

Sc

KEY STAGE
3

TIER
3–6

2005

Science test

Paper 1

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.

First name _____

Last name _____

School _____

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.
- The number of marks available for each question is given below the mark boxes in the margin. You should not write in this margin.
- If you are asked to plan an investigation, there will be space for you to write down your thoughts and ideas.
- 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

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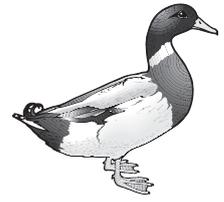
1. The drawings show six living things.
They spend all or part of the time in water.



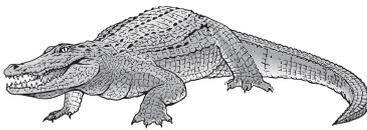
tadpole
A



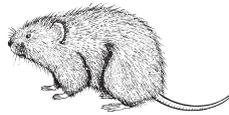
trout
B



duck
C



crocodile
D



water vole
E



frog
F

not to scale

Look at the drawings.

- (a) (i) Give the letter of **one** living thing that uses gills to take in oxygen.

- (ii) Give the letter of **one** living thing that is covered in scales.



1ai

1 mark



1aii

1 mark

(b) Use a word from the list below to fill the gap in the sentence.

lungs legs eyes backbones

The trout, duck, crocodile, water vole and frog are all called vertebrates because they have _____.

1b
1 mark

(c) The trout spends all of its time in water.

Give **one** way the trout is suited for moving in water.

1c
1 mark

(d) Draw a line from each animal below to the group it belongs to.
Draw only **three** lines.

animal

group

frog

reptiles

crocodile

mammals

water vole

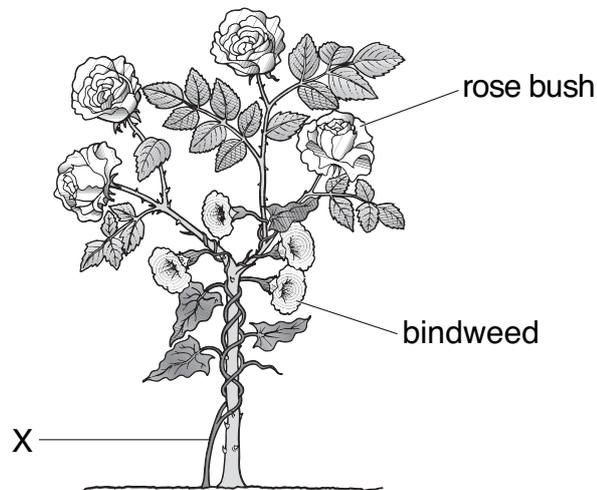
amphibians

1d
1 mark

1d
1 mark

maximum 6 marks

2. Bindweed is a plant that grows tightly around other plants.
The drawing below shows bindweed growing around a rose bush.



- (a) Complete the sentences below. Choose from the words in the list.

air light support water minerals

- (i) Bindweed grows as high as possible on the rose bush so that the
bindweed can get as much _____ as possible.
- (ii) Bindweed grows around the rose bush because the rose bush
provides _____ for the bindweed.

2ai
1 mark

2aia
1 mark

- (b) A gardener cut through the stem of the bindweed at X.
Two days later the bindweed above X was dead.

Why did the bindweed die?
Tick the correct box.

no air

no light

no warmth

no water

2b
1 mark

- (c) The gardener adds fertiliser to the soil to help her rose bushes to grow well.

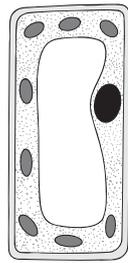
What do plants get from the fertiliser?
Tick the correct box.

acids	<input type="checkbox"/>	minerals	<input type="checkbox"/>
sugars	<input type="checkbox"/>	vitamins	<input type="checkbox"/>

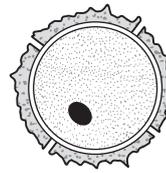
2c
1 mark

- (d) Plant roots have root hairs.

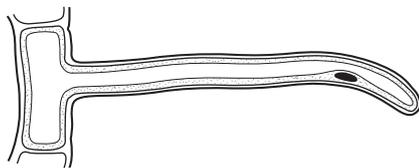
Which diagram shows a root hair?
Tick the correct box.



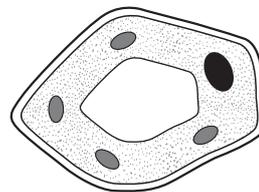
A



B



C



D

not to scale

2d
1 mark

maximum 5 marks

3. The drawings below show four living things found in a wood.



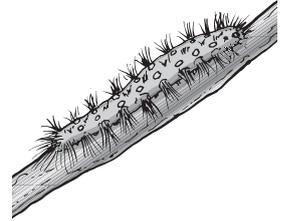
owl



oak tree



blackbird



caterpillar

not to scale

- Caterpillars eat oak leaves.
- Owls eat blackbirds.
- Blackbirds eat caterpillars.

(a) (i) Complete the food chain for these four living things.

oak tree → _____ → _____ → _____

(ii) Why is an oak tree called a producer?
Tick the correct box.

It loses its leaves in autumn.

It makes food by photosynthesis.

Its flowers are tiny.

Its leaves will **not** rot.

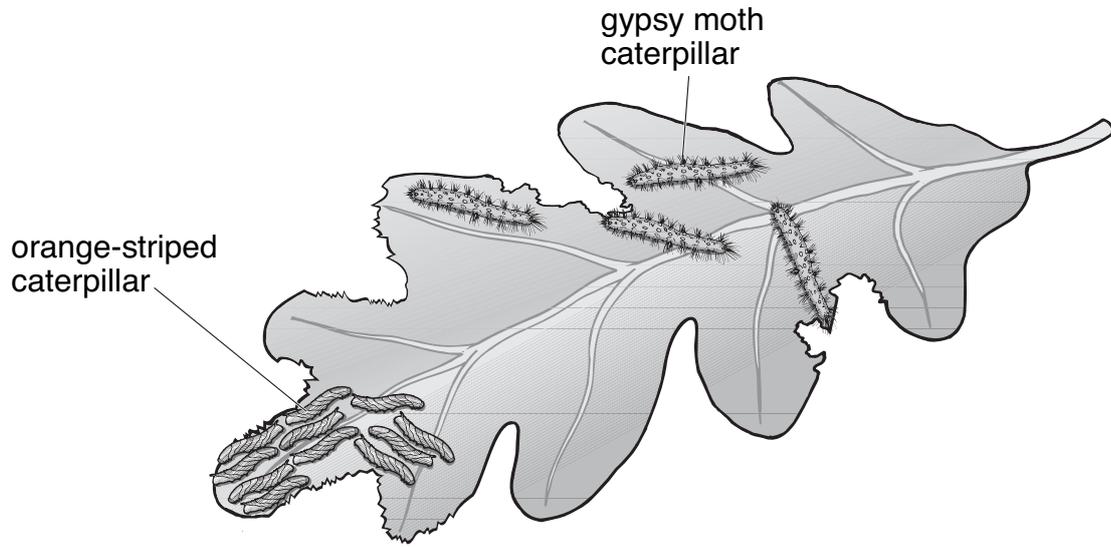
3ai

1 mark

3aii

1 mark

(b) On one oak tree, there were two types of caterpillar.



not to scale

All the caterpillars were eating the leaves.

The number of gypsy moth caterpillars increased.

What happened to the number of orange-striped caterpillars?

Explain your answer.

(c) There are **no** caterpillars on the oak tree in winter.

Suggest a reason for this.

3b
1 mark

3b
1 mark

3c
1 mark

maximum 5 marks

4. The drawings show six objects made from different materials.



iron nail



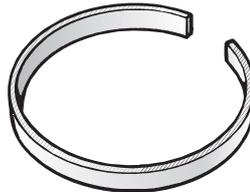
steel paper-clip



silver earrings



gold ring



copper bracelet



aluminium can

not to scale

(a) Fill the gaps in the sentences below.

The objects are made from materials that are all types of _____ . All the materials are good conductors of electricity and _____ .

4a

1 mark

4a

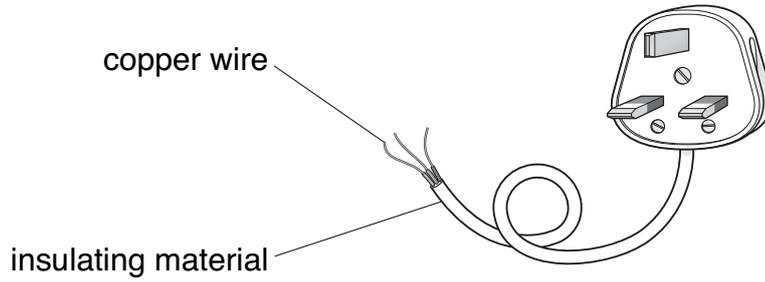
1 mark

(b) From the drawings above give **one** object that could rust.

4b

1 mark

(c) The drawing below shows part of an electric cable and a plug.



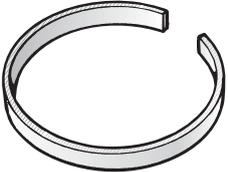
(i) What material could be put around the wires to insulate them?

(ii) Why is this insulating material needed?

4ci
1 mark

4cii
1 mark

(d) Which pair of objects is attracted to a magnet?
Tick the correct box.


iron nail
and

copper bracelet


iron nail
and

steel paper-clip


steel paper-clip
and

aluminium can

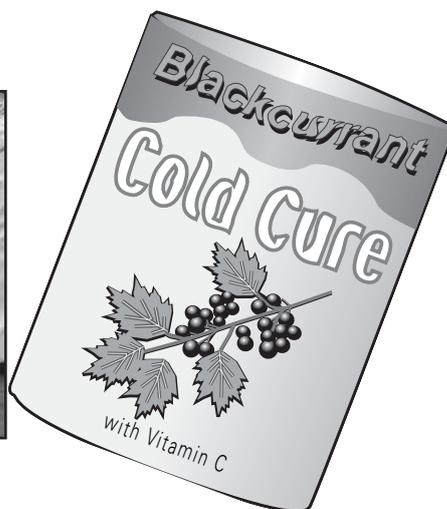

gold ring
and

silver earrings

4d
1 mark

maximum 6 marks

5. Emma and Philip wanted to see if changing the temperature of the water affected the time taken for a cold cure powder to dissolve in water.



Philip recorded their results.

Water at 40°C took 74 seconds.
 20°C took 144 seconds.
 It took 34 seconds for water
 at 57°C.

- (a) (i) Write the heading for the first column in the table below.

_____ (°C)	time to dissolve (s)

- (ii) Write their results correctly in the table above.

5ai

1 mark

5aii

1 mark

5aii

1 mark

(b) Give the names of **two** pieces of measuring equipment they would need.

1. _____

2. _____

5b

1 mark

5b

1 mark

(c) Why did they put the same amount of water in each beaker?

5c

1 mark

(d) Emma wrote, 'My investigation was good', as her conclusion.

Philip said this was **not** a scientific conclusion.

Explain why Emma's conclusion is **not** scientific.

5d

1 mark

(e) Look at their results on the opposite page.

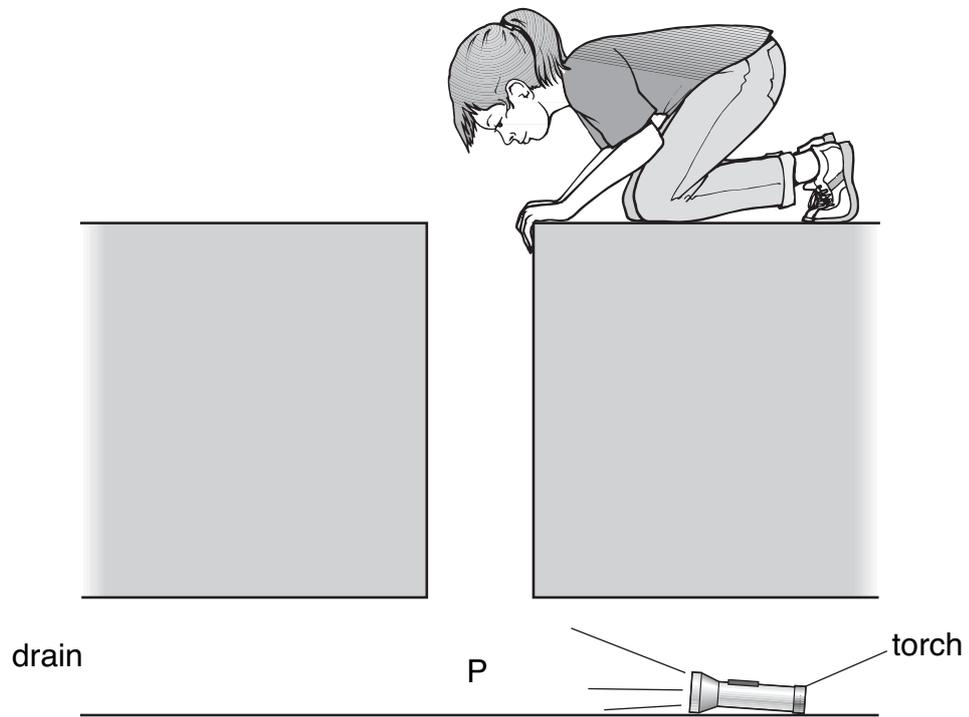
Write a scientific conclusion for their investigation.

5e

1 mark

maximum 8 marks

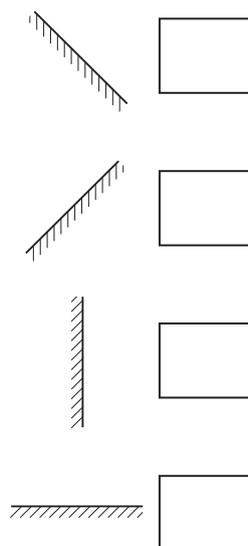
6. Jenny dropped her torch down a drain.
The torch was still switched on but Jenny could **not** see it.



not to scale

- (a) (i) Jenny lowered a mirror into the drain and placed it at position P.

At which angle should Jenny put the mirror to see the torch?
Tick the correct box.



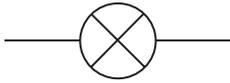
1 mark

(ii) What happens to the light from the torch when it hits the mirror?

6aii
1 mark

(b) The diagrams below show the symbols for three parts of the torch circuit.

(i) On the line below each diagram, give the name of the part.



6bi
1 mark

6bi
1 mark

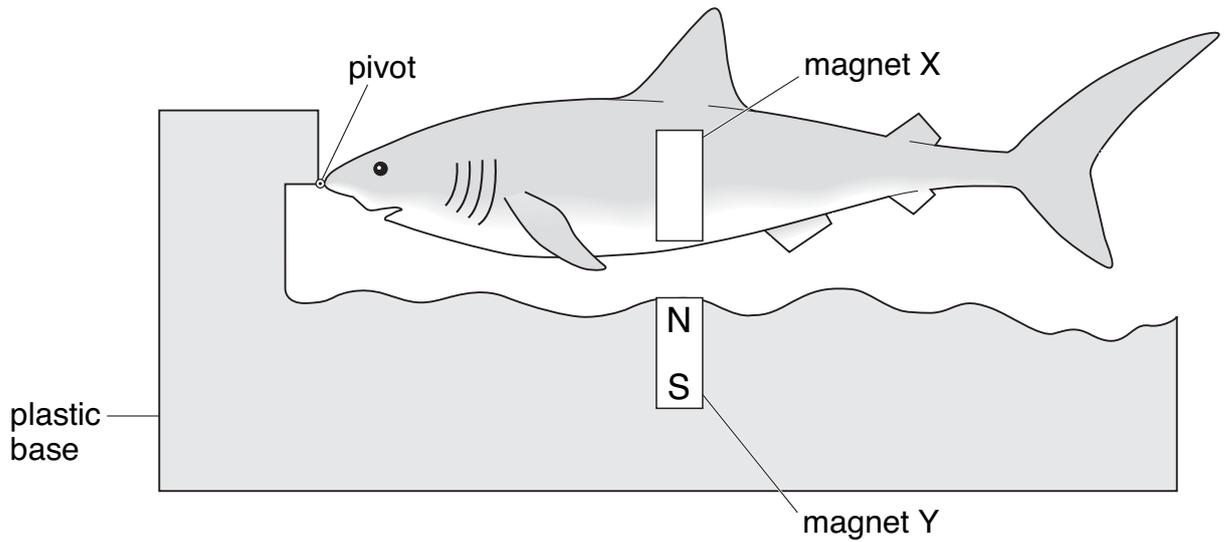
6bi
1 mark

(ii) In the space below, draw a circuit diagram to show how these **three** parts are connected in a torch.

6bii
1 mark

maximum 6 marks

7. The drawing shows a toy shark. Magnets X and Y make the shark 'float' above the plastic base.



- (a) On magnet X, write the letters N and S to label the poles of the magnet.

7a

1 mark

- (b) (i) Choose a word from the list below to complete the sentence.

attract cancel repel

7bi

1 mark

The toy shark 'floats' because the magnets _____
each other.

- (ii) Sophie pressed down on the tail of the shark with her finger.

What happened to the shark when she removed her finger?

7bii

1 mark

- (c) Sophie added weights to the toy shark and measured the distance between the two magnets.
Her results are shown below.

weight added to the toy shark (N)	distance between the magnets (mm)
0.1	6
0.2	4
0.3	3

Complete the sentence below.

As the weight on the toy shark increased, the distance between the magnets _____.

7c
1 mark

- (d) Sophie turned the magnet in the plastic base the other way up.

What happened to the shark?

7d
1 mark

maximum 5 marks

-
8. The photographs below show pupils investigating the movement of objects on ramps.



Plan an investigation into the factors affecting the movement of objects on ramps.

You can use any objects and any surfaces you like, and any other equipment you need.

In the box below, write a short draft of **one** question you could plan to investigate about the movement of objects on ramps.

Use your draft to help you answer the following questions.

- (a) Give **one** factor you could change as you carry out your investigation (the independent variable).

8a
1 mark

- (b) What factor would you observe or measure to collect your results (the dependent variable) and what equipment would you use to measure them?

The factor I would observe or measure is _____

8b
1 mark

The measuring equipment I would use is _____

8b
1 mark

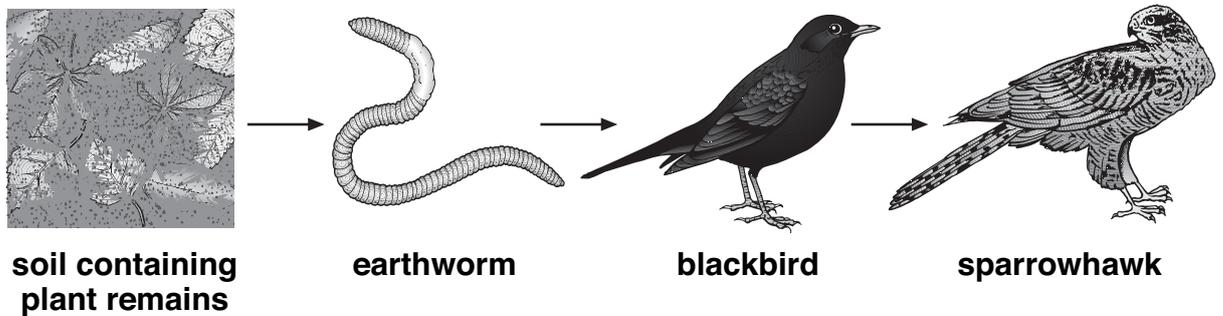
- (c) Give **one** factor you should keep the same to make your test fair.

8c
1 mark

maximum 4 marks

9. Copper and arsenic are present in the soil near copper mines. When earthworms eat this soil they change from brown to bright yellow. The copper and arsenic are **not** poisonous to earthworms.

(a) Earthworms are part of the food chain shown below.



not to scale

- (i) Use the food chain to suggest how copper and arsenic get into the body of a sparrowhawk.



9ai

1 mark

- (ii) Mary suggested that blackbirds are more likely to catch bright yellow earthworms than brown earthworms.

Give **one** reason why this might be true.



9aii

1 mark

- (b) Mary wanted to count the bright yellow earthworms and the brown earthworms in the soil at different distances from the mines.

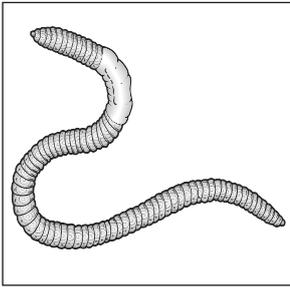
What important information about the soil could she get from her results?



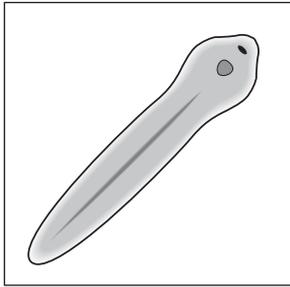
9b

1 mark

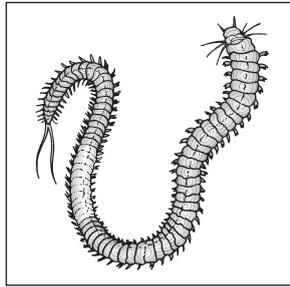
(c) The drawings below show an earthworm and three other worms.



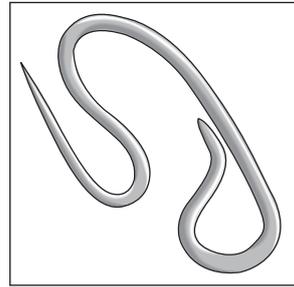
earthworm



flatworm



ragworm



roundworm

not to scale

The ragworm belongs to the same group as the earthworm.

How can you tell this from the drawings?

9c
1 mark

(d) The roundworm and some flatworms are parasites.

What does this mean?

Tick the correct box.

They feed only on insects.

They live in a burrow.

They feed on other living things and harm them.

They live in the sea.

9d
1 mark

maximum 5 marks

10. (a) Carbon monoxide, nicotine and tar get into the lungs when a person smokes.

Draw a line from each substance to the effect of the substance on the body.

Draw only **three** lines.

substance

effect of the substance

10a
1 mark

carbon monoxide

causes addiction to smoking

10a
1 mark

nicotine

causes influenza (flu)

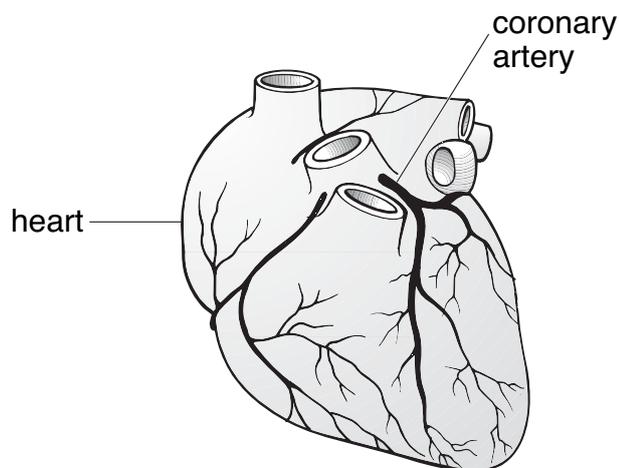
10a
1 mark

tar

causes lung cancer

causes red blood cells to carry less oxygen

- (b) The coronary arteries carry blood to the heart muscle.
The drawing below shows the heart and coronary arteries.



(i) Diagram 1 shows a section through a coronary artery.

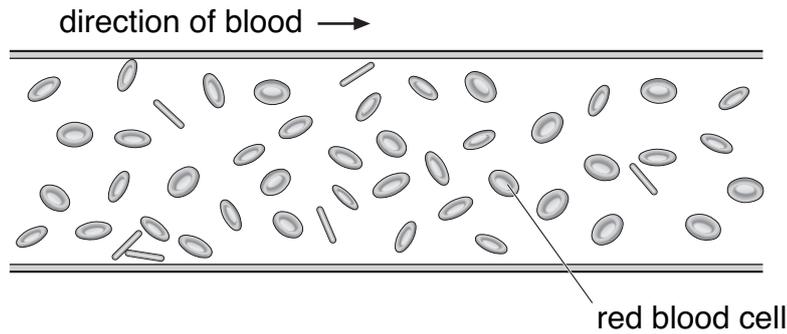


diagram 1

Smoking can cause damage to the coronary artery.
Diagram 2 shows a section through part of a damaged artery.

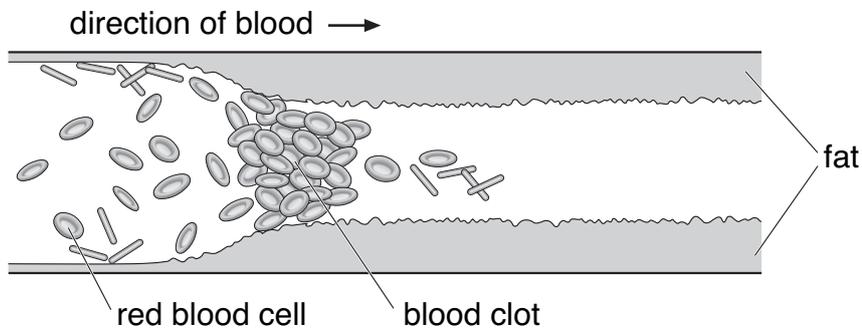


diagram 2

not to scale

Look at diagram 2. A blood clot has formed.

Give **one** other change in the coronary artery.

10bi
1 mark

(ii) Respiration takes place in the muscle cells of the heart.

Explain why a blood clot in the coronary artery prevents these cells respiring normally.

10bii
1 mark

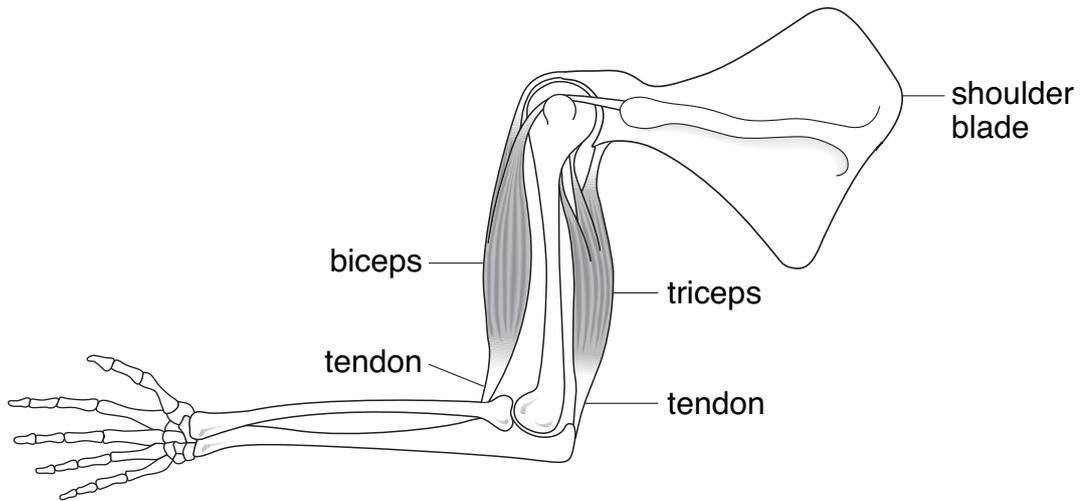
10bii
1 mark

maximum 6 marks

Total

6

11. The diagram below shows muscles and bones of a human arm.



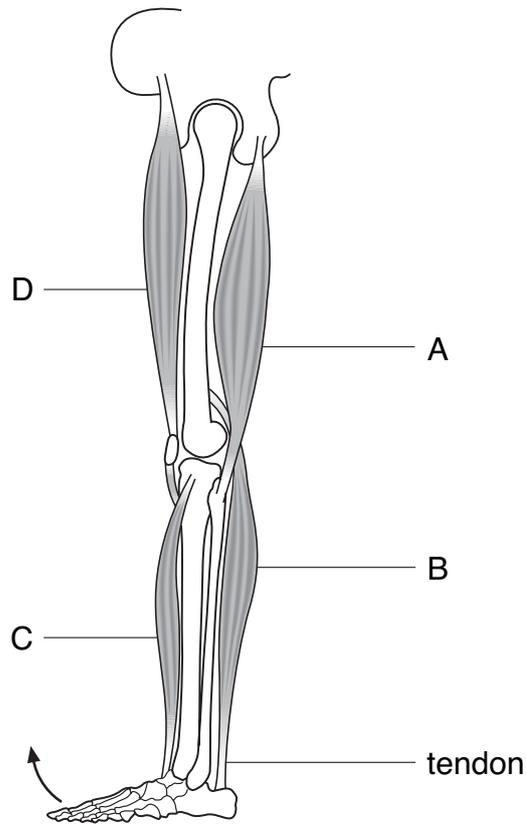
(a) Why is it important that the tendons do **not** stretch?

11a
1 mark

(b) The biceps and triceps are an antagonistic pair of muscles. Explain what this means.

11b
1 mark

(c) The diagram below shows muscles and bones of a human leg.



(i) Which muscle contracts to move the foot in the direction shown by the arrow?
Give the letter.

(ii) Which **two** pairs of muscles are antagonistic pairs?
Tick the **two** correct boxes.

A and B

B and C

C and D

D and A

11ci
1 mark

11cii
1 mark

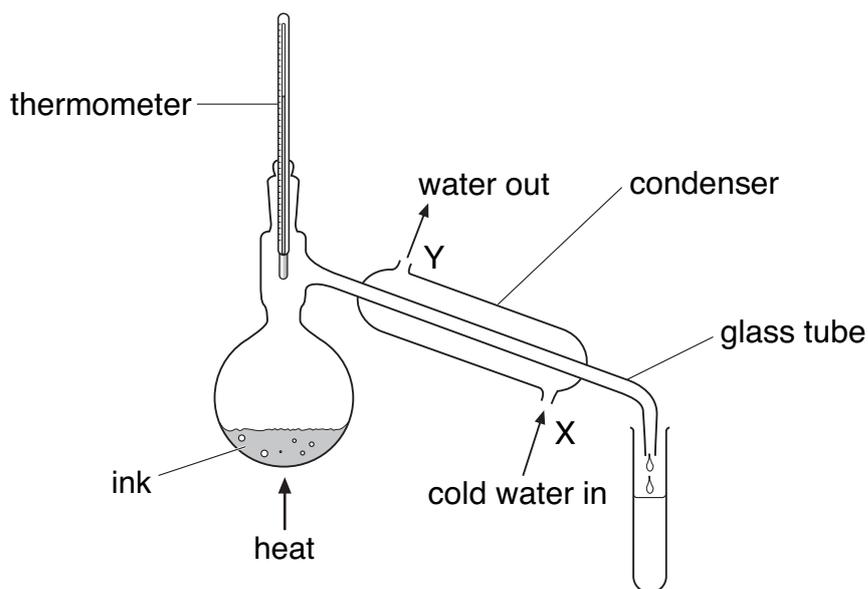
11cii
1 mark

maximum 5 marks

Total

5

12. Rema used the apparatus below to distil 100 cm³ of water-soluble ink.



apparatus A

not to scale

- (a) Which processes occur during distillation?
Tick the correct box.

condensation then evaporation

evaporation then condensation

melting then boiling

melting then evaporation

12a
1 mark

- (b) Give the name of the colourless liquid that collects in the test-tube.

12b
1 mark

- (c) What would the temperature reading be on the thermometer when the ink has been boiling for two minutes?

_____ °C

12c
1 mark

- (d) (i) Water at 15°C enters the condenser at X.
Predict the temperature of the water when it leaves the condenser at Y.

_____ °C

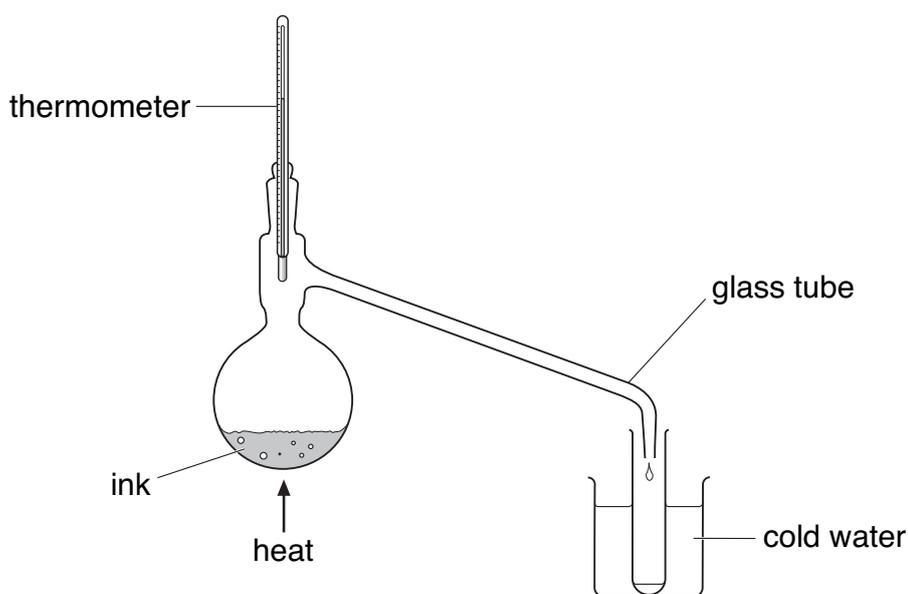
Explain this change of temperature.

- (ii) Give **two** ways in which the water vapour changes as it passes down the glass tube in the condenser.

1. _____

2. _____

- (e) Peter used the apparatus below to distil 100 cm³ of water-soluble ink.



apparatus B

not to scale

Why is the condenser in **apparatus A** better than the glass tube and beaker of water in **apparatus B**?

maximum 7 marks

12di
1 mark

12dii
1 mark

12dii
1 mark

12e
1 mark

Total
7

13. Burning fossil fuels causes air pollution.

(a) (i) Give the names of **two** fossil fuels.

_____ and _____

(ii) Some fossil fuels contain sulphur.

Complete the word equation for the reaction between sulphur and oxygen in the air.

sulphur + oxygen → _____

(b) Burning fossil fuels leads to the formation of acid rain.

Acid rain has collected in this lake.

A helicopter is dropping calcium hydroxide into the lake.



calcium hydroxide



13ai

1 mark



13aii

1 mark

Calcium hydroxide dissolves in water to form an alkaline solution.

- (i) What effect does an alkali have on the pH of an acidic lake?

13bi

1 mark

- (ii) When calcium hydroxide reacts with sulphuric acid in the lake a calcium salt is formed.

What is the name of this salt?

Tick the correct box.

calcium carbonate

calcium chloride

calcium nitrate

calcium sulphate

13bi

1 mark

- (c) The photograph below shows trees damaged by acid rain.



- (i) The trees have lost their leaves and have died.
Explain why leaves are needed for a tree to grow.

13ci

1 mark

- (ii) What effect does acid rain have on buildings made from limestone?

13cii

1 mark

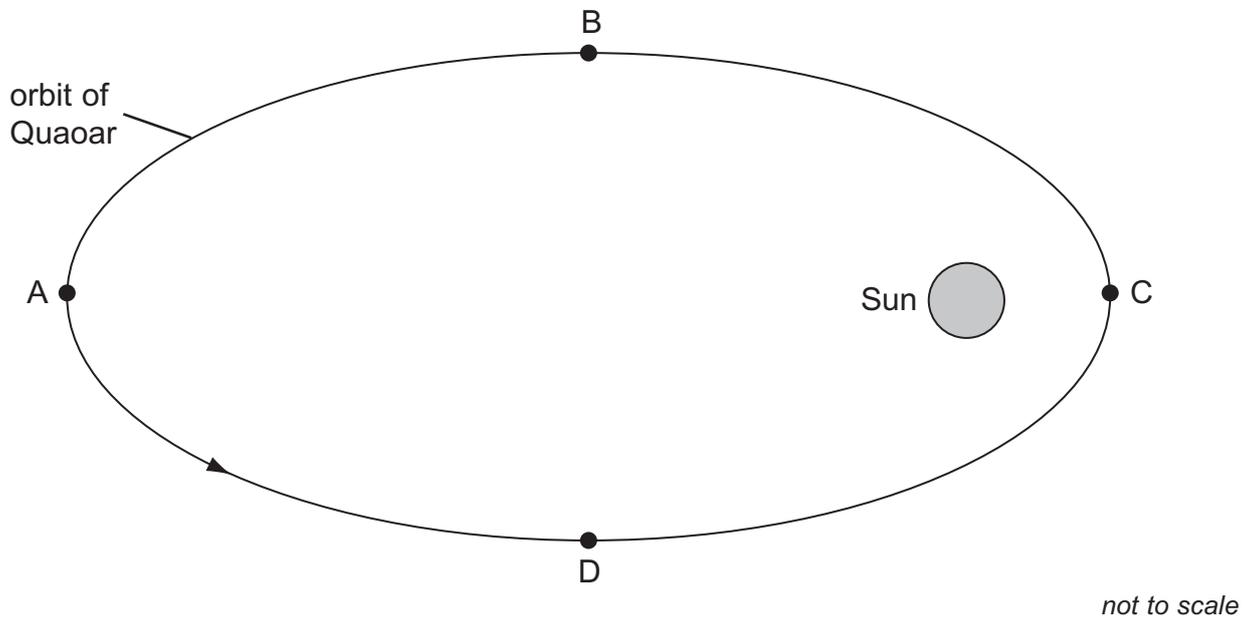
maximum 6 marks

Total

6

14. (a) In 2002 a large asteroid was discovered orbiting the Sun. It was named Quaoar.

The diagram below shows Quaoar in four positions in its orbit.



- (i) In which of the four positions, A, B, C or D, is the effect of the Sun's gravity on Quaoar the greatest?

Explain your answer.

- (ii) **On the diagram above**, draw arrows to show the direction of the Sun's gravity on Quaoar in each of the positions A, B, C and D.

- (iii) At which position, A, B, C or D, is Quaoar travelling most slowly?

Explain your answer.

14ai
1 mark

14aii
1 mark

14aiii
1 mark

- (b) The table below gives information about three of the planets in our solar system.

planet	average distance from Sun (millions of km)	time for one orbit (Earth years)	average surface temperature of planet (°C)
Saturn	1427	30	-180
Uranus	2870	84	-210
Pluto	5900	248	-230

- (i) The time for one orbit of the planet Neptune is 165 Earth years.

Estimate the average distance of Neptune from the Sun.
Use information in the table to help you.

_____ millions of km

14bi
1 mark

- (ii) How does the surface temperature of these planets vary with distance from the Sun?

Use information in the table to help you.

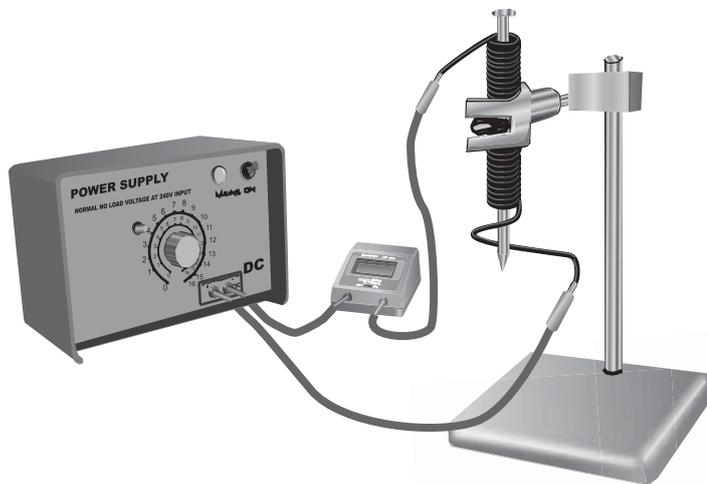
14bii
1 mark

- (iii) Explain why the temperature varies with distance from the Sun in this way.

14biii
1 mark

maximum 6 marks

15. Alex makes an electromagnet.
She winds insulated wire around an iron nail.
She connects the wire to a power supply.
She uses the electromagnet to pick up some steel paper-clips.



This is her prediction.

The more turns of wire around the iron nail, the stronger the electromagnet becomes.

- (a) (i) Give the **one** factor she should change as she investigates her prediction.

- (ii) Give **one** factor she should keep the same.

- (iii) Describe how she could use the paper-clips to measure the strength of the electromagnet.

15ai
1 mark

15aii
1 mark

15aiii
1 mark

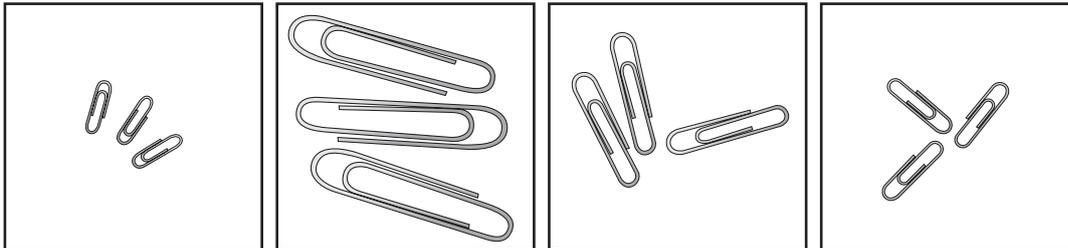
(b) Alex wrote a report of her investigation.

My report.
My results are accurate because I can't see any odd results.

What would an odd result suggest?

15b
1 mark

(c) (i) Which size paper-clips would Alex use to make her results more accurate?
Tick the correct box.



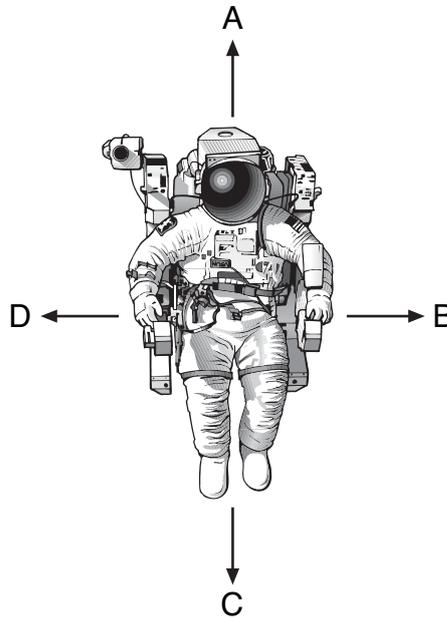
15ci
1 mark

(ii) Give a reason for your choice.

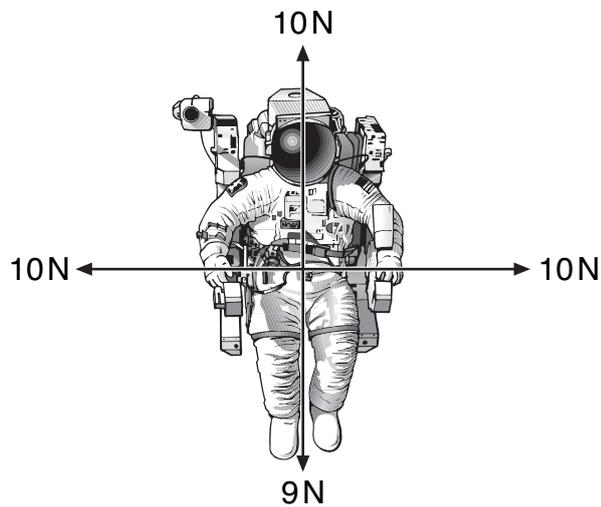
15cii
1 mark

maximum 6 marks

16. The drawing below shows an astronaut in space.
He has four small jets attached to his space suit.
These jets produce forces on the **astronaut** in the directions A, B, C and D.



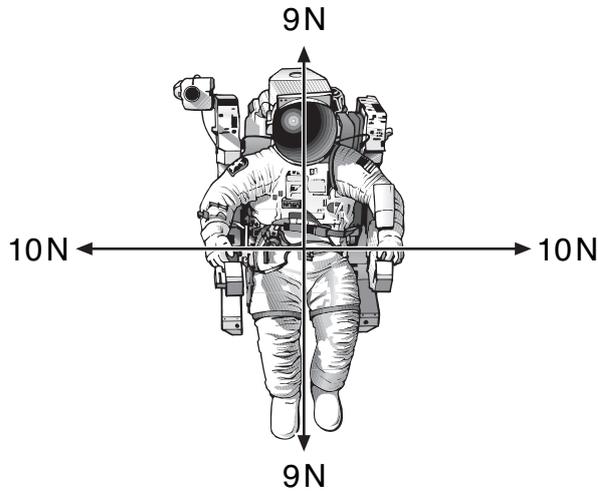
- (a) The drawing below shows the size and direction of four forces acting on the astronaut.



In which direction, A, B, C or D, will the astronaut move?
Give the letter.

16a
1 mark

- (b) The drawing below shows the size and direction of four different forces acting on the astronaut.



What will happen to the astronaut when the jets produce these four forces?

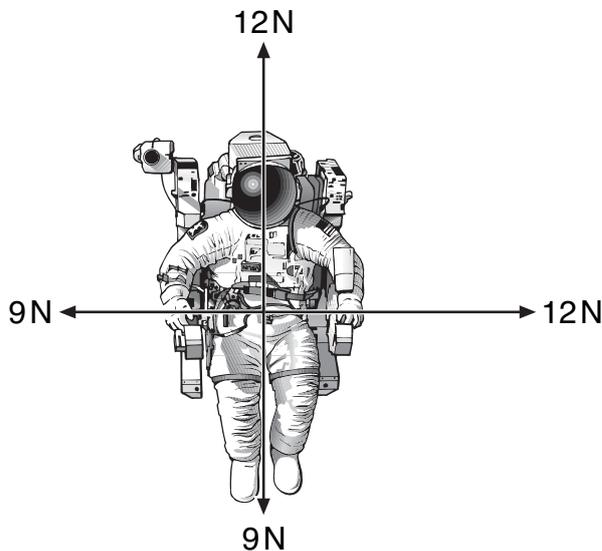
Explain your answer.

16b
1 mark

16b
1 mark

- (c) The drawing below shows the size and direction of four different forces acting on the astronaut.

Draw an arrow on the diagram below to show the direction in which he will move.



16c
1 mark

maximum 4 marks

END OF TEST

