

Sc

KEY STAGE
3

TIER
3–6

2002

Science test

Paper 2

Please read this page, but do not open the booklet until your teacher tells you to start. Write your name and the name of your school in the spaces below. If you have been given a pupil number, write that also.

First name _____

Last name _____

School _____

Pupil number

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Remember

- The test is 1 hour long.
- You will need: pen, pencil, rubber, ruler, protractor and calculator.
- The test starts with easier questions.
- Try to answer all of the questions.
- Write all your answers on the test paper – do not use any rough paper.
- Check your work carefully.
- Ask your teacher if you are not sure what to do.

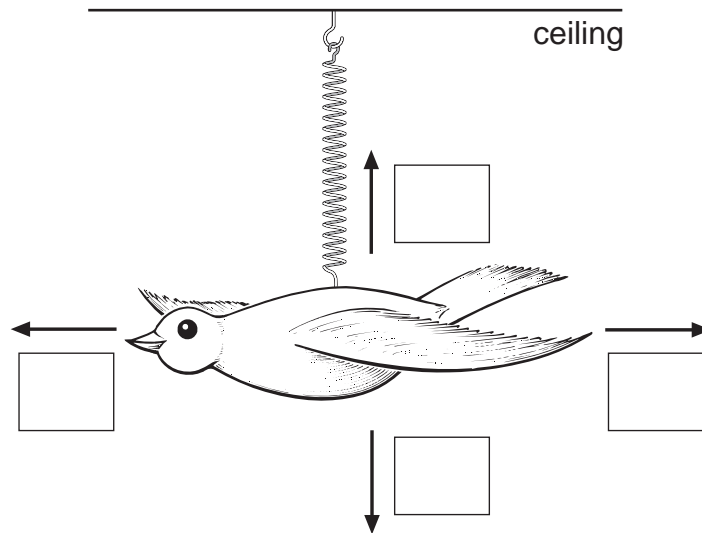
For marker's
use only

Total marks	
Borderline check	

1. Anne has a toy bird on a spring.

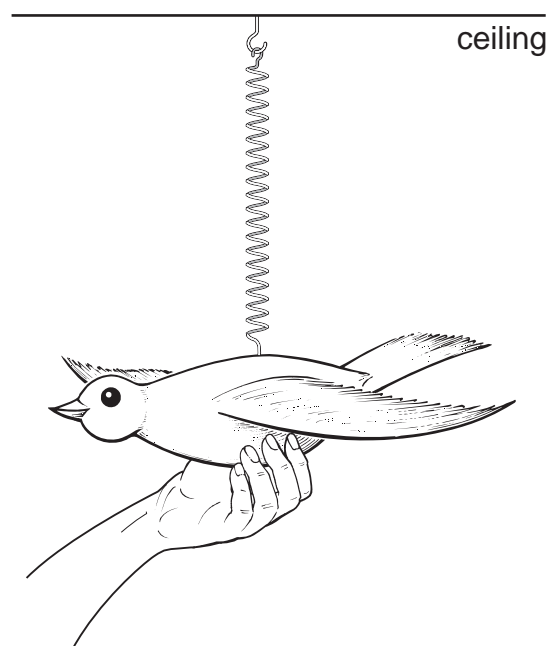
- (a) Which arrow shows the direction of the force of gravity on the bird?
Tick the box by the correct arrow.

1 mark



- (b) Anne pulls the toy bird down. On the diagram below, draw an arrow to show the direction of Anne's force on the bird.
Label the arrow F.

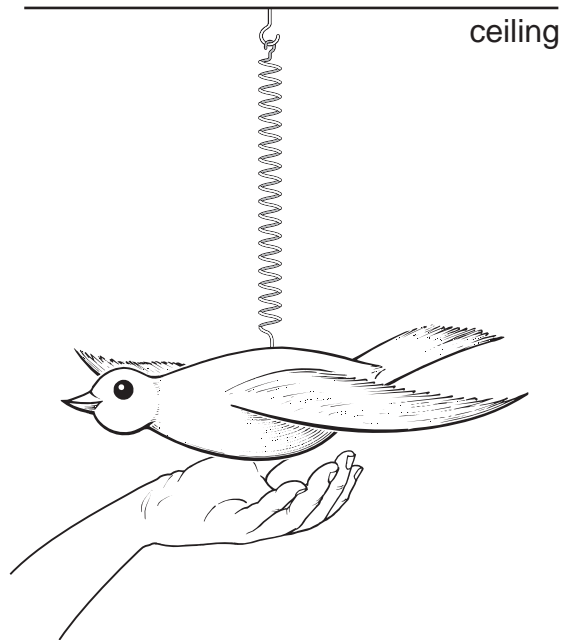
1 mark



(c) Anne lets go of the bird.

(i) On the diagram below, draw an arrow to show which way the bird will start to move. Label this arrow M.

1 mark



(ii) What makes the bird move in this direction?

1 mark

(d) The bird bounces up and down for several minutes, and then stops. Why does the bird stop moving? Tick the correct box.

1 mark

Air resistance slows it down.

Gravity gets less.

The bird gets heavier.

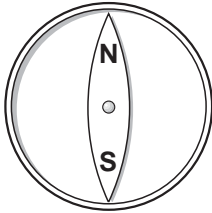
The spring stretches.

maximum 5 marks

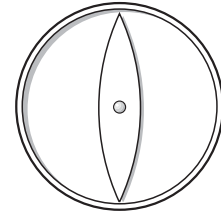
-
2. (a) Sam has two small compasses. When he puts them a long way apart, they both point North.

Label the North and South magnetic poles on compass B.

1 mark



compass A

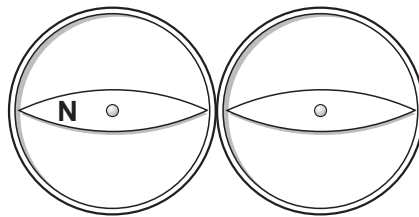


compass B

- (b) Sam puts the compasses side by side.

Label the North and South magnetic poles on **both** compasses. One pole has been done for you.

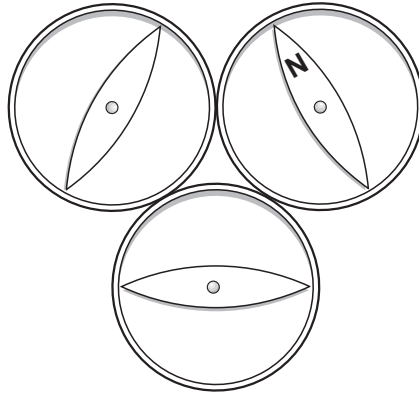
1 mark



-
- (c) Sam then puts three compasses close together.

Label the North and South magnetic poles on each of the **three** compasses.
One pole has been done for you.

1 mark



- (d) What metal are compass needles made from?

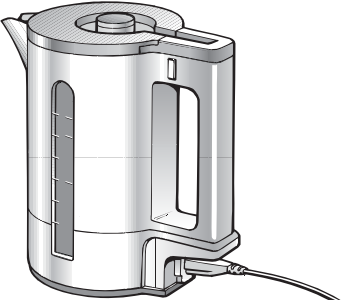
1 mark

maximum 4 marks



3. The drawings below show what happens to the energy supplied to four appliances.

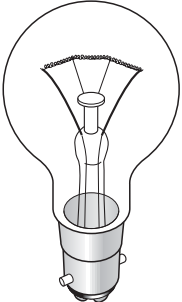
kettle



98% of the energy is used to heat the water

2% of the energy is wasted

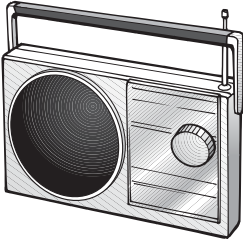
light bulb



_____ % of the energy is given out as light

95% of the energy is wasted

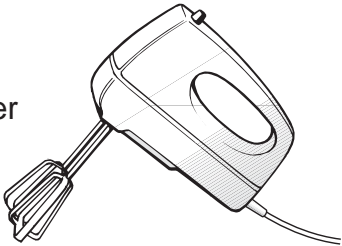
radio



50% of the energy is given out as sound

50% of the energy is wasted

mixer



40% of the energy is used to move the whisks

_____ % of the energy is wasted

(a) (i) What percentage of energy of the light bulb is given out as light?
Write your answer on the line by the light bulb. 1 mark

(ii) What percentage of energy is wasted by the mixer?
Write your answer in the box by the mixer. 1 mark

(iii) Complete the sentence below. 1 mark

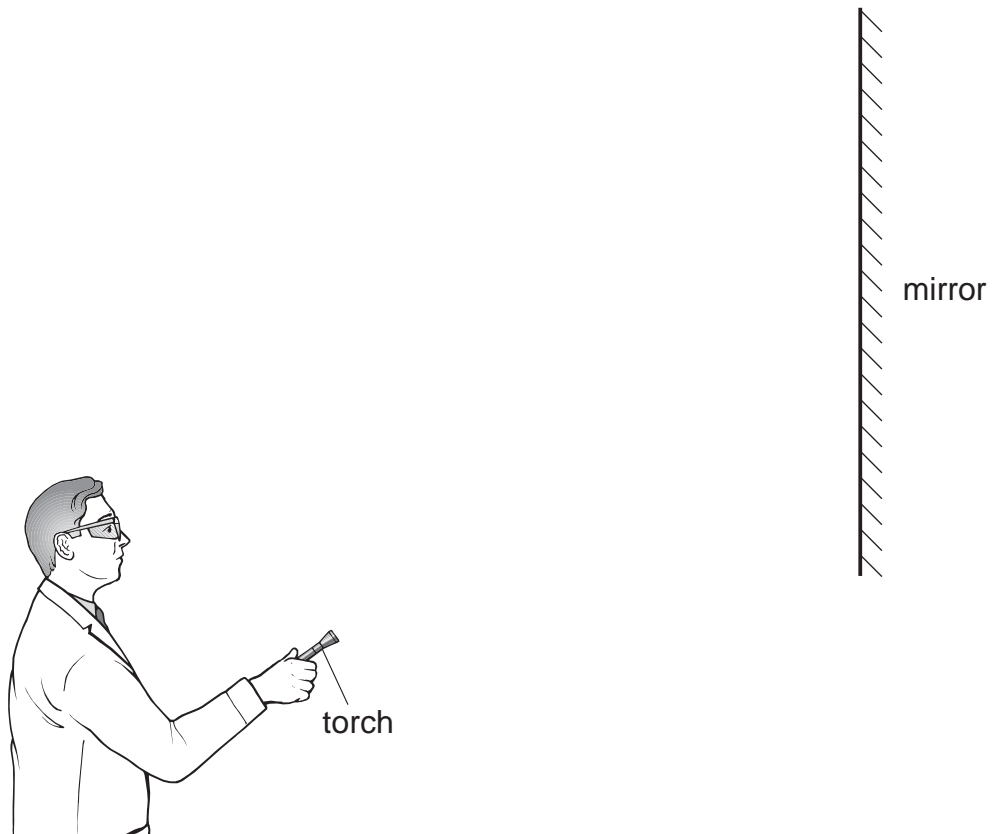
Parts of the mixer become hot because some of the electrical
energy is changed into _____ energy which is
wasted.

(b) Energy is wasted as sound in many appliances.
Which appliance in the drawings produces sound which is **not** wasted?
_____ 1 mark

(c) In which of the appliances is the highest percentage of energy wasted?
_____ 1 mark

maximum 5 marks

4. A teacher has a small torch. He switches it on and points it towards a mirror.



(a) A ray of light from the torch reflects off the mirror.
Use a ruler to draw the ray of light:

- (i) from the torch to the mirror;
- (ii) reflecting off the mirror.

1 mark

2 marks

Add arrows to the rays to show the direction of the light.

(b) A laser beam is a very bright and powerful beam of light. It is very dangerous to point a laser beam towards people or animals.
Which part of the body can be most easily damaged by a laser beam?

1 mark

maximum 4 marks

5. The list below shows properties that different elements can have.

- magnetic
- can be compressed
- very high melting point
- very low melting point
- good conductor of heat
- poor conductor of heat
- good conductor of electricity
- poor conductor of electricity

(a) Which **two** properties from the list above make aluminium suitable for saucepans?

2 marks

1. _____

2. _____

(b) Which property in the list above explains why:

(i) copper is used in the cable of a television?

1 mark

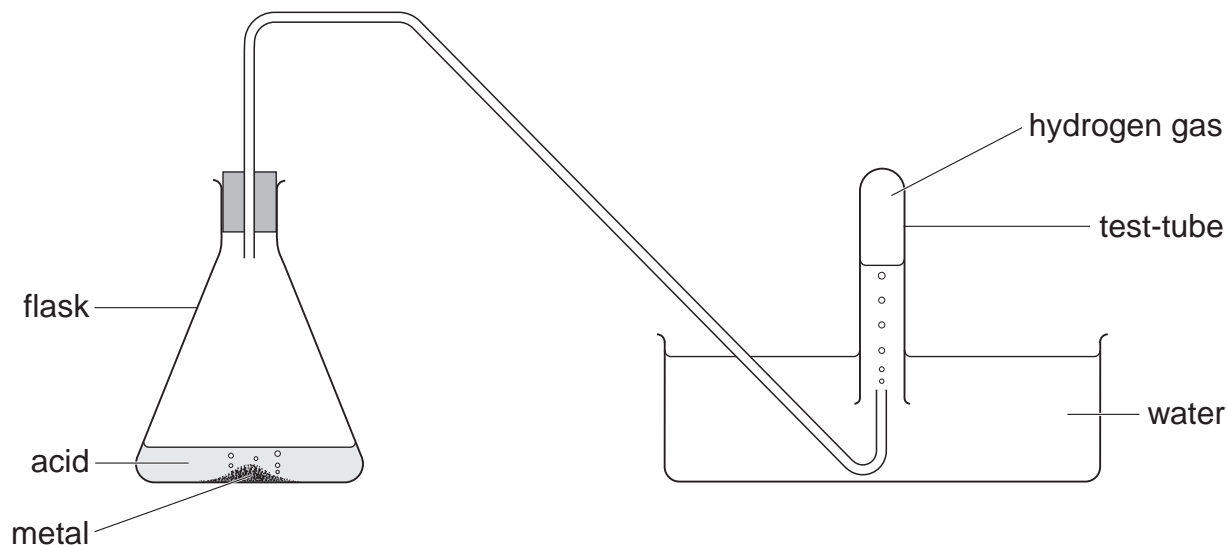
(ii) a lot of oxygen gas can be pumped into a very small container?

1 mark

maximum 4 marks



6. In the experiment shown below, metal and acid react together to make hydrogen gas.



- (a) Look at the flask. How can you tell that a gas is being produced in this experiment?

1 mark

- (b) (i) Hydrogen gas passes through the water and collects in the test-tube.

What does this tell you about hydrogen?

Tick the correct box.

1 mark

It dissolves in the water.

It does **not** dissolve in the water.

It is acidic.

It is alkaline.

- (ii) What happens to the level of the water in the test-tube as hydrogen is produced?

1 mark

(c) Air contains the following gases:

nitrogen
oxygen
water vapour
carbon dioxide

Choose from these gases to answer the questions below.

(i) Which **one** of the four gases do we need to take into the blood in the lungs?

1 mark

(ii) Which **one** of the four gases can produce droplets on a cold window?

1 mark

maximum 5 marks

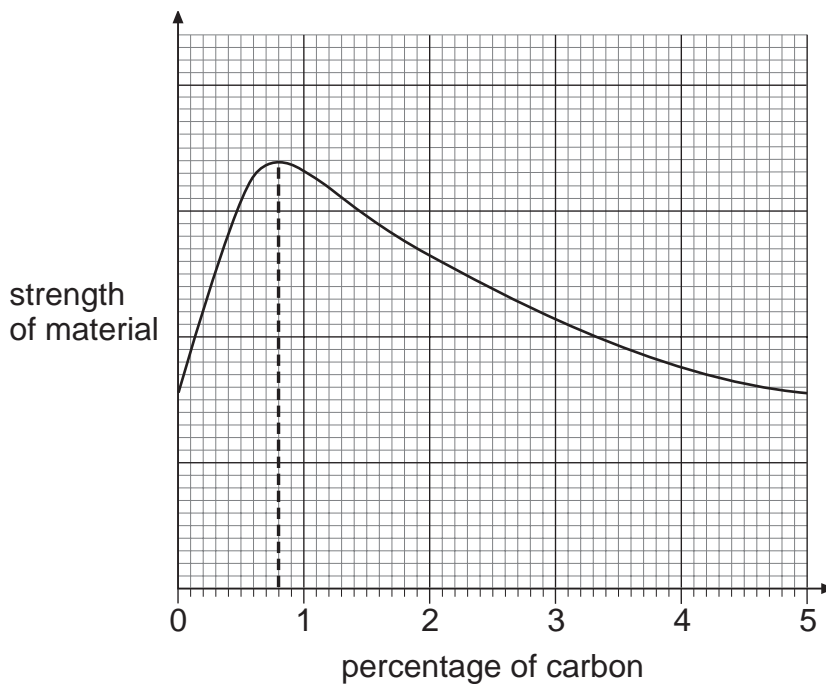
7. (a) The table below shows the percentage of carbon in four different materials.

name of material	percentage of carbon in the material
cast iron	4.5
high carbon steel	0.8
mild steel	0.3
wrought iron	0.1

Which material has the highest percentage of carbon?

1 mark

- (b) The graph below shows how the percentage of carbon affects the **strength** of the materials.



- (i) Use the graph to find the percentage of carbon in the material with the greatest strength.

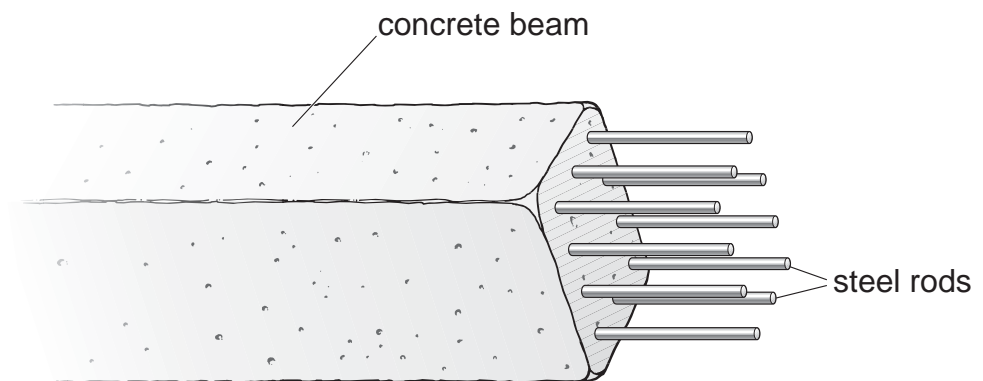
1 mark

_____%

- (ii) Use your answer to part (i) to name the strongest material in the table.

1 mark

(c) Steel rods can be put into concrete beams before the concrete sets.



(i) What could these concrete beams be used for?

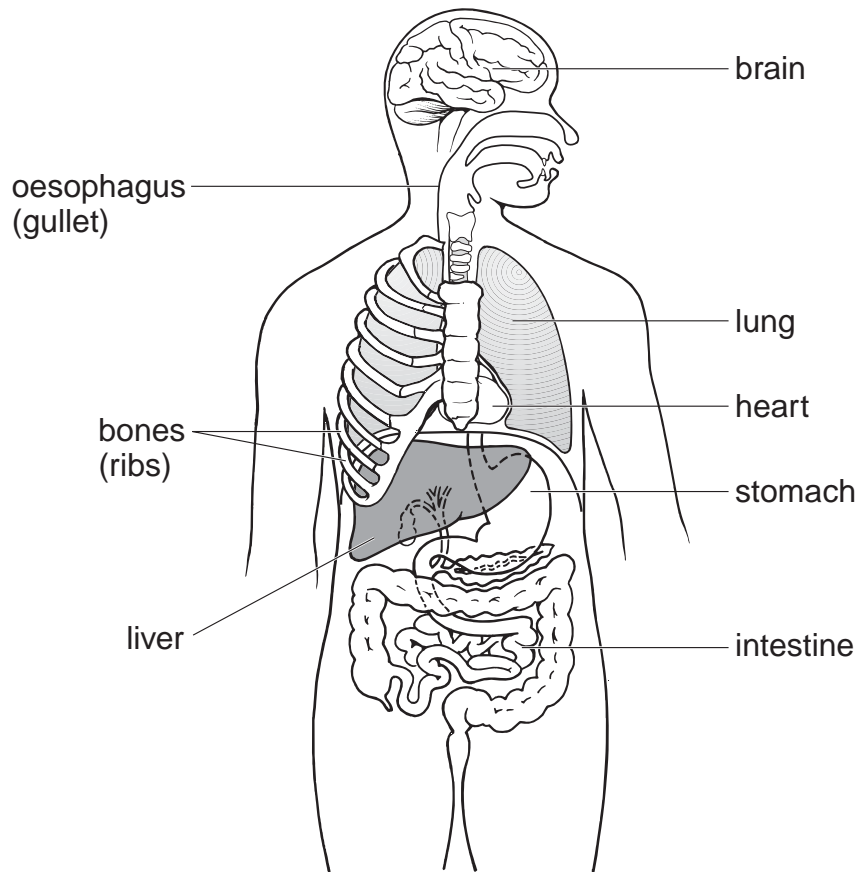
1 mark

(ii) Steel contains iron. Give the name of **one** other substance which must be present for the iron to go rusty.

1 mark

maximum 5 marks

8. The diagram shows some of the organs of the human body.



(a) Give the names of **two** labelled parts where food is digested.

1 mark

_____ and _____

(b) Why do we need to chew our food and mix it with saliva?

2 marks

(c) (i) Draw **one** line from each bad habit to the organ it harms.

3 marks

bad habit

organ

drinking too much alcohol

liver

not eating enough fibre

lung

smoking cigarettes

ribs

intestine

(ii) Which organ in the list below can be harmed if we eat too much fat?
Tick the correct box.

1 mark

brain

heart

lung

ribs

maximum 7 marks

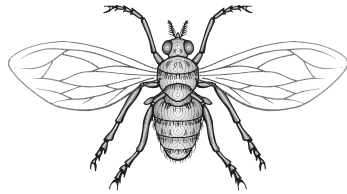
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9. Each of the animals in the drawings below belongs to a different group.

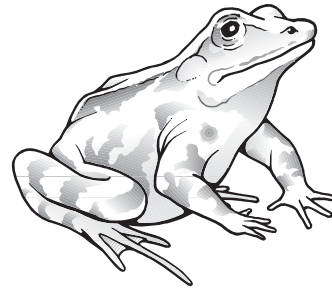
- (a) On the line beneath each drawing, write the name of the group the animal belongs to.
Choose names from the list below.

4 marks

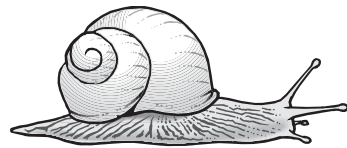
amphibians crustaceans insects mammals molluscs reptiles



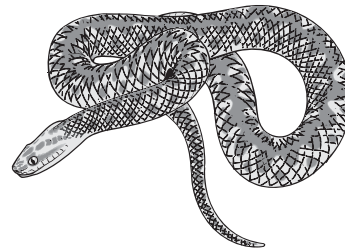
A



B



C



D

- (b) Which of the animals drawn above are invertebrates?
Give the correct letters.

2 marks

_____ and _____

maximum 6 marks

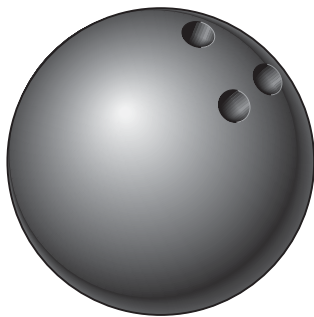


10. The picture shows a man called Aristotle. He lived in Greece over 2000 years ago.

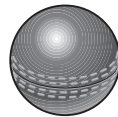


Aristotle said that the heavier an object is, the faster it will fall to the ground.

- (a) The drawings below show a bowling ball, a cricket ball and a ping-pong ball. Lila dropped them all at the same time from the same height.



bowling ball
mass=5 000 g



cricket ball
mass=160 g

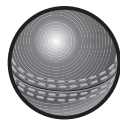


ping-pong ball
mass=2.5 g

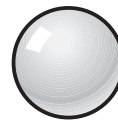
If Aristotle was correct, which of the three balls would you expect to reach the ground first? Give the reason for your answer.

1 mark

- (b) Joe said that it would be a fairer test if Lila had only used a cricket ball and a hollow plastic ball as shown below.



cricket ball
mass=160 g



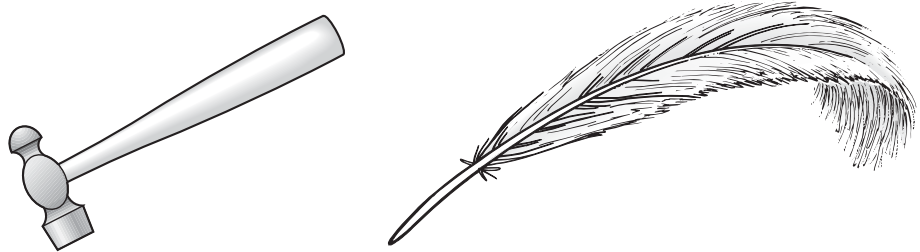
hollow plastic ball
mass=56 g

Why was Joe correct?

1 mark

(c) About 400 years ago in Italy, a man called Galileo had a different idea. He said that all objects dropped from the same height would reach the ground at the same time.

(i) Lila dropped a hammer and a feather at the same time from the same height.



If Galileo was correct, which, if either, would reach the ground first?

1 mark

(ii) Gravity acts on both the hammer and the feather as they fall. Give the name of **one** other force which acts on them as they fall.

1 mark

(iii) An astronaut on the moon dropped a hammer and a feather at the same time from the same height.



How would the results of the astronaut's experiment on the Moon be different from Lila's experiment on the Earth?

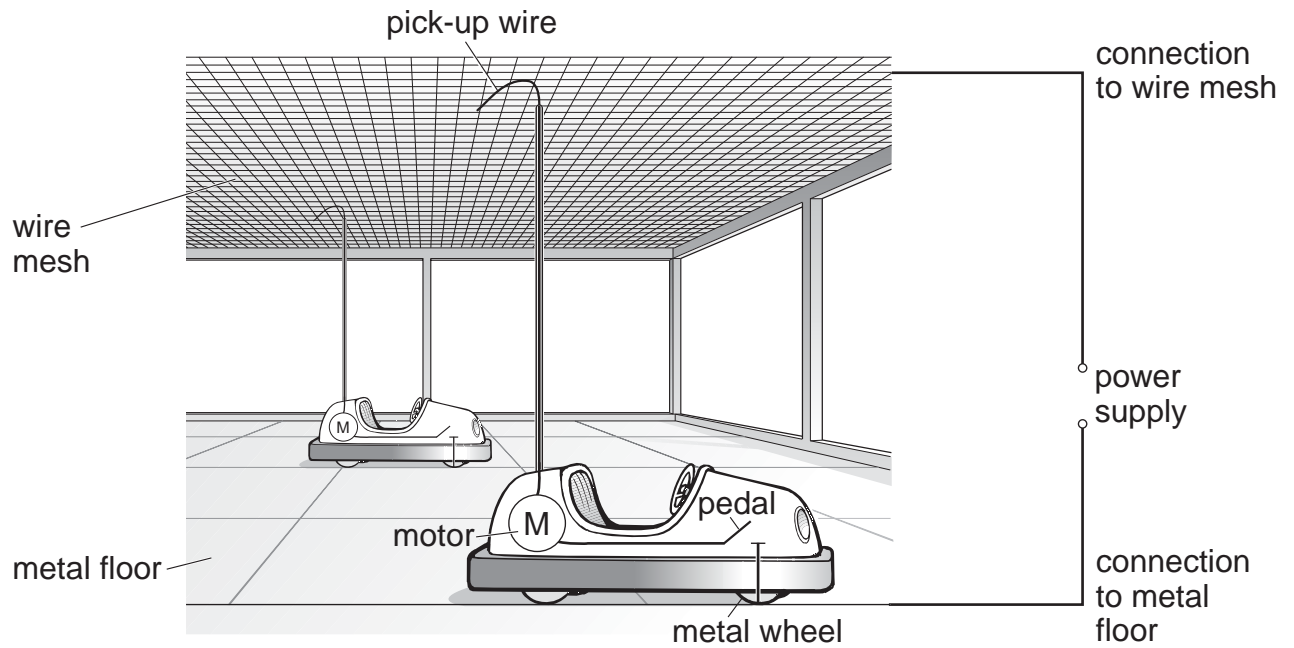
2 marks

Explain your answer.

maximum 6 marks



11. The diagram shows two dodgem cars at a fairground. The circuit symbols for the motor and pedal for each dodgem car are shown on the diagram.



- (a) Complete the following sentence.



1 mark

Each dodgem car is connected to the power supply through the

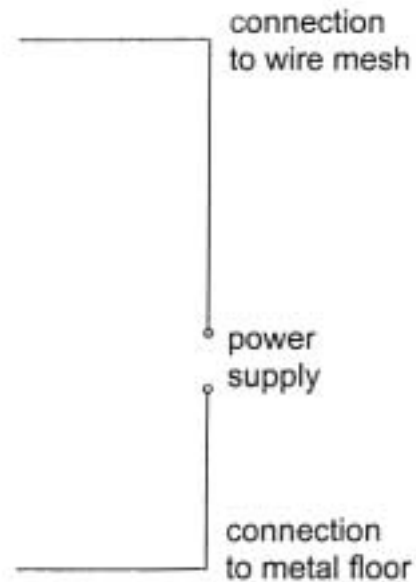
_____ which is in contact with the wire

mesh, and through the _____ which is

in contact with the metal floor.

- (b) Dodgem cars are connected using parallel circuits.
 Complete the circuit diagram below for the **two** dodgem cars.
 Use **two** motor symbols, , and **two** switch symbols,  .
 The power supply for the circuit has been drawn for you.

2 marks



- (c) Even when the power supply is switched on, the dodgem car will **not** move until the pedal is pressed. Give the reason for this.

1 mark

- (d) A man looks after the dodgem cars during the rides.
 Why does the man **not** get an electric shock as he walks across the metal floor?

1 mark

- (e) During one ride, the two dodgem cars are running. The pick-up wire on one car snaps off. Describe how this affects:

- (i) the dodgem car with the broken pick-up wire;

1 mark

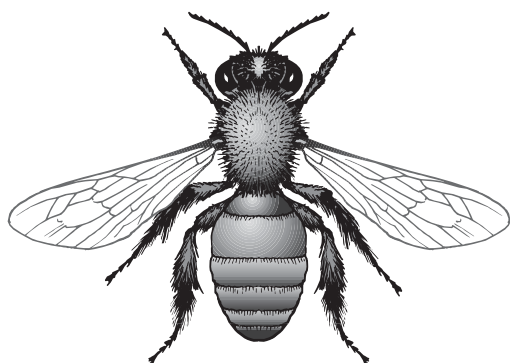
- (ii) the other dodgem car.

1 mark

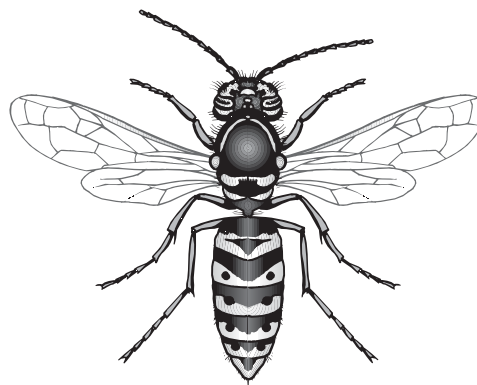
maximum 7 marks

7

12. Bees and wasps are both insects which use a sting as part of their defence. The pH values of their stings are shown on the diagrams.



bee
bee sting, pH 2



wasp
wasp sting, pH 10

- (a) Complete the table below to show whether the stings are acidic or alkaline and what colour they would turn universal indicator paper.

2 marks

	acidic or alkaline	colour of universal indicator paper
bee sting (pH 2)		
wasp sting (pH 10)		

-
- (b) The table below shows five household substances and the pH of each substance.

name of substance	pH of substance
bicarbonate toothpaste	8
lemon juice	3
vinegar	4
washing soda	11
water	7

Give the name of **one** substance in the table which would neutralise each sting.

(i) bee sting _____ *1 mark*

(ii) wasp sting _____ *1 mark*

maximum 4 marks

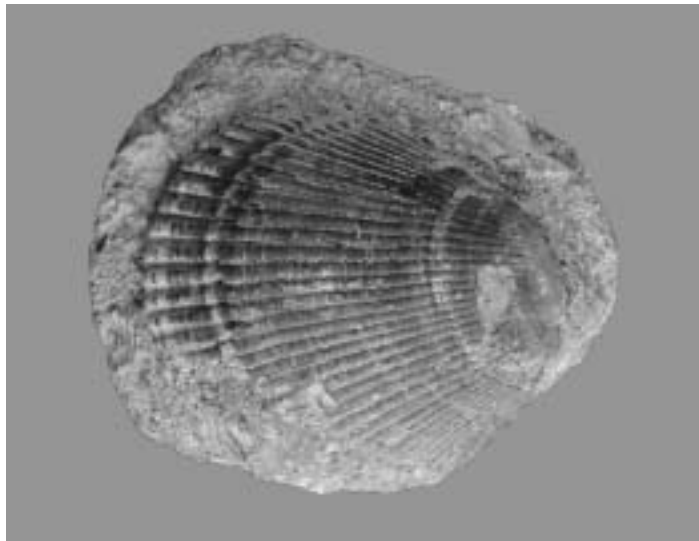


13. (a) Over many years, cliffs may be affected by weathering.

Describe **one** effect of weathering on a cliff.

1 mark

(b) The photograph shows a piece of sandstone.



(i) The sandstone in the photograph contains a fossil.
What is a fossil?

1 mark

(ii) What group of rocks does sandstone belong to?

1 mark

(c) Granite and basalt are igneous rocks. They contain crystals but **no** fossils.

(i) How are igneous rocks formed?

1 mark

(ii) Explain why igneous rocks do **not** contain fossils.

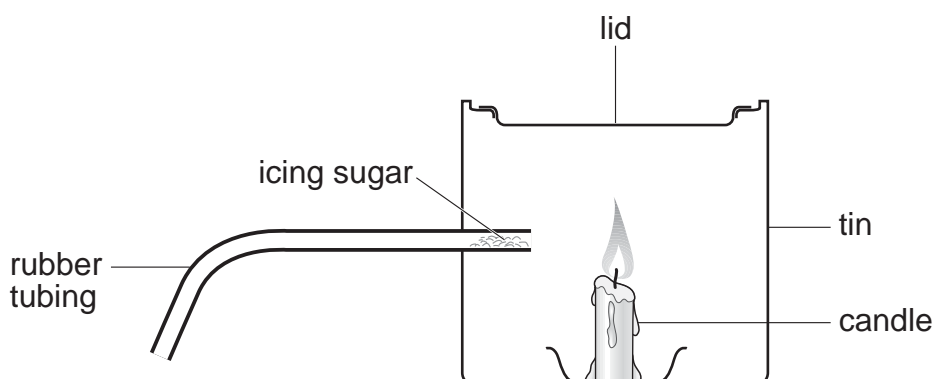
1 mark

(iii) Granite takes much longer to form than basalt.
How will the size of the crystals in granite be different from the size of the crystals in basalt?

1 mark

maximum 6 marks

14. A teacher set up the following apparatus behind a safety screen. She placed 1 g of icing sugar in the end of the rubber tubing inside the tin, as shown below.



The teacher blew through the other end of the rubber tubing. The icing sugar came into contact with the flame. There was a loud explosion and the lid was blown off the tin.

- (a) Complete the following sentence describing the energy changes which took place.

3 marks

_____ energy in the icing sugar changed to _____ energy and _____ energy.

- (b) As a result of the explosion, the lid of the tin was pushed off. Explain what had happened to the gas molecules inside the tin to make this happen.

2 marks

(c) When icing sugar is burned in this experiment, the gas **used** and the gas **produced** are the same as when energy is released from sugar in the cells of the body.

(i) Which gas, in the air, is **used** when the icing sugar burns?

1 mark

(ii) Give the name of the gas **produced** when the icing sugar burns.

1 mark

(d) The table below shows the energy values of four food substances.

food substance	energy value, in kJ per 100 g
icing sugar	1680
curry powder	979
flour	1450
custard powder	630

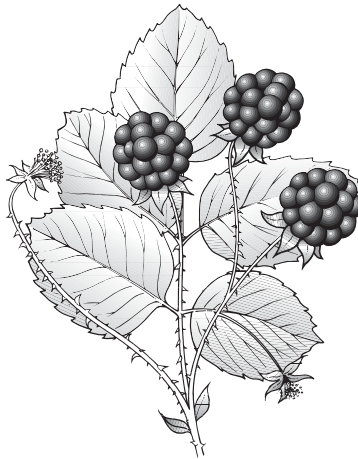
The teacher repeated the experiment with 1 g of custard powder. What difference would this make to the experiment?

1 mark

maximum 8 marks



15. The drawing shows part of a blackberry plant.



- (a) Photosynthesis takes place in the leaves of the blackberry plant. Complete the word equation for photosynthesis.

water + carbon dioxide \rightarrow _____ + oxygen

1 mark

- (b) Jonathan studied a blackberry plant growing in a shady place and a blackberry plant growing in a sunny place.

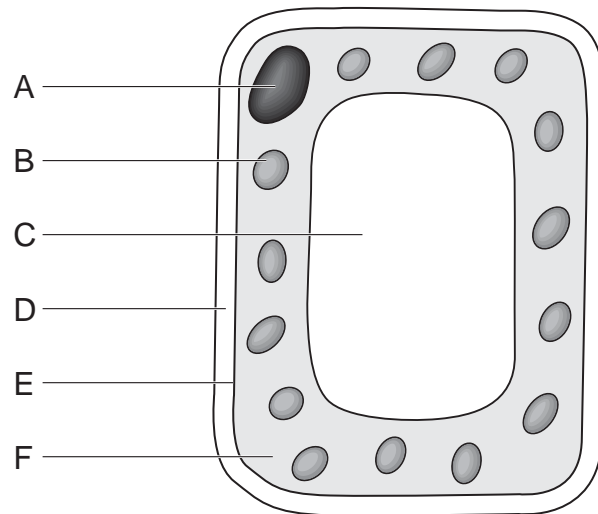
- (i) Jonathan found that the plant in the shady place had larger leaves. Why is it an advantage for plants in the shade to have leaves with a large surface area?

1 mark

- (ii) Both blackberry plants had green leaves. What part of the leaf cells makes the leaf green?

1 mark

(c) The diagram below shows a cell from a leaf of a blackberry plant.



The names of four parts of the cell are listed in the table below.

(i) Match the name of each part with a letter from the diagram. Write your answers in the table.

4 marks

part	letter of part
cell wall	
cytoplasm	
nucleus	
vacuole	

(ii) Which **two** of the labelled parts are also present in an animal cell? Give the correct letters from the diagram.

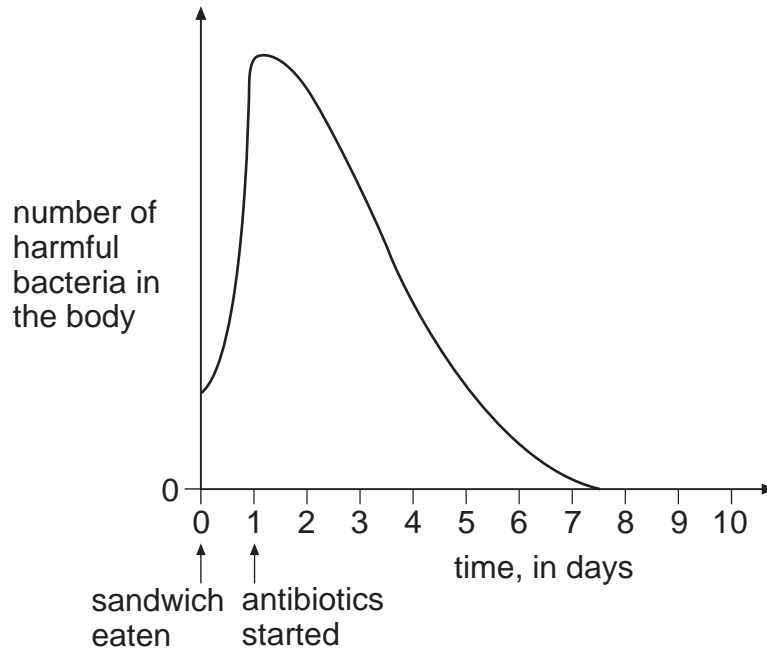
2 marks

_____ and _____

maximum 9 marks



16. One evening Jenny and Leah ate chicken sandwiches which had been in their school bags all day. There were harmful bacteria in the food. The next day both girls became very ill. Their doctor gave them antibiotics to take for eight days. The graph represents how antibiotics affect the number of bacteria in the body.



- (a) Use the graph to explain why the girls did **not** become ill until the day after eating the sandwiches.

1 mark

- (b) After taking the antibiotics for eight days Jenny was completely better. Explain why she got better.

1 mark

-
- (c) Leah should have taken the antibiotics for eight days.
She felt much better after five days and stopped taking the antibiotics.
Two days later she felt very ill again.
Use the graph to help you explain why Leah became ill again.

2 marks

- (d) Food will keep longer if it is placed in a refrigerator at 2°C.
Refrigeration does **not** kill bacteria.
What effect does the low temperature have on bacteria?

1 mark

maximum 5 marks

END OF TEST