HWK 1

Scientific vocabulary	Definition
circuit breaker	A device that uses an electromagnet to break a circuit if the current is too big.
core (electromagnet)	Soft iron metal which the solenoid is wrapped around.
electric bell	A device that uses an electromagnet to make sound using a 'make and break' circuit.
electromagnet	A non-permanent magnet turned on and by controlling the current through it.
loudspeaker	A device that uses an electromagnet to make sound from a varying potential difference. Turns an electric signal into a pressure wave of sound.
magnet	A material with a magnetic field around it in which a magnetic material experiences a force.
magnetic field	A region in which there is a force on a magnet or magnetic material.
magnetic field lines	Imaginary lines that show the direction of the force on a magnetic material.
magnetic force	Non-contact force from a magnet on a magnetic material.
magnetic poles	The ends of a magnetic field, called north-seeking and south-seeking poles.
magnetise	To make a material magnetic.
permanent magnet	An object that is magnetic all of the time.
solenoid	Wire wound into a tight coil, part of an electromagnet.

Q1. The diagram below shows three trolleys. Peter put a bar magnet on each trolley.

(a) He pushed trolleys A, B and C together.

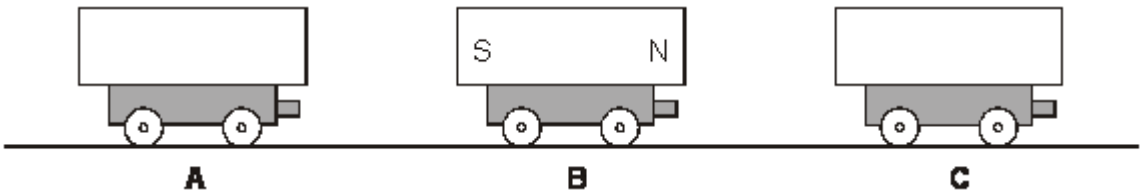
- Magnet B **attracted** magnet A.
- Magnet B **repelled** magnet C.



On the diagram above, label the north and south poles of magnets A and C.
Use the letters N and S.

2 marks

(b) Peter turned trolley B around. Trolleys A and C were **not** turned around.

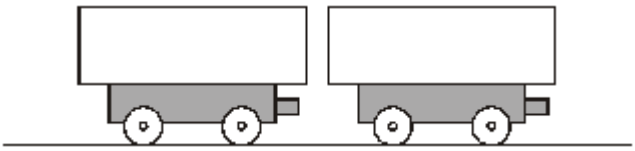


What would happen now when Peter pushed them all together?
Use either **attract** or **repel** to complete each sentence below.

Magnet B would ..... magnet A.

Magnet B would ..... magnet C. 1 mark

(c) Peter held two trolleys close together and then let go.

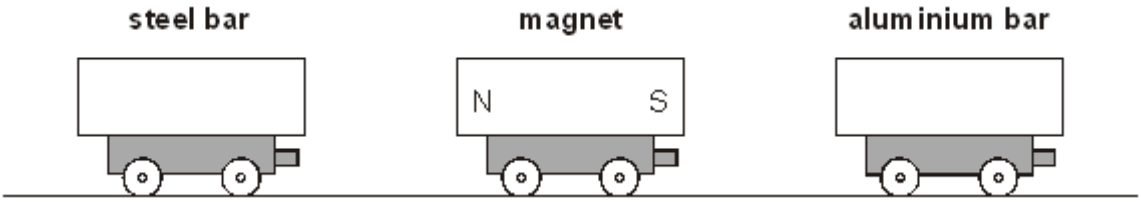


The magnets repelled each other.

Draw an arrow on both magnets to show which way they would move. 1 mark

(d) Peter took a magnet, a steel bar and an aluminium bar.

He put them on three trolleys as shown below.



(i) What happens to the steel bar as he moves it closer to the magnet?

..... 1 mark

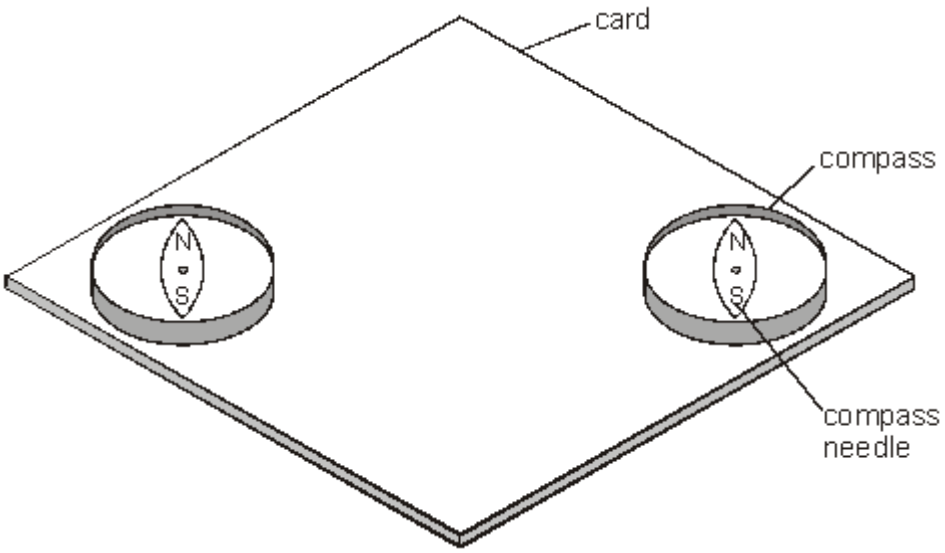
(ii) What happens to the aluminium bar as he moves it closer to the magnet?

.....
.

1 mark
maximum 6 marks

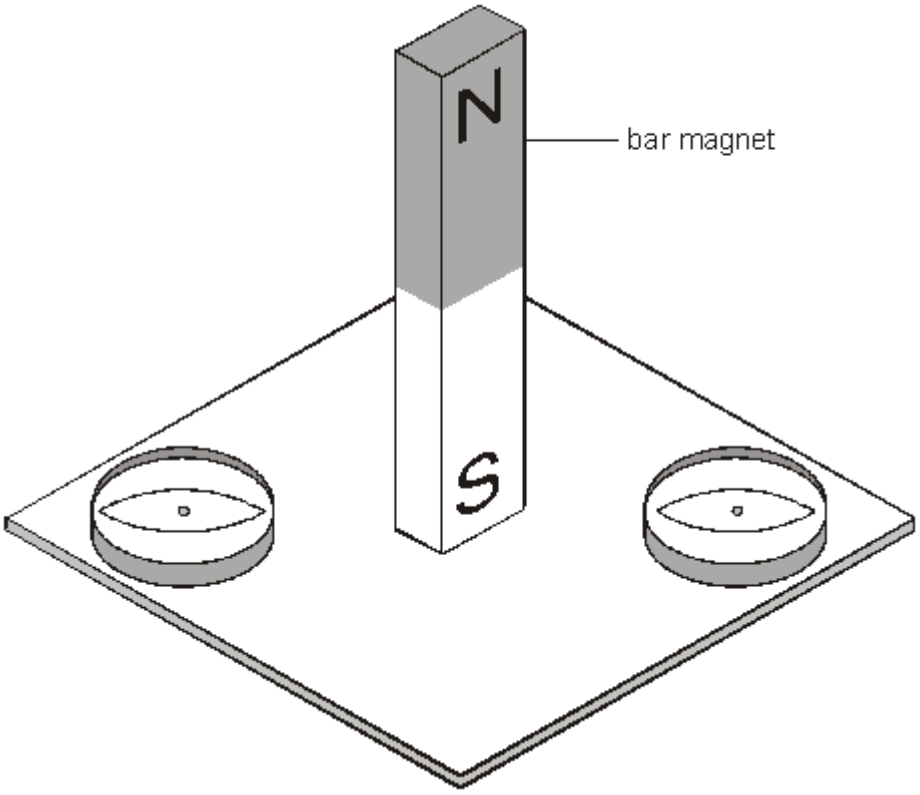
Q2. A compass needle is a small magnet with a North pole, N, and a South pole, S.

Ruth placed two compasses onto a piece of card.
Both compass needles pointed in the direction shown below.



(a) Ruth placed a bar magnet with its **South pole** between the two compasses.
The compass needles moved as shown below.

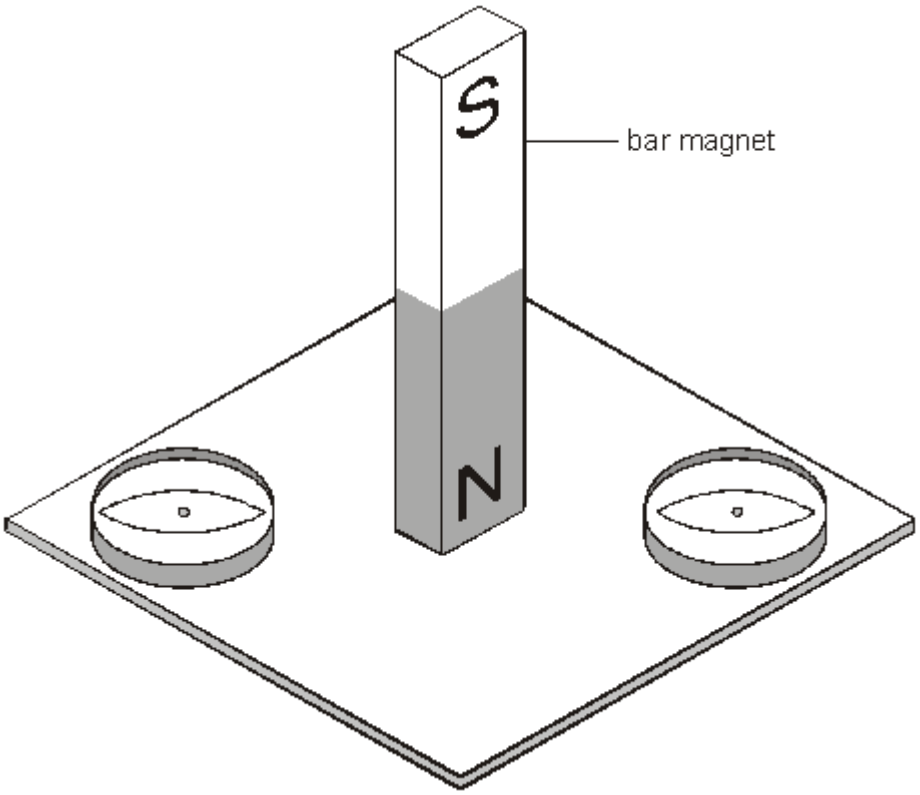
On the diagram below, label the North pole and South pole of each compass needle. Use the letters N and S.



1 mark

(b) Ruth turned the bar magnet round so that the **North pole** was between the two compasses.

On the diagram below, label the North pole and South pole of each compass needle now.
Use the letters N and S.



1 mark

(c) Ruth repeated her experiment with an aluminium bar instead of a bar magnet.

What happened to the compass needles?

.....

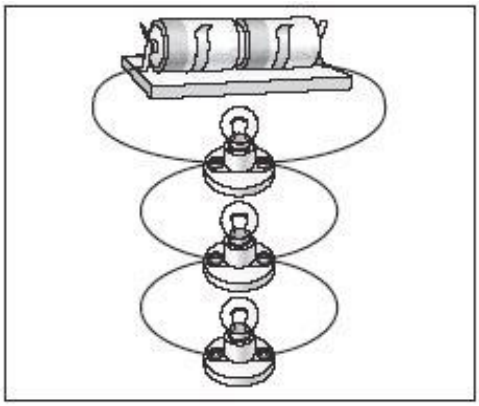
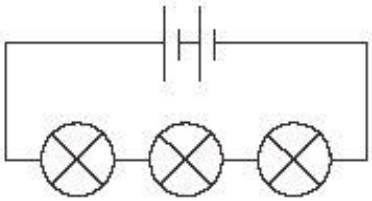
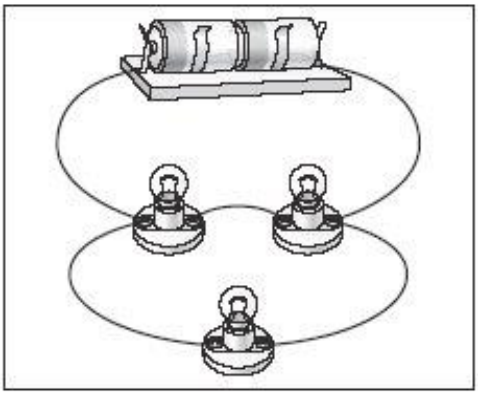
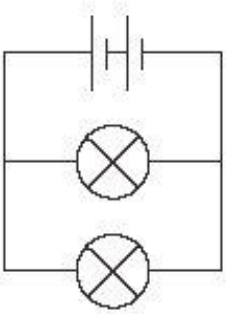
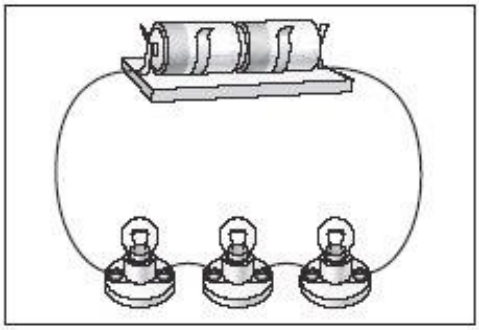
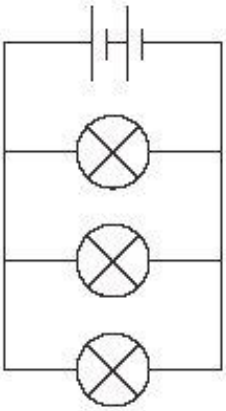
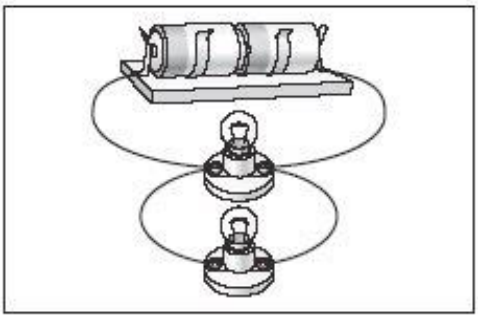
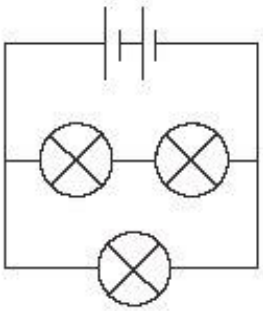
1 mark
maximum 3 marks

Anagram	Definition	Scientific vocabulary word
BE cell relict	A device that uses an electromagnet to make sound using a 'make and break' circuit.	
atom neglecter	A non-permanent magnet turned on and by controlling the current through it.	
aiming deflect	A region in which there is a force on a magnet or magnetic material.	
geocentric mfa	Non-contact force from a magnet on a magnetic material.	
agents compile	The ends of a magnetic field, called north-seeking and south-seeking poles.	
Amman getter Penn	An object that is magnetic all of the time.	
Deon soil	Wire wound into a tight coil, part of an electromagnet.	

New Words

Scientific vocabulary	Definition
ammeter	A device for measuring electric current in a circuit.
amps	Units of measurement of electric current, symbol A.
battery	Two or more electrical cells joined together.
cell	A chemical store of energy, which provides the push that moves charges around a circuit.
current	Flow of electric charge, usually electrons, in amperes (A).
parallel	If some components are in separate loops in an electric circuit.
series	If components in a circuit are in the same loop in an electric circuit.
voltage	The amount of energy shifted from the battery to the moving charge, or from the charge to circuit components, in volts (V).
voltmeter	A device for measuring potential difference (voltage).
volts	Unit of measurement of potential difference (voltage), symbol V.

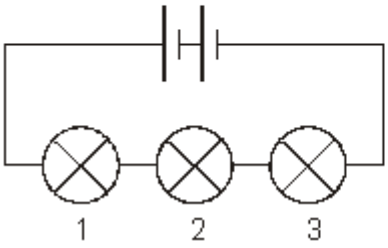
Q1. (a) Draw a line from each electrical circuit to the correct circuit diagram. Draw only **four** lines.

electrical circuit	**circuit diagram**
	
	
	
	

2 marks

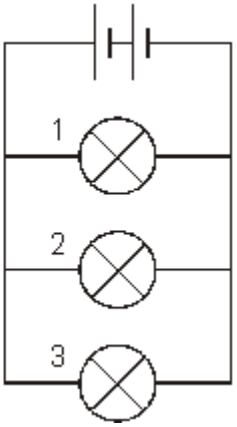
(b) In each circuit below, **bulb 1 breaks** and goes off.

Under each circuit diagram below, tick the correct boxes to show if bulb 2 and bulb 3 are **on** or **off**.



circuit A

	on	off
bulb 1 breaks		?
bulb 2		
bulb 3		



circuit B

	on	off
bulb 1 breaks		?
bulb 2		
bulb 3		

2 marks

(c) Give the name of the part that provides energy for each circuit.

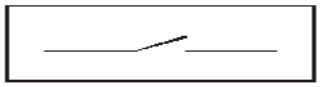
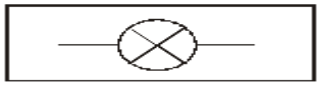
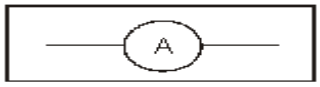
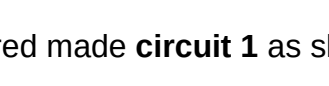
..... 1 mark

(d) Why is copper used for wires in a circuit?
Tick the correct box.

Copper does **not** stick to a magnet.	☐	Copper is a good conductor of electricity.	☐
Copper is a brown metal.	☐	Copper is a good conductor of heat.	☐

1 mark
maximum 6 marks

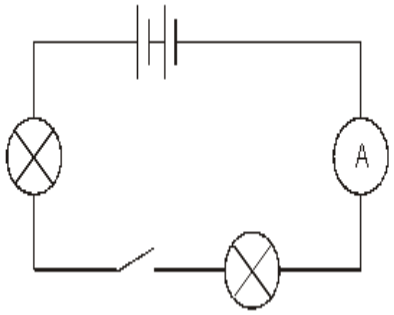
Q2. (a) Draw a line from each circuit symbol below to the correct name. Draw only four lines.

circuit symbol	name
	ammeter
	switch
	motor
	battery
	bulb

3 marks

(b) Fred made **circuit 1** as shown below.

circuit 1

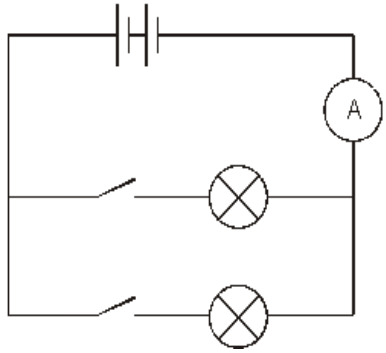


Give the name of the part that is the energy source for the circuit.

..... 1 mark

(c) Fred then made **circuit 2** as shown below.

circuit 2



In the table below, tick a box to show whether **circuit 1** and **circuit 2** are series or parallel circuits.
Tick only **two** boxes.

	series	**parallel**
circuit 1		
circuit 2		

1 mark

(d) What metal is usually used for wires in electric circuits?

.....1 mark

maximum 6 marks

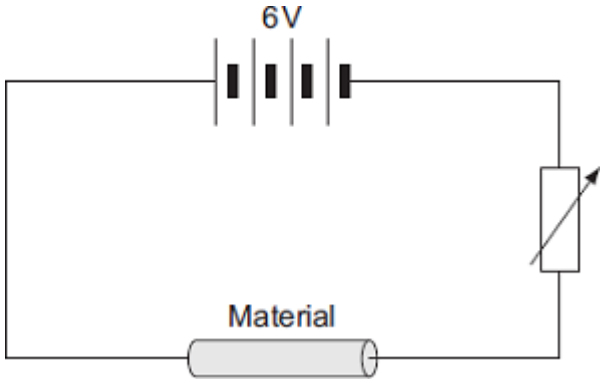
YEAR 8 ELECTRICITY AND MAGNETISM HWK 3

Anagram	Definition	Scientific vocabulary word
arm mete	A device for measuring electric current in a circuit.	
Bert tay	Two or more electrical cells joined together.	
cur tern	Flow of electric charge, usually electrons, in amperes (A).	
all pearl	If some components are in separate loops in an electric circuit.	
I seers	If components in a circuit are in the same loop in an electric circuit.	
Elga tov	The amount of energy shifted from the battery to the moving charge, or from the charge to circuit components, in volts (V).	
melt overt	A device for measuring potential difference (voltage).	

New Words

Scientific vocabulary	Definition
electrical conductor	A material that allows current to flow through it easily, and has a low resistance.
electrical insulator	A material that does not allow current to flow easily, and has a high resistance.
electron	Tiny particles that are part of atoms and carry a negative charge.
ohms	The units of resistance, symbol Ω.
potential difference	The amount of energy shifted from the battery to the moving charge, or from the charge to circuit components, in volts (V).
rating	The value of potential difference at which a cell or bulb operates.
resistance	A property of a component, making it difficult for charge to pass through, in ohms (Ω).
voltage	The amount of energy shifted from the battery to the moving charge, or from the charge to circuit components, in volts (V).
voltmeter	A device for measuring potential difference (voltage).
volts	Unit of measurement of potential difference (voltage), symbol V.

Q1. (a) The diagram shows the circuit used to investigate the resistance of a sample of a material. The diagram is not complete; the ammeter and voltmeter are missing.



(i) Draw the symbols for the ammeter and voltmeter on the diagram in the correct places. **(2)**

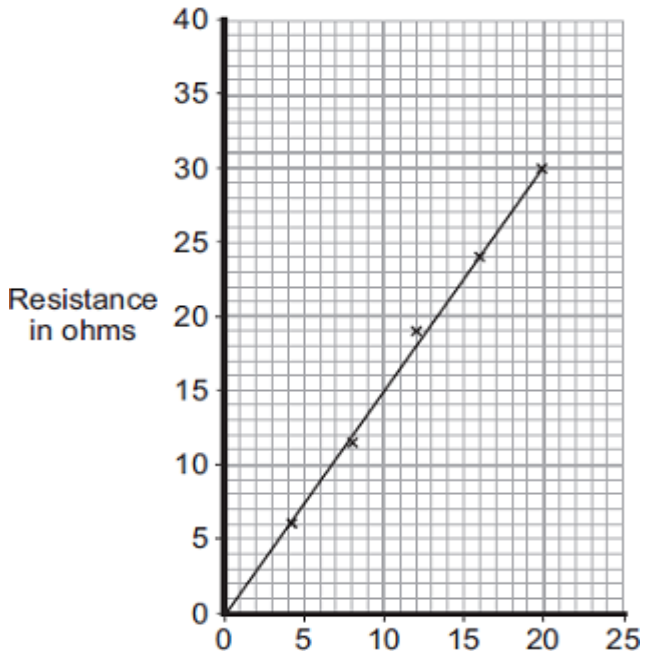
(ii) How can the current through the material be changed?

..... **(1)**

(b) The material, called conducting putty, is rolled into cylinders of different lengths but with equal thickness.

Graph 1 shows how the resistance changes with length.

Graph 1



(i) The current through a 25 cm length of conducting putty was 0.15 A.

Use **Graph 1** to find the resistance of a 25 cm length of conducting putty.

Resistance = ... ohms **(1)**

(ii) Use your answer to **(b) (i)** and the equation in the box to calculate the potential difference across a 25 cm length of conducting putty.

potential difference = current x resistance

Show clearly how you work out your answer.

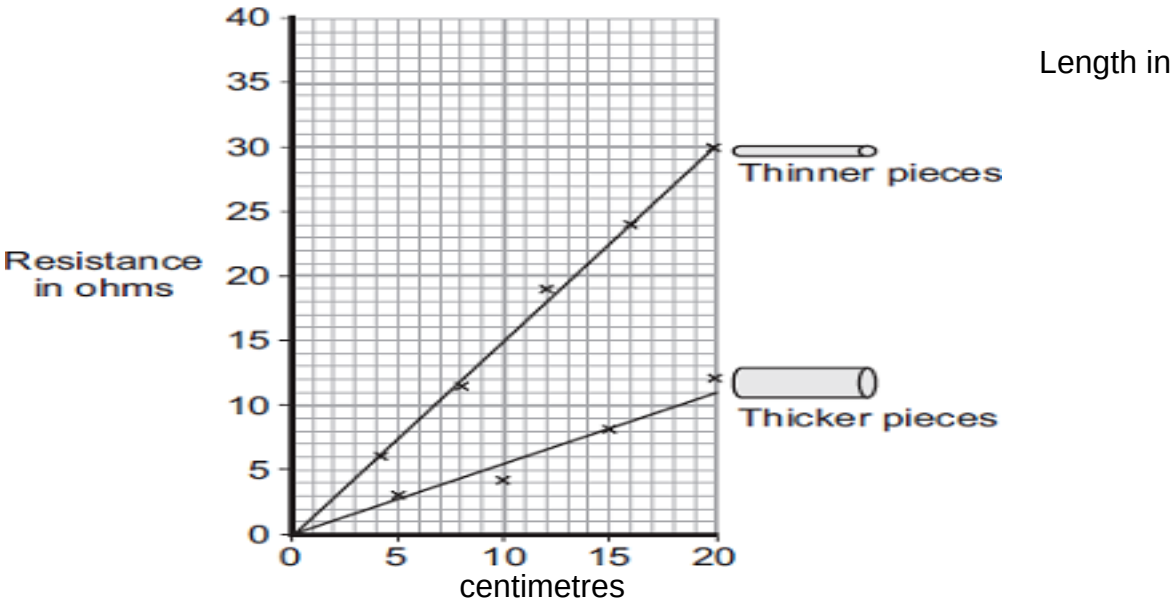
.....

.....

Potential difference = ... volts. **(2)**

(c) A second set of data was obtained using thicker pieces of conducting putty. Both sets of results are shown in **Graph 2**.

Graph 2



(i) What is the relationship between the resistance and the thickness of the conducting putty?

.....

..... **(1)**

(ii) Name **one** error that may have reduced the accuracy of the results.

..... **(1)**

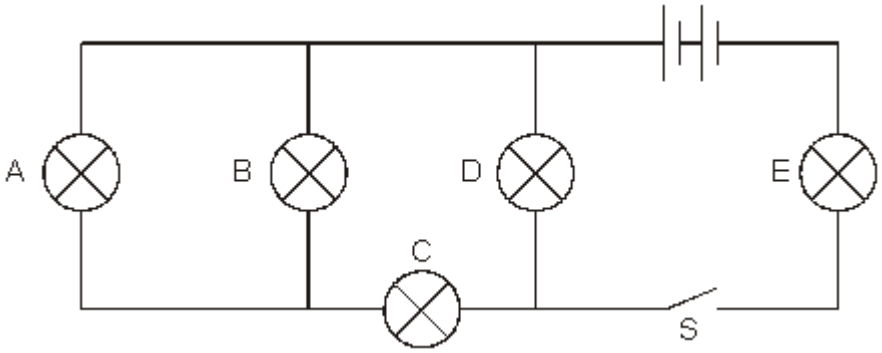
(iii) How could the reliability of the data have been improved?

.....

..... **(1)**

(Total 9 marks)

Q2. (a) Max built **circuit 1** as shown below.



circuit 1

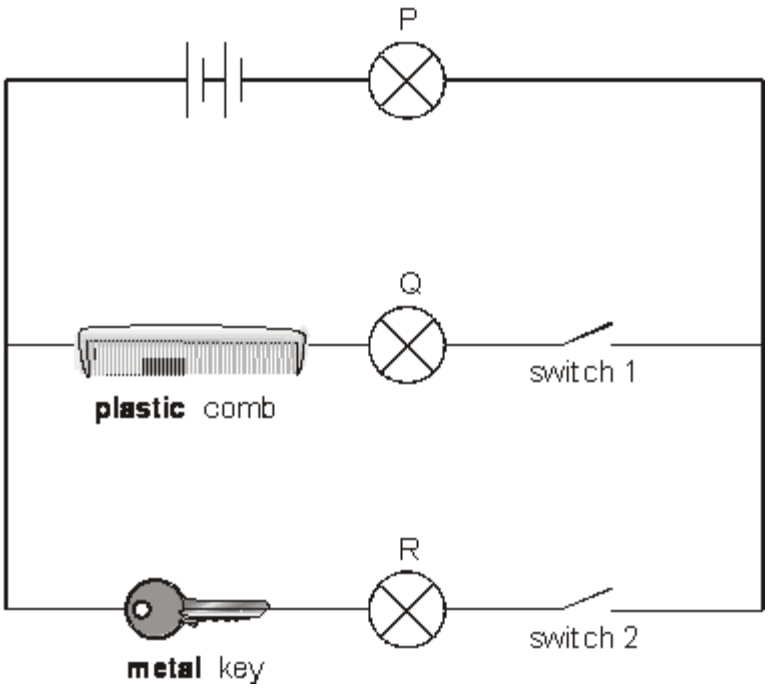
He closed the switch, S, and all the bulbs came on.
One of the bulbs then broke and **all** the bulbs went off.

Which bulb must have broken?
Give the letter.

.....

1 mark

(b) Max built **circuit 2** as shown below.
He connected a plastic comb and a metal key in different parts of the circuit.



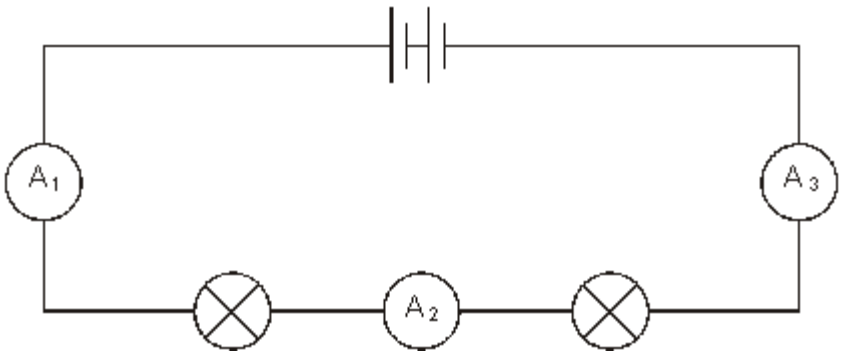
circuit 2

Look carefully at **circuit 2**.
Complete the table below to show which bulbs in circuit 2 will be on or off when
different switches are open or closed.
Write **on** or **off** in the boxes below.

switch 1	switch 2	bulb P	bulb Q	bulb R
open	open	off	off	off
open	closed			
closed	open			

2 marks

(c) Max built **circuit 3** using a battery, two bulbs and three ammeters.



circuit 3

The current reading on ammeter A_1 was 0.8 amps.
What would be the reading on ammeters A_2 and A_3?
Place **one** tick in the table by the correct pair of readings.

readingon ammeter A_2 (amps) (amps)	**reading on ammeter A_3**	**correct pair of readings**
0.8	0.8	
0.8	0.4	
0.4	0.8	
0.4	0.4	

1 mark
maximum 4 marks

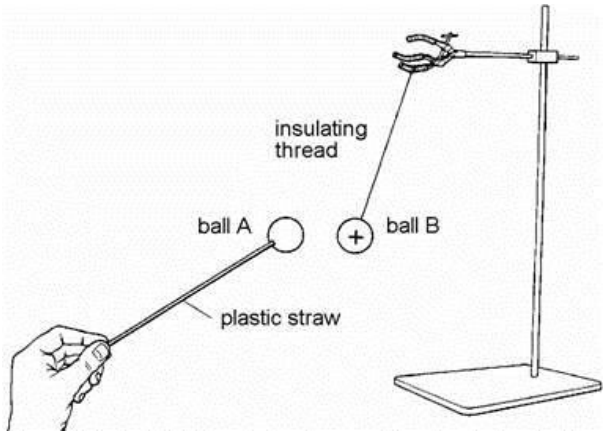
YEAR 8 ELECTRICITY AND MAGNETISM HWK 4

Anagram	Definition	Scientific vocabulary word
electrical conductor	A material that allows current to flow through it easily, and has a low resistance.	
electrical insulator	A material that does not allow current to flow easily, and has a high resistance.	
electron	Tiny particles that are part of atoms and carry a negative charge.	
ohms	The units of resistance, symbol Ω.	
potential difference	The amount of energy shifted from the battery to the moving charge, or from the charge to circuit components, in volts (V).	
rating	The value of potential difference at which a cell or bulb operates.	
resistance	A property of a component, making it difficult for charge to pass through, in ohms (Ω).	
voltage	The amount of energy shifted from the battery to the moving charge, or from the charge to circuit components, in volts (V).	
voltmeter	A device for measuring potential difference (voltage).	
volts	Unit of measurement of potential difference (voltage), symbol V.	

New Words

Scientific vocabulary	Definition
attract	Be pulled together, for example, opposite poles of a magnet attract and positive and negative charges attract.
charged up	When materials are rubbed together, electrons move from one surface to the other.
electric charge	A property of a material, the electric charge can be positive, negative, or neutral.
electron	Tiny particles that are part of atoms and carry a negative charge.
electrostatic force	Non-contact force between two charged objects.
lightning	Occurs when electrons jump from one charged area to another and produce a big current.
negatively charged	An object that has gained electrons as a result of the charging process.
positively charged	An object that has lost electrons as a result of the charging process.

Q1. Two polystyrene balls, A and B, are shown below. Both balls are charged. Ball B is positively charged. The diagram shows what happens when ball A is brought near ball B.



(a) Ball A is charged. Describe **one** method by which ball A could have been charged.

..... 1 mark

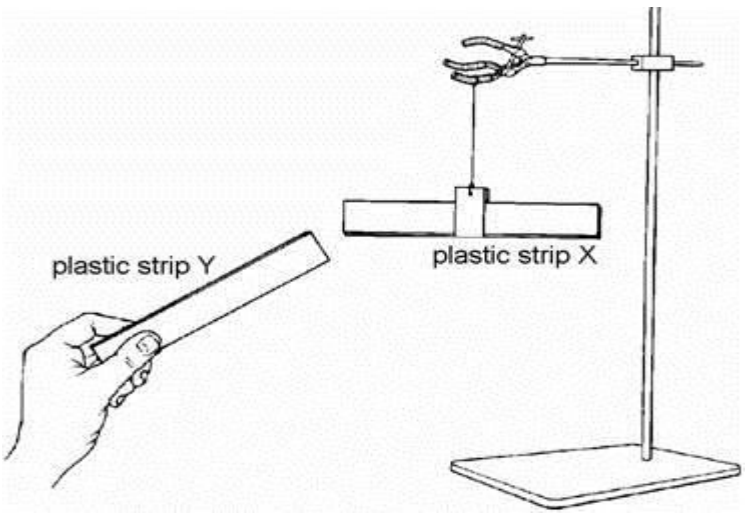
(b) Is ball A positively or negatively charged? Explain your answer.

..... 1 mark

(c) Ball A is moved a little closer to ball B. Which way does ball B move?

.....1 mark

(d) Kevin rubs the whole surface of two strips of the same plastic with a cloth. He hangs strip X on a nylon thread. Then he brings strip Y near one end of strip X.



Describe what will happen to strip X and explain your answer.

.....

..... 2 marks

(e) Describe what will happen if Kevin brings strip Y near the **other** end of strip X and explain your answer.

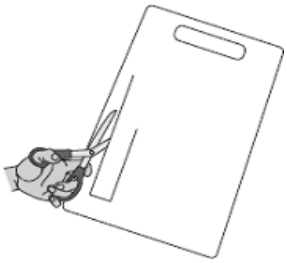
.....

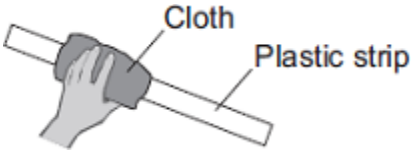
.....

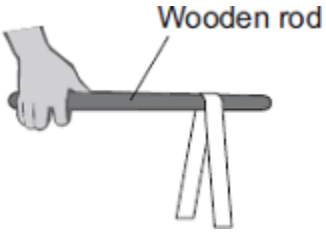
..... 2 marks

Maximum 7 marks

Q2. (a) A student uses some everyday items to investigate static electricity.







1 A strip of plastic is cut from a plastic carrier bag

2 The plastic strip is rubbed with a cloth

3 The plastic strip is hung over a wooden rod

(i) Draw a ring around the correct answer in the box to complete each sentence.

Rubbing the plastic strip with a cloth causes the strip to become negatively charged.

This happens because

electrons
neutrons
protons

move from the cloth onto the plastic strip.

(2)

The cloth is left with

a negative
a positive
zero

charge.

(ii) When the plastic strip is hung over the wooden rod, the two halves of the strip move equally away from each other.

What **two** conclusions should the student make about the forces acting on the two halves of the plastic strip?

1 .....

2 ..... **(2)**

(b) Electrical charges move more easily through some materials than through other materials. Through which **one** of the following materials would an electrical charge move most easily?

Draw a ring around your answer.

aluminium **glass** **rubber**

(1)

(Total 5 marks)

Q3. The diagram shows a student after rubbing a balloon on his hair. The balloon and hair have become charged.

(a) Draw a ring around the correct answer in the box to complete the sentence.

(i) After rubbing, the charge on his hair is

positive.
negative.
neutral.

(1)

(ii) When the balloon is rubbed on his hair the balloon gains

neutrons.
protons.
electrons.

(1)

(b) After the student rubs the balloon on his hair, his hair stands on end.

Explain why.

.....

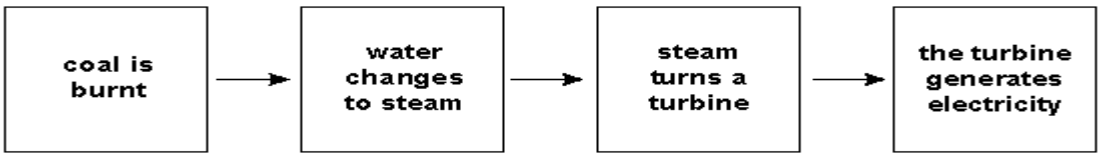
.....

.....**(2)**

(Total 4 marks)

Scientific vocabulary	Definition
chemical energy store	Emptied during chemical reactions when energy is transferred to surroundings, for example when you burn a fuel.
dissipation (dissipated)	Becoming spread out wastefully.
elastic energy store	Filled when a material is stretched or compressed, for example when you stretch a spring.
energy	Energy is needed to make things happen.
gravitational potential energy store	Filled when an object is raised, for example when climbing a ladder.
joule	The unit of energy, symbol J.
kilojoule	1 kilojoule = 1000 J, symbol kJ.
kinetic energy store	Filled when an object speeds up, for example when a car accelerates.
law of conservation of energy	Energy cannot be created or destroyed, only transferred between stores.
thermal energy store	Filled when an object is warmed up, such as when you heat water in a kettle.

Q1. In a power station, coal can be used to generate electricity.



(a) Use words from the box to answer the questions below. 1 mark

(i)

chemical	**electrical**		**gravitational potential**
kinetic	**light**	**sound**	**thermal**

What is the useful energy transfer when coal is burnt?

..... energy is transferred to .....energy. 1 mark

(a) Some of the energy stored in coal is wasted when it is burnt.
Give the name of **one** type of energy released that is **not** useful.

..... 1 mark

(b) Wind turbines are also used to generate electricity.
The wind turns the turbine blades and the turbine blades turn a generator.

Use words from the **box above**. Complete the sentence to show the useful energy transfer in a wind turbine and generator.

..... energy is transferred to ..... energy. 1 mark

(c) Suggest **one** disadvantage of using wind to generate electricity.

.....

..... 1 mark

(d) Sugar cane is a plant.

The sugar from the cane is used to make alcohol.
Alcohol is a fuel.

(i) Which energy source do plants use to produce sugar?

..... 1 mark

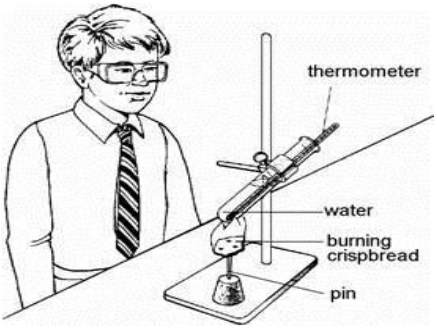
(ii) Is sugar cane a renewable **or** non-renewable source of energy? Tick one box.

renewable source ☐ non-renewable source ☐

Give a reason for your answer.

..... 1 mark

maximum 7 marks



Q2. Peter burns a piece of crispbread to find out how much energy is stored in it. Energy from the burning crispbread raises the temperature of the water in the test-tube.

(a) Describe one way Peter has arranged the apparatus so that he is working safely.

.....

..... 2 marks

(b) Peter wants to find out if potato crisps contain as much energy as crispbread. He does the experiment again using a piece of potato crisp.

Suggest **two** things he must do to make the experiment a fair test.

1. .....

2. ..... 1 mark

The table shows some of the nutritional information from a packet of crispbread and a packet of potato crisps.

	energy in kJ	protein in g	carbohydrate in g	fat in g	fibre in g
100 g of crisp bread	1455	11.6	58.1	7.3	14.7
100 g of potato crisps	2072	5.8	57.9	28.7	4.3

(c) Peter burns 1.0 g of potato crisp instead of 1.0 g of crispbread in a similar experiment. What result will he get when he burns the potato crisp? Tick the correct box.

The change in the temperature of the water will be greater. ☐

The change in the temperature of the water will be the same. ☐

The change in the temperature of the water will be smaller. ☐

There will be no change in the temperature of the water. ☐

1 mark

(d) (i) Fibre contains energy. Explain why this energy can **not** be used by the human body.

.....

..... 1 mark

(ii) Use the table in part (b) to give **two** reasons for choosing crispbread rather than potato crisps as part of a balanced diet.

1. .....

2. .....

2 marks

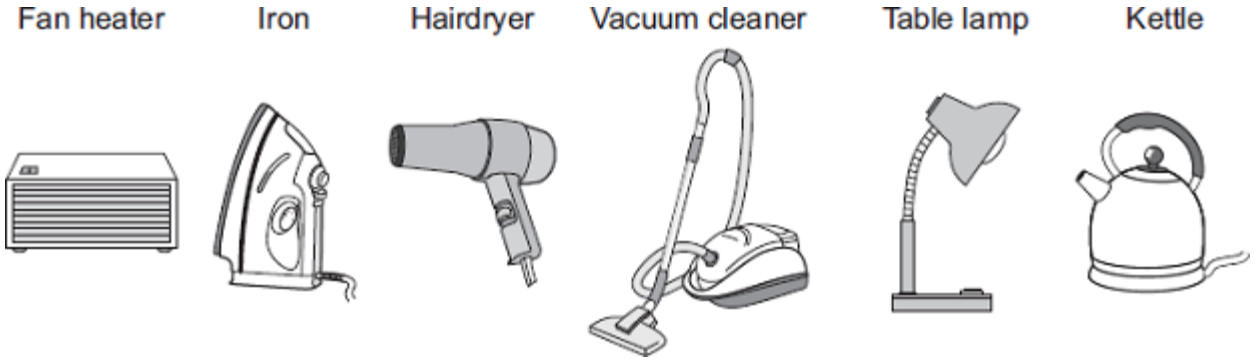
(e) Crispbread does not contain vitamin C. Which of the foods in the list below is the best source of vitamin C?
Tick the correct box.

cheese	eggs	fish	oranges
☐	☐	☐	☐

1 mark
Maximum 8 marks

Q3.

The pictures show six different household appliances.



(a) Four of the appliances, including the fan heater, are designed to transform electrical energy into heat.

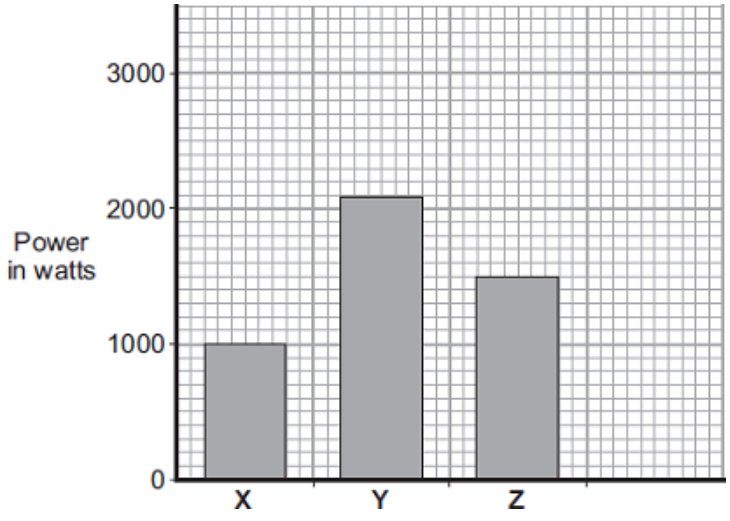
Name the other **three** appliances designed to transform electrical energy into heat.

1 .....

2 .....

3 ..... **(3)**

(b) The bar chart shows the power of three electric kettles, **X**, **Y** and **Z**.



Kettle

(i) In one week, each kettle is used for a total of 30 minutes. Which kettle costs the most to use? Put a tick (✓) next to your answer.

(1)

X ☐

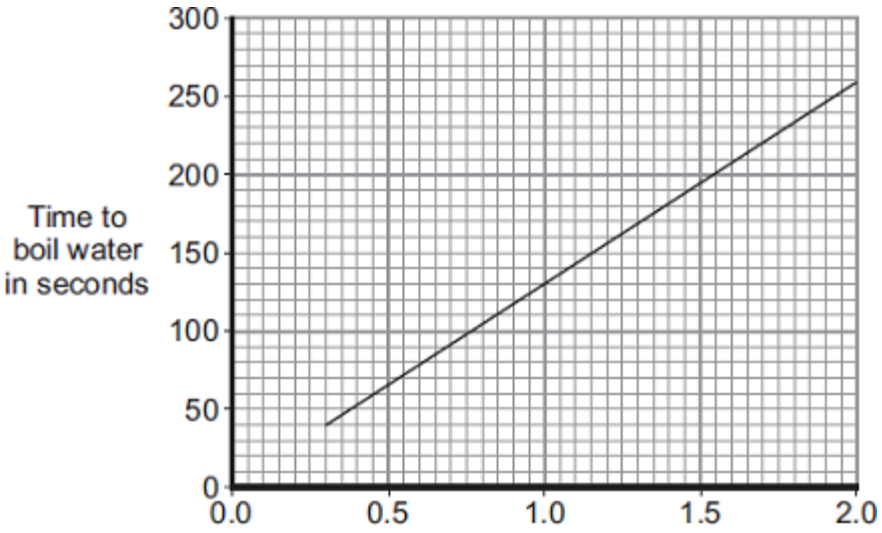
Y ☐

Y ☐

(ii) A new 'express boil' kettle boils water faster than any other kettle.

Draw a fourth bar on the chart to show the possible power of an 'express boil' kettle. **(1)**

(c) The graph shows how the time to boil water in an electric kettle depends on the volume of water in the kettle.



A householder always fills the electric kettle to the top, even when only enough boiling water for one small cup of coffee is wanted.

Explain how the householder is wasting money.

.....

.....

..... **(3)**

(Total 8 marks)

YEAR 8 ENERGY HWK 2

Anagram	Definition	Scientific vocabulary word
Carlene geochemistry	Emptied during chemical reactions when energy is transferred to surroundings, for example when you burn a fuel.	
Daisi piston	Becoming spread out wastefully.	
clattering eyesores	Filled when a material is stretched or compressed, for example when you stretch a spring.	
ejuol	The unit of energy, symbol J.	
Ceres keynoting tire	Filled when an object speeds up, for example when a car accelerates.	
Alfonso footway reverencing	Energy cannot be created or destroyed, only transferred between stores.	
greyer stenothermal	Filled when an object is warmed up, such as when you heat water in a kettle.	

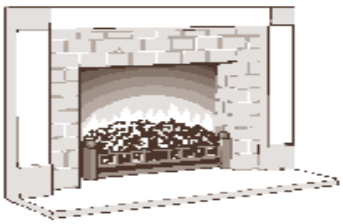
New Words

Scientific vocabulary	Definition
energy resource	Something with stored energy that can be released in a useful way.
fossil fuel	Non-renewable energy resources formed over millions of years from the remains of ancient plants or animals. Examples are coal, crude oil, and natural gas.
non-renewable	An energy resource that cannot be replaced and will be used up, such as coal, oil, or gas.
renewable	An energy resource that can be replaced and will run out. Examples are solar, wind, waves, geothermal, and biomass.
watt	The unit of power, symbol W.

Q1.

The drawings below show six ways of providing energy.

coal fire



burns coal to provide heat

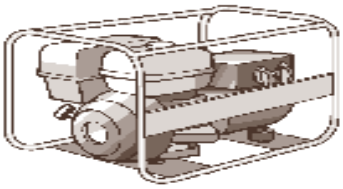
A

turbine

turns a generator to provide electricity

B

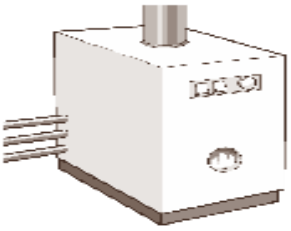
petrol generator



burns petrol to provide electricity

C

gas boiler



burns gas to provide heat

D

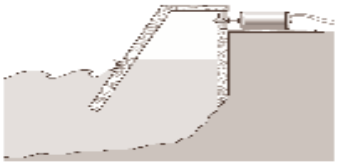
solar panel

solar panel

uses solar energy to provide heat

E

wave turbine



uses wave energy to provide electricity

F

(a) From the drawings, give the names of **two** fossil fuels.

1. .....

2. ..... 2 marks

(b) (i) What is the source of energy for a solar panel?

..... 1 mark

(ii) Why can the solar panel **not** work at night?

.....

1 mark

(c) What makes the blades of the turbine in drawing B go round?

.....

1 mark

(d) Renewable energy resources will **not** run out.

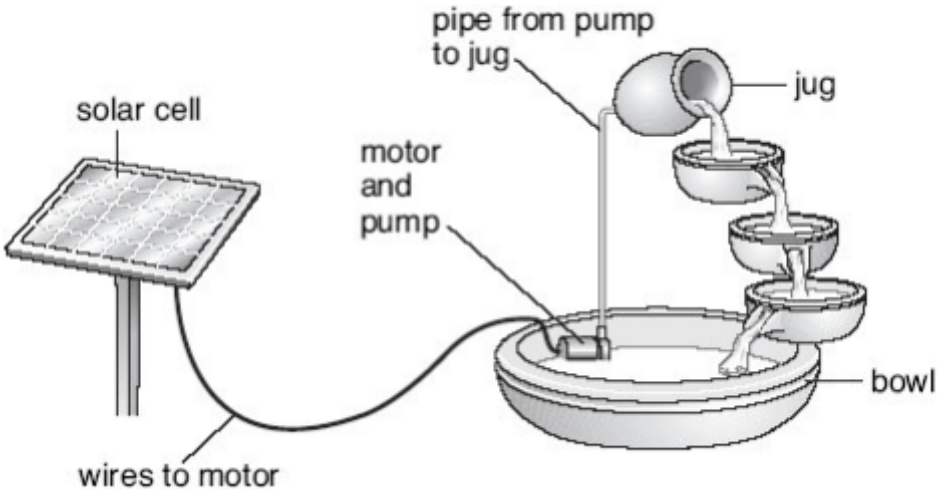
From the drawings, give **one** energy source that will **not** run out.

.....

1 mark

maximum 6 marks

Q2. The drawing below shows a garden water feature. It is solar-powered.



The solar cell absorbs energy from the Sun.
The solar cell is connected to a motor in the bowl.
The motor drives a pump.
Water is pumped up to the jug and it flows back down to the bowl.

(a) Use the information above to help you to complete the following sentences.
Choose words from the list.

chemical	electrical	gravitational potential	kinetic
light	sound	thermal	

(i) The useful energy change in the solar cell is from light to ..... energy.

1 mark

(ii) The useful energy change in the motor is from electrical energy to ..... energy.

1 mark

(iii) As the water flows from the jug to the bowl ..... energy is changed into ..... energy.

2 marks

(b) Give **one** advantage and **one** disadvantage of using a solar cell to power the water feature.

advantage .....

.....

1 mark

disadvantage .....

.....

1 mark

maximum 6 marks

YEAR 8 HWK 3

Anagram	Definition	Scientific vocabulary word
course greenery	Something with stored energy that can be released in a useful way.	
files fouls	Non-renewable energy resources formed over millions of years from the remains of ancient plants or animals. Examples are coal, crude oil, and natural gas.	
Alene newborn	An energy resource that cannot be replaced and will be used up, such as coal, oil, or gas.	
Arleen web	An energy resource that can be replaced and will run out. Examples are solar, wind, waves, geothermal, and biomass.	
tt WA	The unit of power, symbol W.	

New Words

Scientific vocabulary	Definition
conduction	Transfer of thermal energy by the vibration of particles.
convection	Transfer of thermal energy when particles in a heated fluid rise.
convection current	The movement of heated fluids where hot fluid moves upwards, and cold fluid moves downwards.
infrared radiation	Radiation given off by the Sun and other objects that brings about energy transfer.
radiation	The transfer of energy as a wave.
temperature	A measure of the motion and energy of particles.
thermal conductor	Material that allows heat to move quickly through it.
thermometer	Instrument used to measure temperature.

Q1.

(a) The diagrams below show how much heat is lost from different parts of a house every second.

Through which part of the house above is most heat lost?

.....

1 mark

(b) Part of the house is insulated to reduce the loss of heat.
This is shown below.

(i) Which part of the house has been insulated?

.....

1 mark

(ii) Explain your answer.

.....
.

.....
.

1 mark

(c) The table below gives information about three fossil fuels that can be used to heat a house.

fuel	physical state	energy released when 1g is burned (J)	Does the fuel produce these substances when burned?	
			water	sulphur dioxide
coal	solid	25000	yes	yes
oil	liquid	42000	yes	yes
methane	gas	55000	yes	no

(i) Which fuel in the table releases the **least** energy when 1 g is burned?

.....

1 mark

(ii) Methane **can** be compressed.
Which information in the table shows that methane can be compressed?

.....
.

1 mark

(iii) Sulphur dioxide causes acid rain.
Use the table to explain why burning methane does **not** produce acid rain.

.....
.

.....
.

1 mark
maximum 6 marks

Q2.

(a) In an iron rod the particles vibrate. If one end of an iron rod is heated, the vibrating particles transfer energy to neighbouring particles which are **not** vibrating so violently.
What is this process called?

……

1 mark

(b) An electric immersion heater is put at the bottom of a large tank of water.

The water next to the heater becomes warm.

(i) What will happen to the warmed water next to the heater?
Give a reason for your answer.

……

……

……

2 marks

(ii) Why can heat **not** be transferred in this way in an iron rod?

……

……

1 mark

(c) In a liquid, some of the particles have enough kinetic energy to escape from the surface.
This process happens even when the liquid is well below its boiling point.

(i) What is this process called? ……

1 mark

(ii) How will this affect the temperature of the liquid left in the container?

……

1 mark

Maximum 6 marks

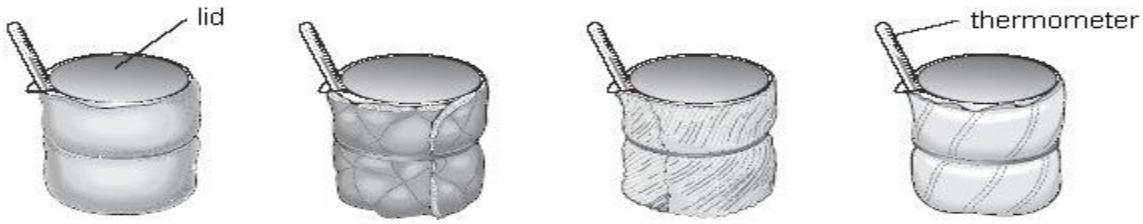
Anagram	Definition	Scientific vocabulary word
coconut din	Transfer of thermal energy by the vibration of particles.	
connive oct	Transfer of thermal energy when particles in a heated fluid rise.	
Circe nonvector nut	The movement of heated fluids where hot fluid moves upwards, and cold fluid moves downwards.	
Aaron iridin rafted	Radiation given off by the Sun and other objects that brings about energy transfer.	
Aida Torin	The transfer of energy as a wave.	
autre temper	A measure of the motion and energy of particles.	
detract lunchroom	Material that allows heat to move quickly through it.	
mortem three	Instrument used to measure temperature.	

New Words

Scientific vocabulary	Definition
temperature	A measure of the motion and energy of particles.
thermal conductor	Material that allows heat to move quickly through it.
thermal insulator	Material that only allows heat to travel slowly through it.
thermometer	Instrument used to measure temperature.

Q1. A company has made a new material called 'Wellwarm'. They want to use 'Wellwarm' to make coats.

(a) A scientist tested 'Wellwarm' to see how well it insulated a beaker of hot water.
She tested 'Wellwarm' and three other materials as shown below.



material A **material B** **material C** **material D**

She wrapped each beaker in a different material.
She recorded the temperature at the start and 20 minutes later.

(i) What was the independent variable that the scientist **changed**?

..... 1 mark

(ii) What was the dependent variable that the scientist **measured** during the investigation?

..... 1 mark

(b) The results of the investigation are shown below.

time (minutes)	temperature of water (°C) wrapped in			
	material A	material B	material C	material D
0	60	60	60	60
20	34	40	38	36

(i) The scientist said that the 'Wellwarm' material is the best insulator.
Which material was 'Wellwarm'? Use the results to help you. Tick the correct box.

A ☐ B ☐ C ☐ D ☐ 1 mark

(ii) Use the evidence in the results table to explain your choice.

.....
.

..... 1 mark

(c) The company made a coat from each of the four materials they tested.

A person tested the different coats by wearing each one in a cold room.
He measured the temperature inside each coat for 30 minutes.

Write down two **other** variables that should be controlled to make this a fair test.

1. ..... 1 mark

2. ..... 1 mark

(d) Write down one thing the scientists should do to make sure the person testing the coats is safe.

..... 1 mark

(e) Suggest **one** advantage of using a temperature sensor and data logger instead of a thermometer in this experiment.

.....
.

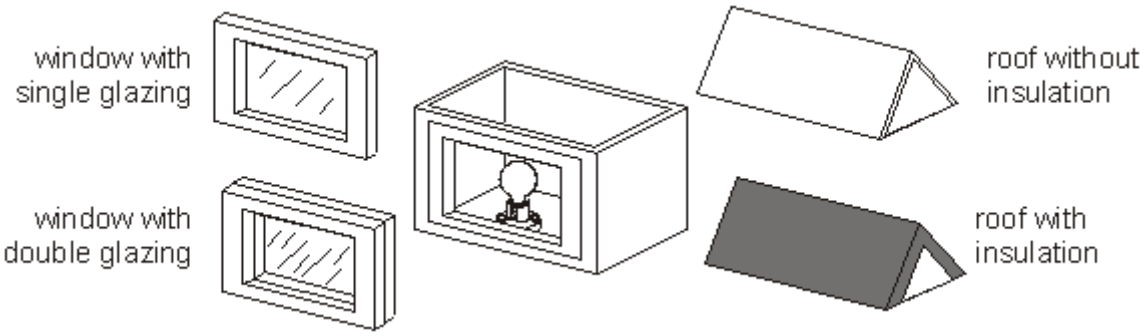
..... 1 mark
maximum 8 marks

Q2.

Some pupils investigate whether double glazing or roof insulation is more efficient at
reducing heat loss from houses.

They have a model house which can have these features:

- window with single glazing
- window with double glazing
- roof without insulation
- roof with insulation.



(a) A temperature sensor and a small lamp are placed inside the house. The lamp is
used as a heat source.
When the model house reaches a given temperature, **the lamp is switched off**.
A datalogger then records temperature regularly over time.

(i) What can the combination of single glazing and **no** roof insulation tell pupils that is relevant to their investigation?

.....

..... 1 mark

(ii) Which **two** combinations **must** they use to find the more efficient way of preventing heat loss in their model house?

..... and .....

..... and ..... 1 mark

(b) The pupils predicted that the roof insulation will be more effective than double glazing at reducing heat loss.

What evidence would support this prediction?

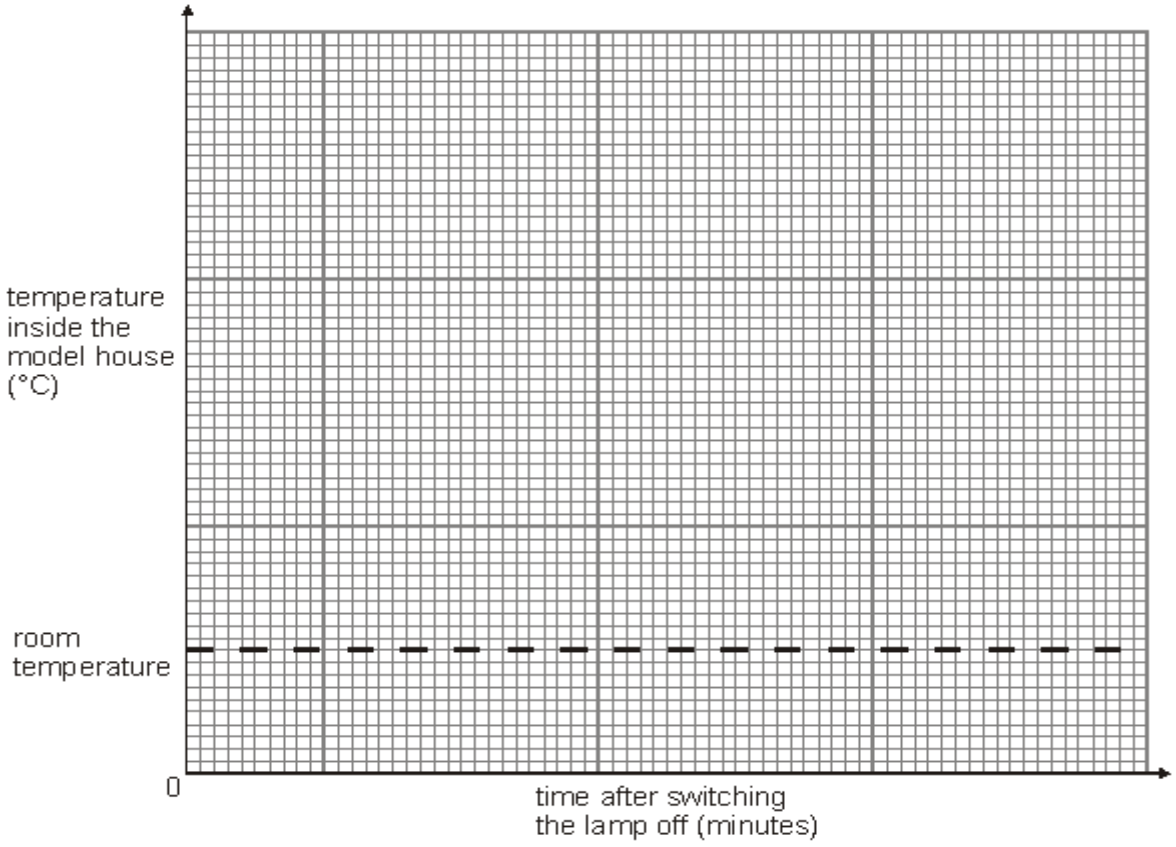
.....

.....

..... 1 mark

(c) On the grid below, sketch the shape of the two graphs you would expect to see on the datalogger if the pupils' prediction is correct.

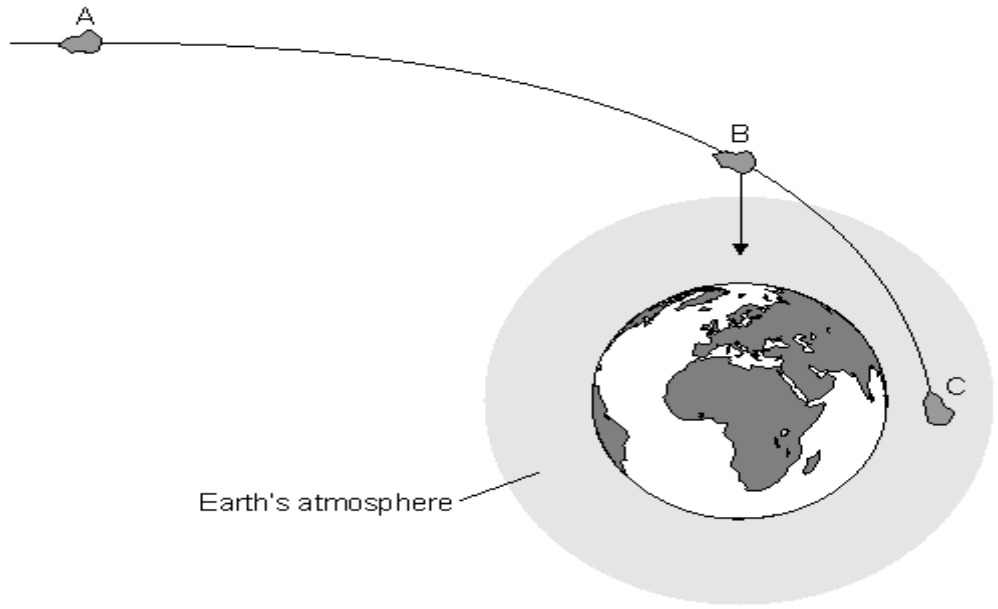
You do **not** need to add scales to the axes.
Use a solid line (_____) to show the graph for double glazed windows.
Use a dotted line (-------) to show the graph for roof insulation.



2 marks
maximum 5 marks

Scientific vocabulary	Definition
balanced (forces)	Forces acting on an object that are the same size but act in opposite directions.
field	The region where other objects feel a gravitational force.
gravitational field strength	The force from gravity on 1 kg (N/kg).
gravity/gravitational force	A non-contact force that acts between two masses.
kilogram	A unit of mass, symbol kg.
mass	The amount of stuff in an object (kg).
newton	Unit for measuring forces (N).
newtonmeter	A piece of equipment used to measure weight in newtons.
pull	A type of force.
push	A type of force.
unbalanced (forces)	Opposing forces on an object that are unequal.
weight	The force of gravity due to the Earth (or other planet or moon) on an object (N).

Q1. The diagram below shows the path of a meteor as it gets closer to the Earth.
The meteor is shown in three positions: A, B and C.*not to scale*



(a) The path of the meteor is affected by the Earth's gravity.
The arrow shows the direction of the force due to gravity acting on the meteor at B.

(i) **On the diagram** draw an arrow to show the direction of the force of gravity on the meteor at A.
Use a ruler.

1 mark

(ii) **On the diagram** draw an arrow to show the direction of the force of gravity on the meteor at C.
Use a ruler.

1 mark

(iii) How does the force of gravity on the meteor change as it travels from A to C?

.....

1 mark

(b) What happens to the speed of the meteor as it travels from A to B?

.....

1 mark

(c) When the meteor enters the Earth's atmosphere, three forces act on the meteor. Gravity and upthrust are two of these forces.

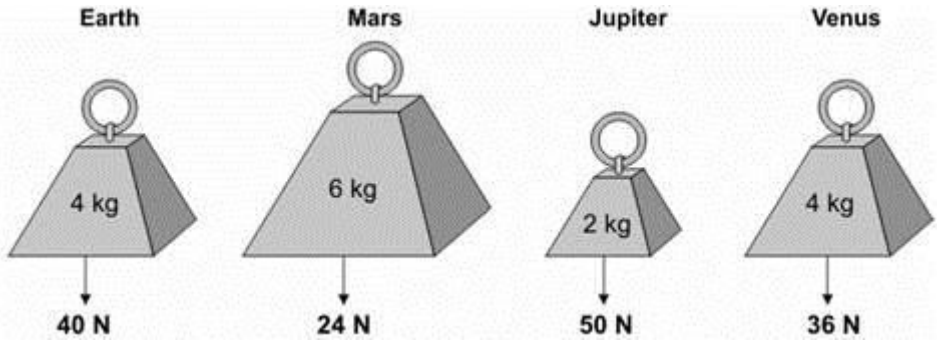
Give the name of the **other** force.

.....

1 mark
maximum 5 marks

Q2.

The drawings show the mass and weight of four objects on different planets.



(a) On which of the four planets is the object with the largest mass?

.....

1 mark

(b) How can you tell, from the drawings, that gravity is greater on Earth than on
Venus?

.....

.....

1 mark

(c) Gravity is less on the Moon than on the Earth.

Complete the sentences below to compare the weight and mass of an astronaut
on the Moon and on the Earth.

The **weight** of an astronaut on the Moon is ..... the **weight** of
an astronaut on the Earth.

1 mark

The **mass** of an astronaut on the Moon is ..... the **mass** of the
astronaut on the Earth.

1 mark

(d) The table below gives information about five planets.

planet	**distance from the Sun (million km)**	**time for planet to orbit the Sun (Earth-years)**
Venus	110	0.6
Earth	150	1.0
Mars	230	
Jupiter	780	12.0
Saturn	1400	30.0

(i) Look at the information in the table.

How does the time for a planet to orbit the Sun change with its distance
from the Sun?

.....

.....

1 mark

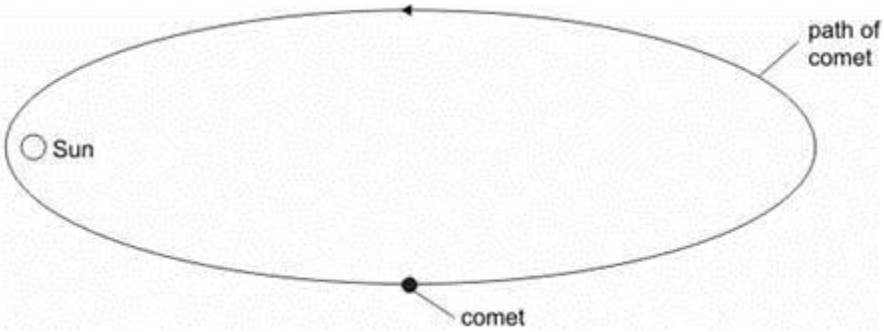
(ii) Use information in the table to estimate the time for Mars to orbit the Sun.

..... Earth-years

1 mark

(e) The diagram below shows the path of a comet around the Sun.

On the path of the comet below, place a letter X to show the position where
the comet is travelling the fastest.



not to scale

1 mark
maximum 7 marks

YEAR 8 MOTION AND PRESSURE HWK 2

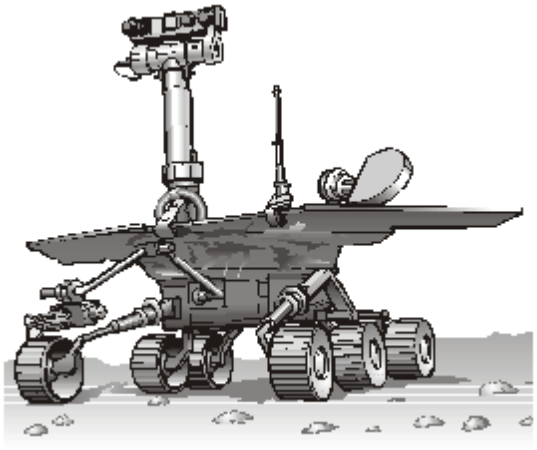
Anagram	**Definition**	**Scientific vocabulary word**
AEC bland	Forces acting on an object that are the same size but act in opposite directions.	
die fl	The region where other objects feel a gravitational force.	
Aaron tightfisted travelling	The force from gravity on 1 kg (N/kg).	
Aaron gigavolt refractivity	A non-contact force that acts between two masses.	
Argo milk	A unit of mass, symbol kg.	
en wont	Unit for measuring forces (N).	
lupl	A type of force.	
shup	A type of force.	
barnacle confused	Opposing forces on an object that are unequal.	
ge with	The force of gravity due to the Earth (or other planet or moon) on an object (N).	

New Words

Scientific vocabulary	**Definition**
centre of gravity	The point in an object where the force of gravity seems to act.
compression	Force squashing or pushing together, which changes the shape of an object.
contact force	A force that acts when an object is in contact with a surface, air, or water.
deformation	Changing shape due to a force.
newton	Unit for measuring forces (N).
newton metres	The unit of moment.
newtons per metre squared	A unit of pressure.
pressure	The ratio of force to surface area, in N/m^2, and how it causes stresses in solids.
stress	The effect of a force applied to a solid, found using stress = force/area.
tension	Force extending or pulling apart.

Q1.

The drawing below shows a space buggy on the surface of Mars.



(a) The distance between Earth and Mars is 192 000 000 km.

It took a spacecraft 200 days to take the buggy from Earth to Mars.

Calculate the speed at which the spacecraft travelled.

Give the unit.

.....

.....

2 marks

(b) The weight of the buggy was 105 N on Earth and 40 N on Mars.

Why was the weight of the buggy less on Mars than on Earth?

.....

.....

1 mark

(c) The buggy uses solar panels to generate electrical energy.

The solar panels generate less electrical energy on Mars than on Earth.

Give a reason why.

.....

.....

1 mark

(d) The weight of the buggy was 40 N on Mars.
When the buggy landed on Mars it rested on an area of 0.025 m^2.

Calculate the pressure exerted by the buggy on the surface of Mars.

Give the unit.

.....

.....

2 marks
maximum 6 marks

Q2.

Tom tries on four types of footwear in a sports shop.

ski boot

trainer

ice skate

walking boot

(a) (i) When Tom tries on the footwear, which one sinks into the carpet the most?

.....

1 mark

(ii) When Tom tries on the footwear, what is the same for each type of footwear? Tick the correct box.

the area of the footwear	☐
Tom's weight on the footwear	☐
the material of the footwear	☐
the weight of the footwear	☐

1 mark

(b) The drawing below shows a snowshoe.

How do snowshoes help people to walk in deep snow?

.....

.....

1 mark

(c) Choose the correct word from the list to complete the sentence below.

air resistance **friction** **gravity** **magnetism**

When Tom is ice skating the force of .....

between the skate and the ice is less than when he is walking on a carpet.

1 mark
Maximum 4 marks

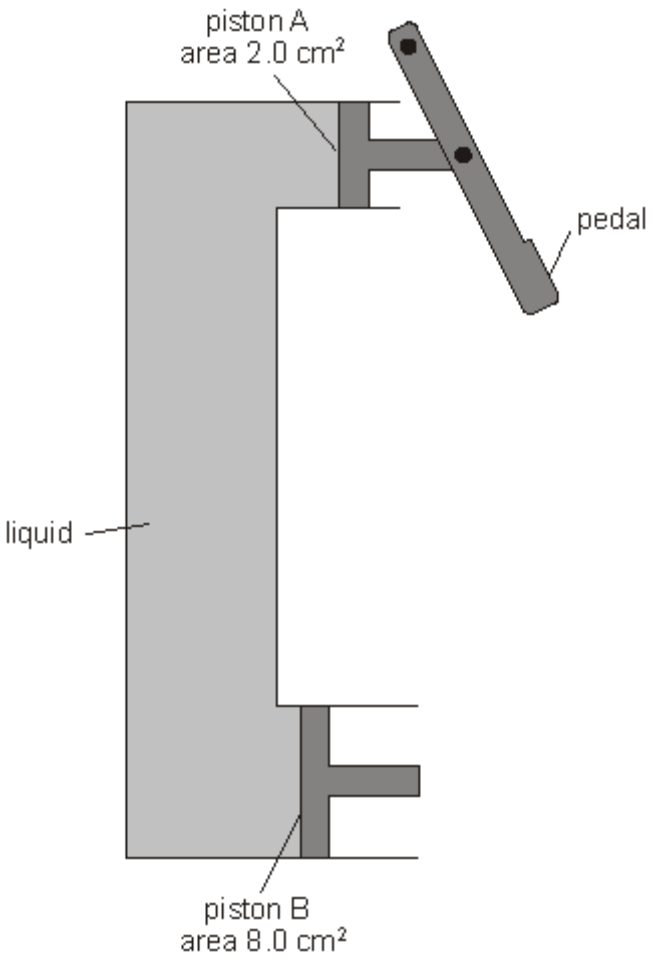
YEAR 8 MOTION AND PRESSURE HWK 3

Anagram	Definition	Scientific vocabulary word
fatty recovering	The point in an object where the force of gravity seems to act.	
com ropiness	Force squashing or pushing together, which changes the shape of an object.	
concreto fact	A force that acts when an object is in contact with a surface, air, or water.	
amide fronto	Changing shape due to a force.	
en town	Unit for measuring forces (N).	
mentes towner	The unit of moment.	
Andrews querente stomper	A unit of pressure.	
er purses	The ratio of force to surface area, in N/m^2, and how it causes stresses in solids.	
res SST	The effect of a force applied to a solid, found using stress = force/area.	
Enos nit	Force extending or pulling apart.	

New Words

Scientific vocabulary	Definition
atmospheric pressure	The pressure caused by the weight of the air above a surface.
compression	Force squashing or pushing together, which changes the shape of an object.
fluid	A substance with no fixed shape, a gas or a liquid.
gas pressure	The force exerted by air particles when they collide with a surface.
incompressible	Cannot be compressed (squashed).
liquid pressure	The pressure produced by collisions of particles in a liquid.
newton	Unit for measuring forces (N).
newton metres	The unit of moment.
newtons per metre squared	A unit of pressure.
pressure	The ratio of force to surface area, in N/m^2, and how it causes stresses in solids.
streamlined	Shaped to reduce resistance to motion from air or water.
stress	The effect of a force applied to a solid, found using stress = force/area.
tension	Force extending or pulling apart.
water resistance	The force on an object moving through water that causes it to slow down, also known as drag.

Q1. The diagram below shows a container filled with a liquid.



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.

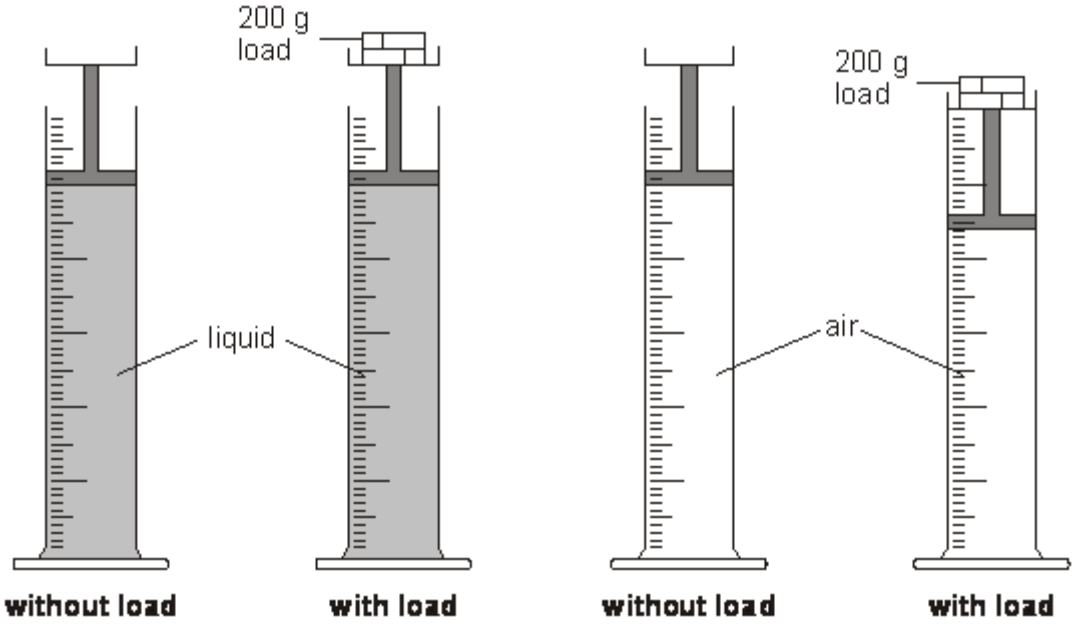
Use this pressure to calculate the force on piston B.

.....

.....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.

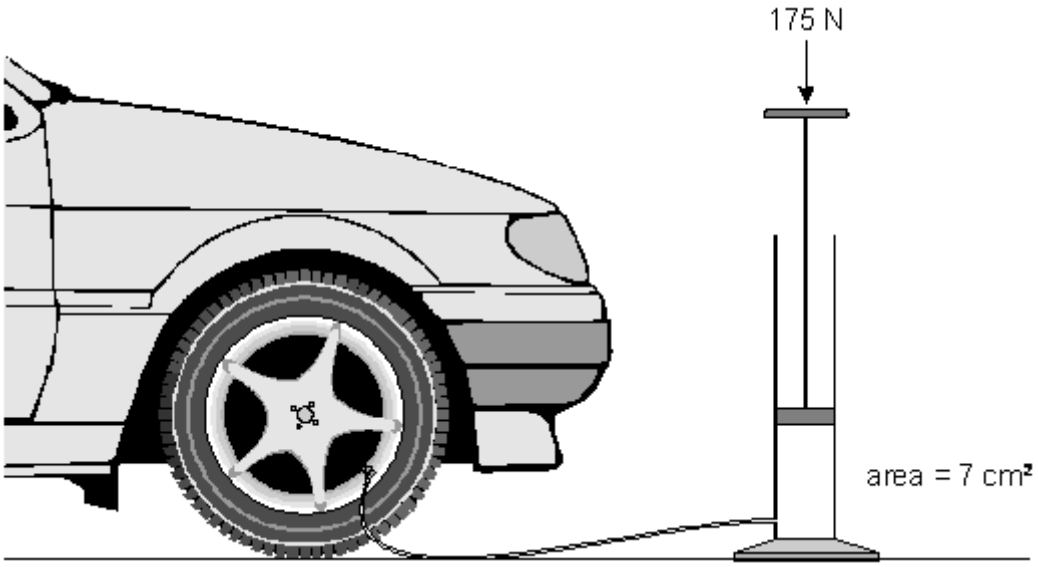
.....

.....

1 mark
maximum 5 marks

Q2.

Karen wants to pump up her car tyre.
Her pump has a piston with an area of 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