Sc

KEY STAGE 3

TIER 3–6

2006

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

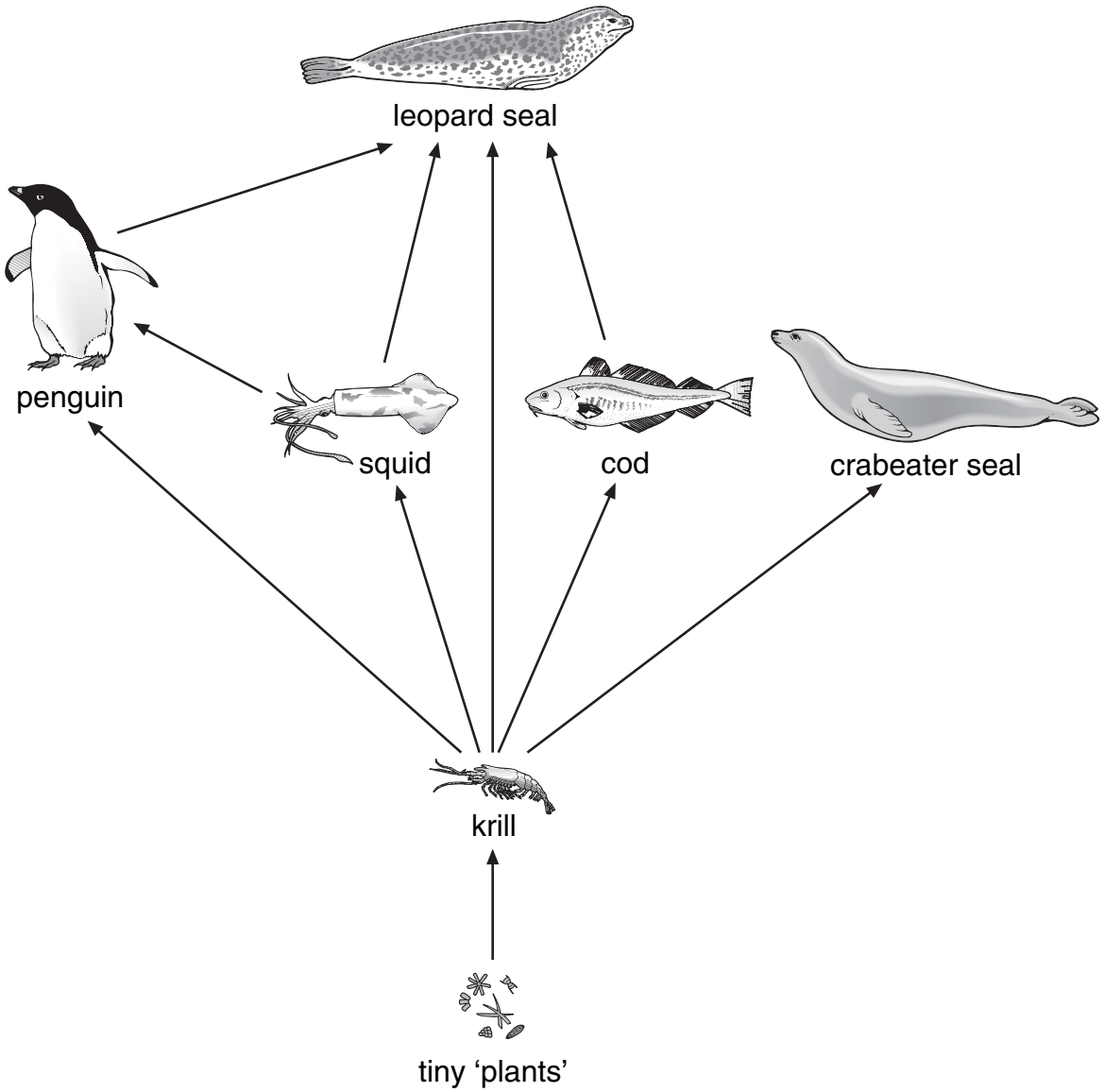
- The test is 1 hour long.
- You will need: pen, pencil, rubber, ruler, protractor and calculator.
- The test starts with easier questions.
- Try to answer all of the questions.
- The number of marks available for each question is given below the mark boxes in the margin. You should not write in this 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	

QCA/06/1936

1. The drawing below shows part of a food web in the sea around Antarctica.



not to scale

(a) From the food web, give the names of two animals that only eat krill.

1a
1 mark

1. _____

1a
1 mark

2. _____

(b) (i) Which word describes the plants in a food web?
Tick the correct box.

producers	☐	predators	☐
herbivores	☐	carnivores	☐

☐ 1bi
1 mark

(ii) Krill are small animals that eat tiny plants.

Which word describes krill in the food web?
Tick the correct box.

producers	☐	predators	☐
herbivores	☐	carnivores	☐

☐ 1bii
1 mark

(c) (i) Crabeater seals eat krill.
Fishermen catch large amounts of krill from the sea.

How would a decrease in the number of krill affect the number of crabeater seals?

_____

_____

☐ 1ci
1 mark

(ii) Look at the food web.
Leopard seals also eat krill.

A decrease in the number of krill will affect the crabeater seals sooner than it affects leopard seals.
Give the reason for this.

_____

_____

☐ 1cii
1 mark

maximum 6 marks

Total
☐
6

2. Choose words from the box below to answer **all** the questions.

cell division	digestion	fertilisation	foetus	genes	
intestine	ovary	ovum (egg)	sperm	testis	uterus

(a)



A

(i) What is the name of cell A?

_____

2ai

1 mark

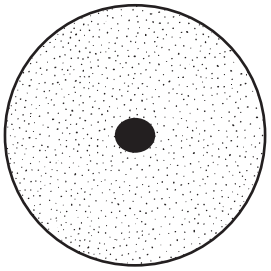
(ii) Where is cell A produced?

_____

2aii

1 mark

(b)



B

(i) What is the name of cell B?

_____

2bi

1 mark

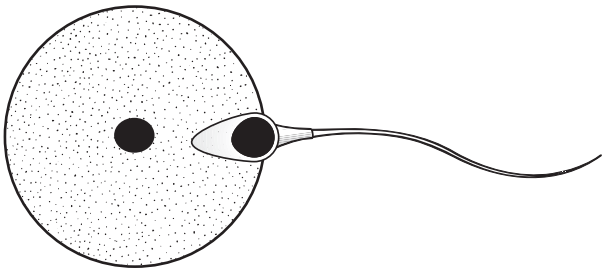
(ii) Where is cell B produced?

_____

2bii

1 mark

(c)



C

not to scale

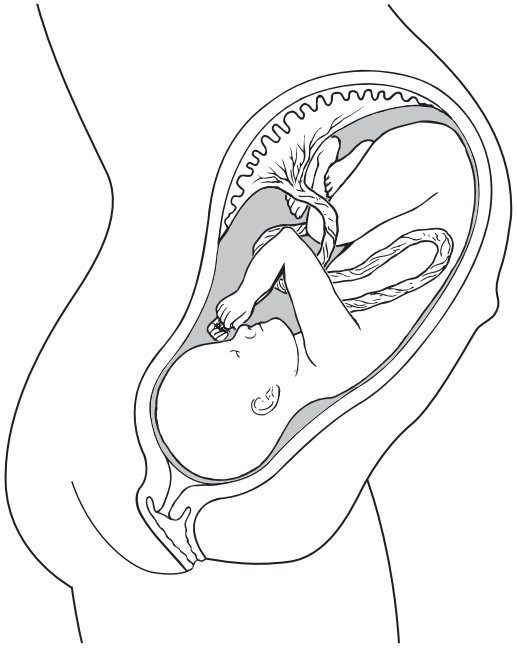
What process is shown in C? Choose your answer from the box opposite.

_____

2c

1 mark

(d) The diagram shows a baby developing inside its mother.



(i) Which word means an unborn baby? Choose your answer from the box opposite.

_____

2di

1 mark

(ii) Where does the unborn baby develop? Choose your answer from the box opposite.

_____

2dii

1 mark

maximum 7 marks

Total

7

3. The drawings below show three healthy young plants.



A **B** **C**

The drawings below show the three plants after two weeks.



A **B** **C**

(a) (i) Plant B did not have enough light.

How can you tell this from the drawing?

_____

_____

3ai

1 mark

(ii) Plant C did not have enough water.

How can you tell this from the drawing?

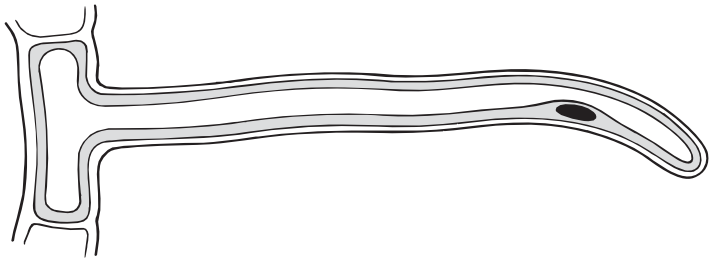
_____

_____

3aii

1 mark

(b) The drawing below shows a root hair cell.



Give two substances that root hair cells absorb from the soil.

1. _____

2. _____

3b

1 mark

3b

1 mark

maximum 4 marks

Total

4

4. Two pupils investigated the effect of temperature on how fast oil flows through a funnel.
They used the equipment in the photograph below.



(a) They measured the time taken for all the oil to flow through the funnel.

What equipment did they use to measure the time?

_____

4a

1 mark

(b) Complete the table below to show what they should do with each factor in their investigation.
Tick one box for each factor.

factor	change it	keep it the same	measure it
temperature of the oil			
type of oil			
volume of oil			
time taken for all the oil to flow through the funnel			

4b

1 mark

4b

1 mark

(c) (i) Look at their results in the table below.

temperature of oil (°C)	time taken for all the oil to flow through the funnel (s)
22	131
40	35
60	22
80	19

What happens to the time taken for the oil to flow through the funnel as its temperature increases?

_____

_____

4ci

1 mark

(ii) How long would it take for all the oil to flow through the funnel at 15 C?

Choose from the following times.
Tick the correct box.

15 seconds ☐

80 seconds ☐

131 seconds ☐

180 seconds ☐

4cii

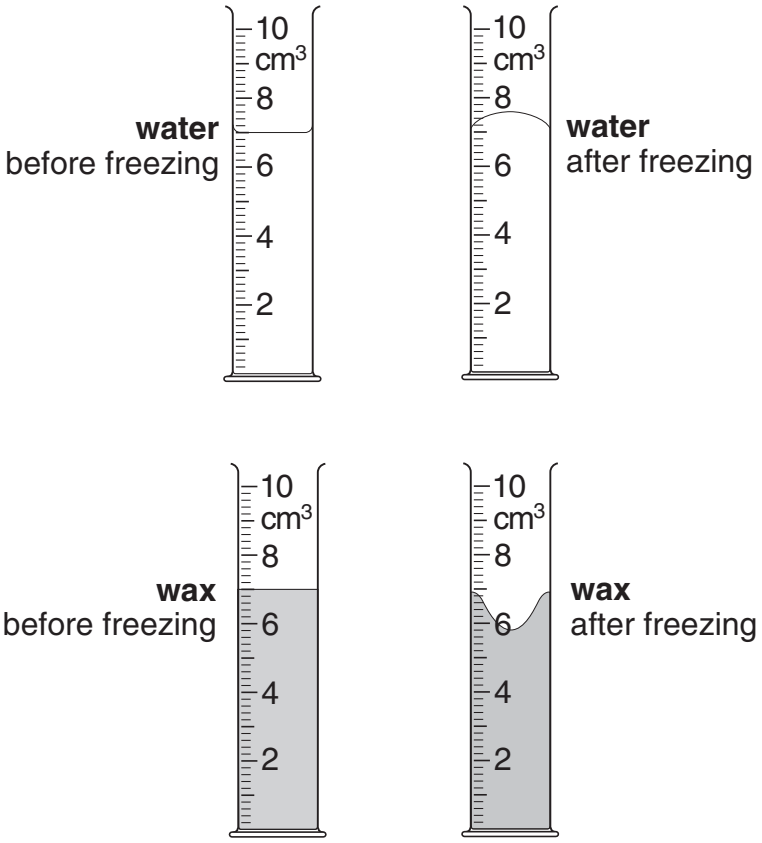
1 mark

maximum 5 marks

Total

5

5. Meera poured 7 cm^3 of water into a measuring cylinder.
She poured 7 cm^3 of melted wax into another measuring cylinder.
She put both measuring cylinders into a freezer for 24 hours.



(a) Look at the measuring cylinders.
What happened to the volume of the water and the wax after freezing?

the volume of water _____

the volume of wax _____

5a
1 mark

(b) The measuring cylinders were taken out of the freezer and left in a room at 20 C.

- Frozen water melts at 0 C.
- Wax melts at 53 C.

What would the physical state of each substance be at 20 C?

Choose from gas or liquid or solid.

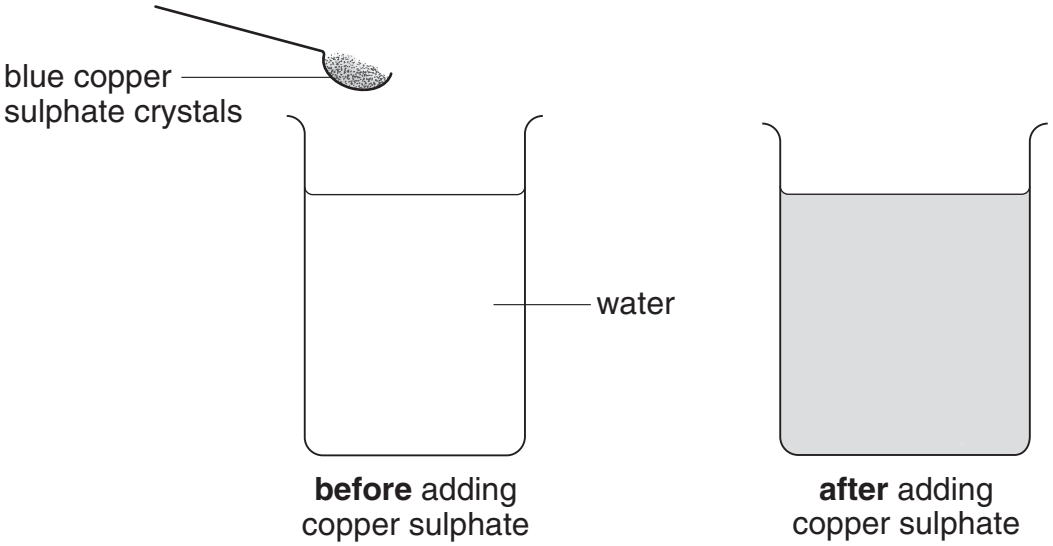
water _____

5b
1 mark

wax _____

5b
1 mark

(c) Meera added blue copper sulphate crystals to some water in a beaker.
The copper sulphate dissolved in the water.



(i) Give one way Meera could see that the copper sulphate had dissolved in the water.

_____

5ci
1 mark

(ii) Give one way that she could get the copper sulphate to dissolve more quickly.

_____

5cii
1 mark

(d) Meera poured some of the copper sulphate solution into a dish.
She left it in a warm room for a week.



A week later there was a blue solid but no liquid in the dish.

(i) What happened to the water in the copper sulphate solution?

_____

5di
1 mark

(ii) What was the blue solid left in the dish?

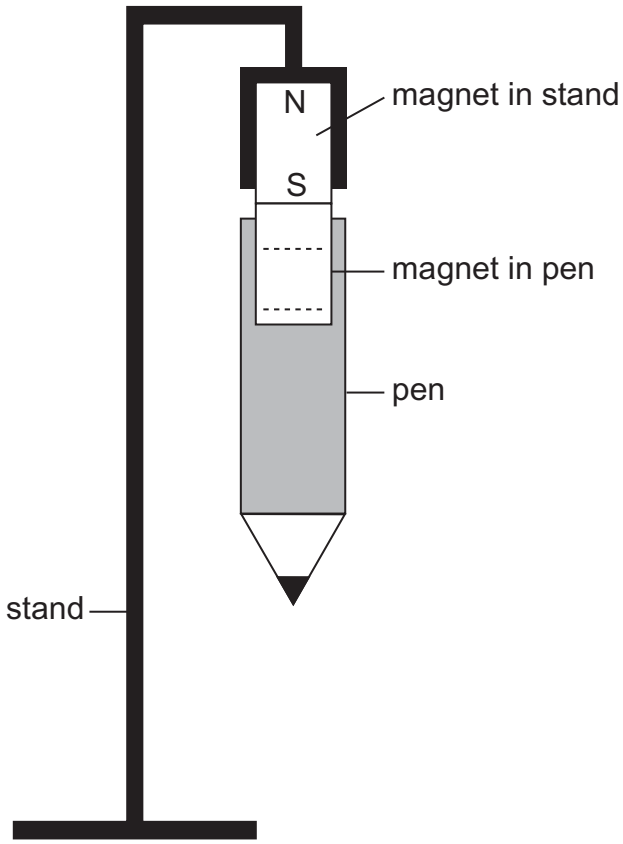
_____

5dii
1 mark

maximum 7 marks

Total
7

6. The diagram below shows a pen.
The pen is held up by two magnets, one in the stand and the other in the pen.



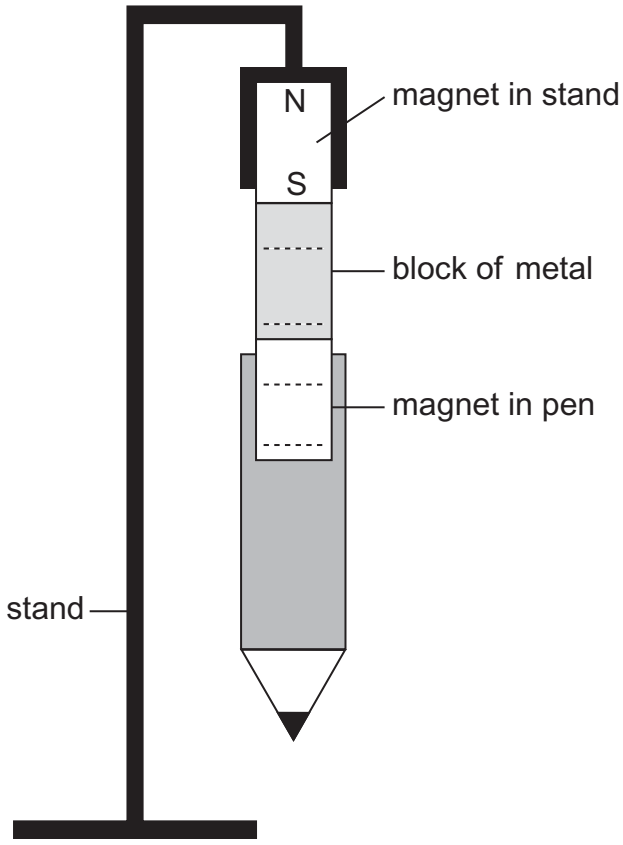
6a

1 mark

(a) On the dotted lines above, label the North pole and the South pole of the magnet in the pen.

Use the letters N and S.

(b) John put a block of metal between the two magnets as shown below.



The block of metal became a magnet.

(i) On the dotted lines above, label the North poles and the South poles of both the block of metal and the magnet.

Use the letters N and S.

6bi

1 mark

(ii) What metal could the block be made of?

_____

6bii

1 mark

(c) John repeated the experiment using a piece of wood instead of a block of metal.
The pen did not stay up.
Give the reason for this.

_____

6c

1 mark

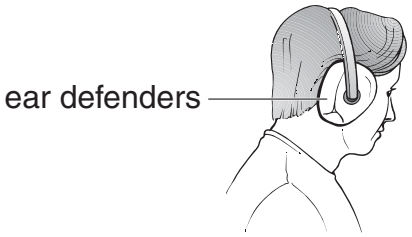
maximum 4 marks

Total

4

7. Three pupils watched a firework display.

(a) A man lit the fireworks. He wore ear defenders.



Why should he wear ear defenders when he is close to loud fireworks?

_____

_____

7a

1 mark

(b) A rocket exploded making a loud sound and a bright flash.
Peter, Sabrina and Jan were standing at different distances from the rocket.





Jan



Sabrina



Peter



When the rocket exploded, Jan heard the quietest sound.
Why did Jan hear the quietest sound?

_____

_____

7b

1 mark

(c) Jan saw the flash before she heard the sound.

What does this tell you about the speed of light and the speed of sound?

_____

_____

7c

1 mark

(d) Complete the sentences below using words from the list.

chemical electrical heat light sound

(i) Jan, Sabrina and Peter could *see* the rocket explode because it gave out _____ energy.

7di

1 mark

(ii) They could *hear* the rocket explode because it gave out _____ energy.

7dii

1 mark

(e) When the rocket stopped burning it fell to the ground.

What force caused it to fall to the ground?

_____

7e

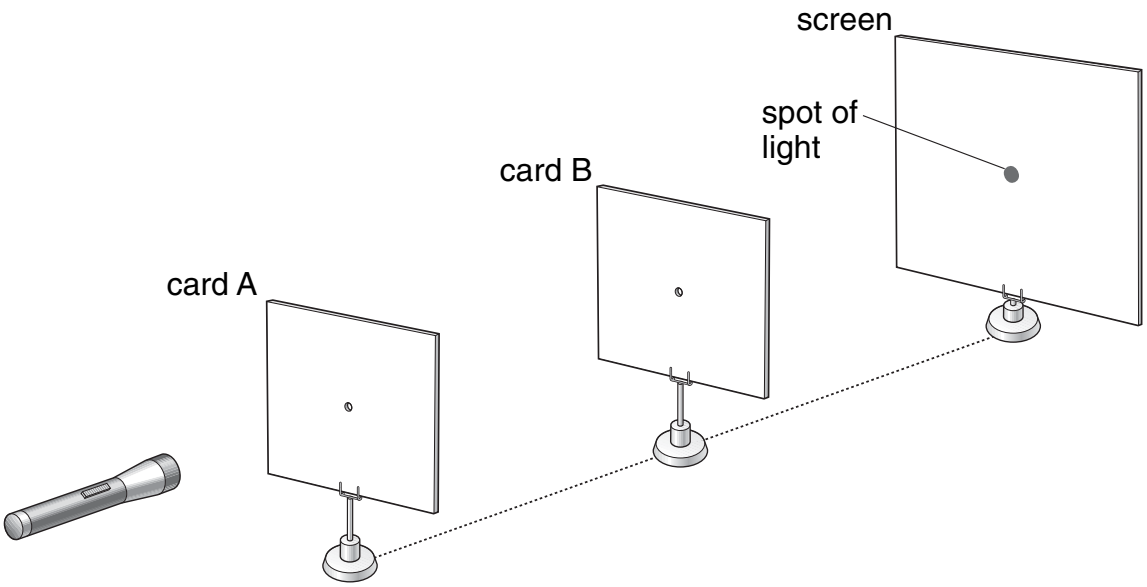
1 mark

maximum 6 marks

Total

6

8. Gabby arranged a torch, two cards and a screen as shown below.
Light from the torch passed through holes in the cards and onto the screen.



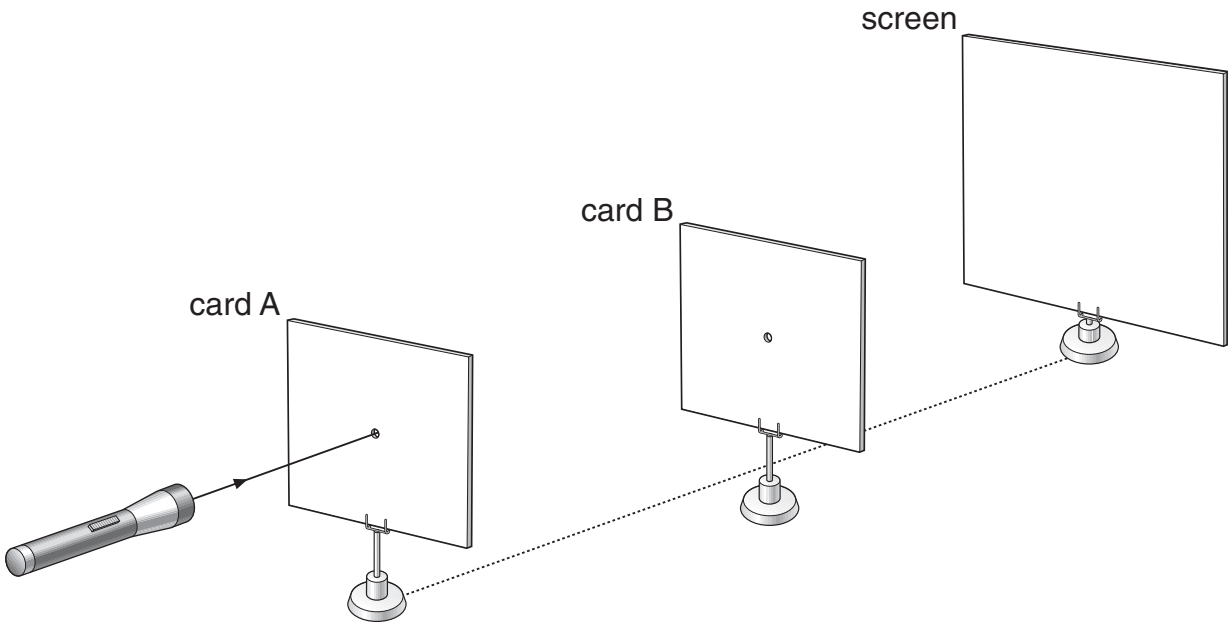
(a) Why did a spot of light appear on the screen? Tick the correct box.

Light can be split up into many colours.	☐	Light can travel through empty space.	☐
Light travels in straight lines.	☐	Light travels very fast.	☐

☐ 8a
1 mark

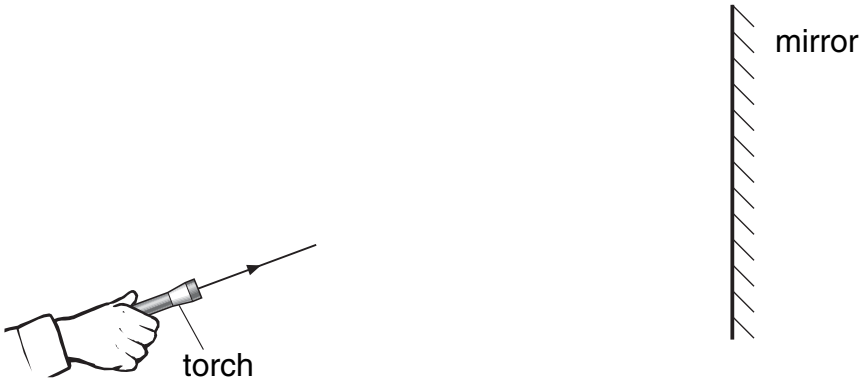
(b) Gabby moved card B to one side as shown below.
The ray of light passed through the hole in card A and onto card B.

Continue the ray of light from the torch to show where it would hit card B.
Use a ruler.



☐ 8b
1 mark

(c) Gabby used a torch to shine a ray of light towards a mirror.
Continue the ray of light to show how it reflects off the mirror.
Add an arrow to show the direction of the reflected ray.
Use a ruler.

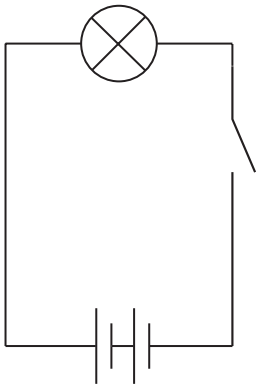


8c
1 mark

8c
1 mark

8c
1 mark

(d) Gabby built a circuit like the circuit in her torch.



What could she do to the circuit to make this bulb brighter?
Tick the correct box.

Add another battery.	☐	Add another bulb.	☐
Add another switch.	☐	Add longer wires.	☐

8d
1 mark

maximum 6 marks

Total
6

9. Every year thousands of trees are cut down in forests.

(a) Mammals and birds are two groups of animals that live in forests.

Give two reasons why fewer mammals and birds can survive after trees have been cut down.

1. _____

_____

2. _____

_____

9a
1 mark

9a
1 mark

(b) Many small plants grow in the clearings left after trees are cut down.

Explain why small plants are able to grow well after the trees have been cut down.

_____

_____

_____

9b
1 mark

9b
1 mark

(c) In some forests, small branches are left on the ground.



Fungi and bacteria feed on these branches and release minerals, such as nitrates, back into the soil.

Why is it important that the minerals are released back into the soil?

_____

_____

9c

1 mark

(d) A label was printed on the back of a birthday card.

> The paper for this card was made from wood taken from sustainable forests.

In sustainable forests, new trees are planted to replace trees that are cut down.

Give two reasons why it is important to replace forest trees that are cut down.

1. _____

_____

2. _____

_____

9d

1 mark

9d

1 mark

maximum 7 marks

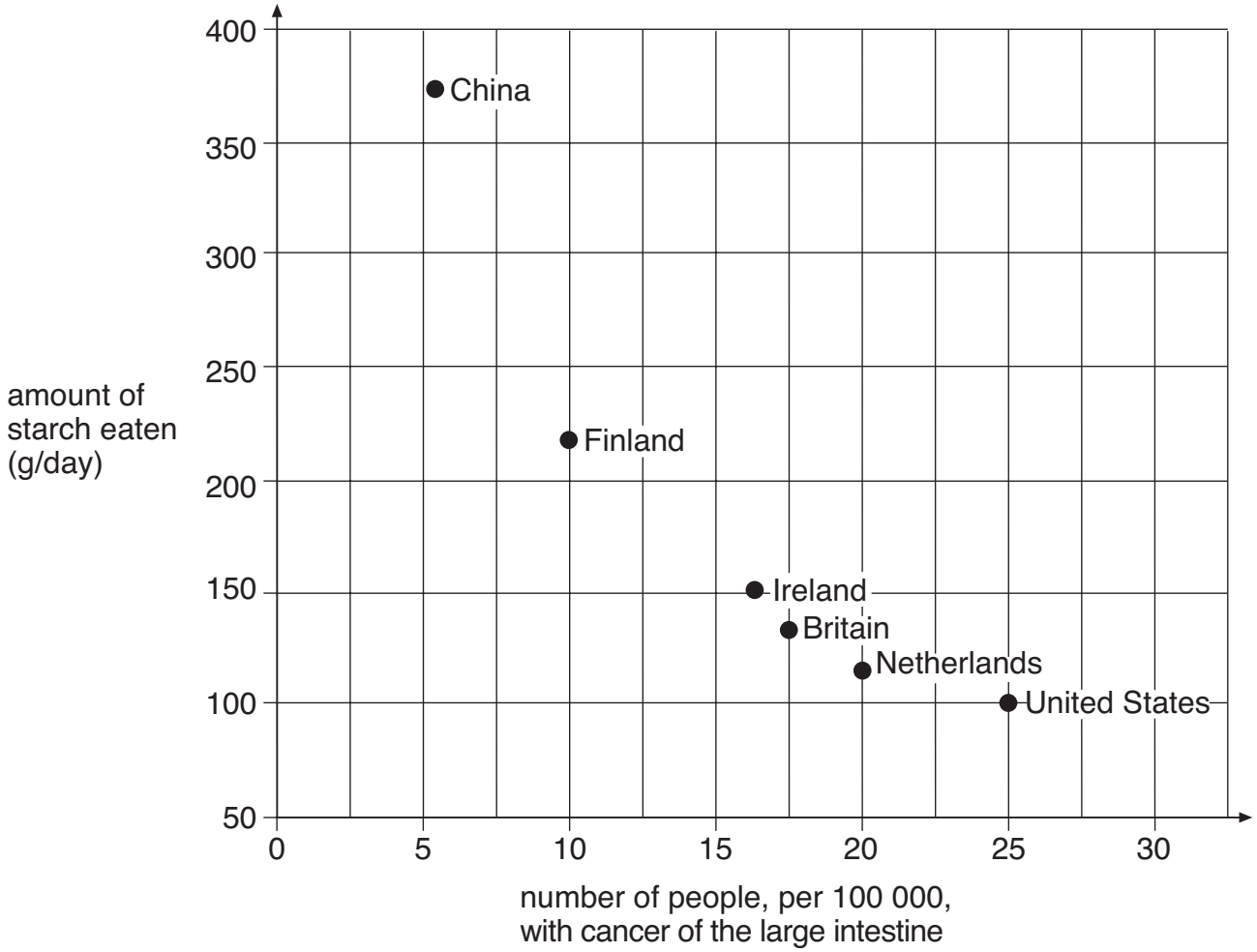
Total

7

 Photograph © Heather Angel/Natural Visions

10. People in different countries eat different amounts of starch.
A scientist compared the amount of starch that people ate with the number of people with cancer of the large intestine.

The scatter graph below shows her results.



Look at the scatter graph.

(a) (i) Which country had the greatest proportion of people with cancer of the large intestine?

_____

10ai

1 mark

(ii) What conclusion could you come to about the effect of eating starch on getting cancer of the large intestine?

_____

_____

10aii

1 mark

(b) (i) Starch is a carbohydrate.

Which two of the following foods are good sources of starch?
Tick the two correct boxes.

bread	☐	cheese	☐
chicken	☐	tomatoes	☐
fish	☐	pasta	☐

☐ 10bi
1 mark

☐ 10bi
1 mark

(ii) What other type of nutrient, needed as part of a balanced diet, keeps the intestine working well and prevents constipation?
Tick the correct box.

fat	fibre	minerals	protein	vitamins
☐	☐	☐	☐	☐

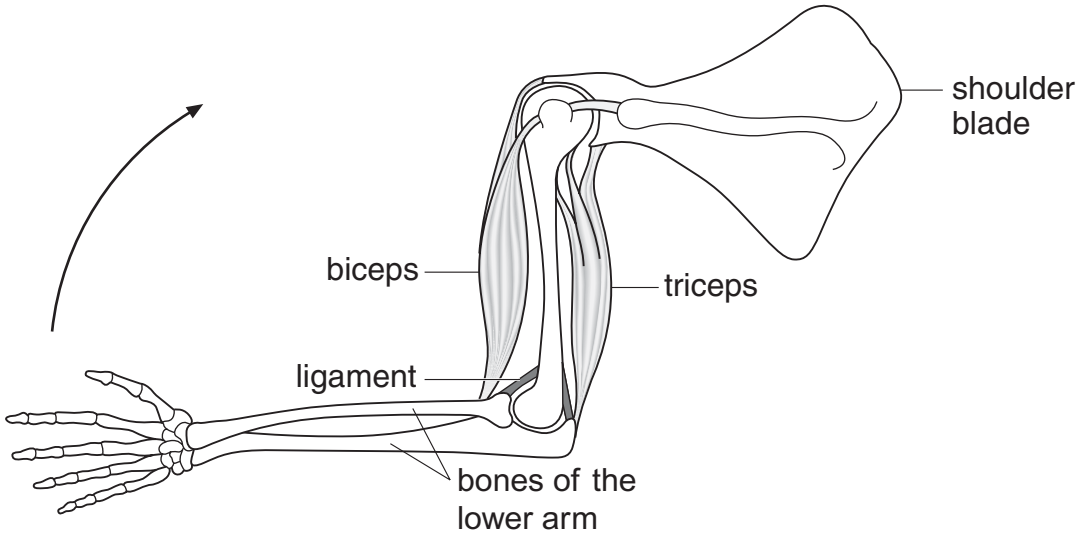
☐ 10bii
1 mark

maximum 5 marks

Total
☐
5

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

The biceps and triceps are muscles that contract to move the bones of the lower arm.



(a) What do the biceps and triceps do to move the arm in the direction shown by the arrow?
Tick the correct box.

The biceps and the triceps contract at the same time.	☐
The biceps contracts and the triceps relaxes.	☐
The biceps relaxes and the triceps contracts.	☐
The biceps and the triceps relax at the same time.	☐

☐ 11a
1 mark

(b) Ligaments hold bones together at a joint. Ligaments can stretch.

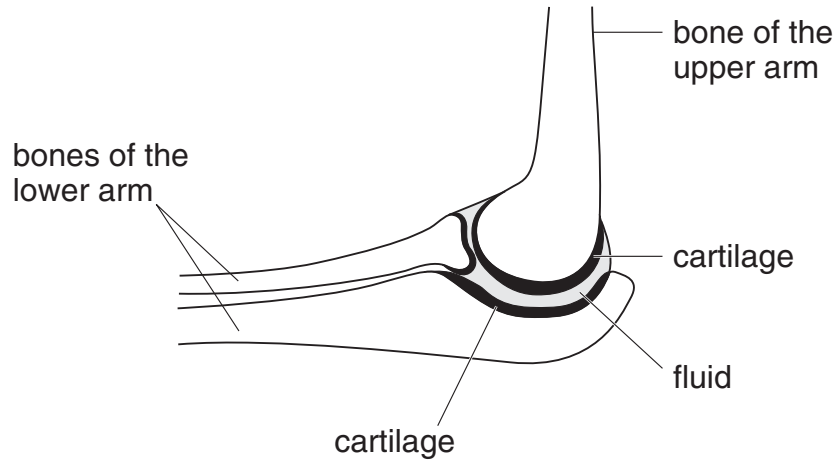
Why must ligaments be able to stretch?

_____

_____

☐ 11b
1 mark

(c) The diagram below shows an elbow joint.



(i) The ends of the bones at a joint are covered by a layer of smooth material called cartilage.
There is also a fluid in the joint.

Why are cartilage and fluid needed in a joint?

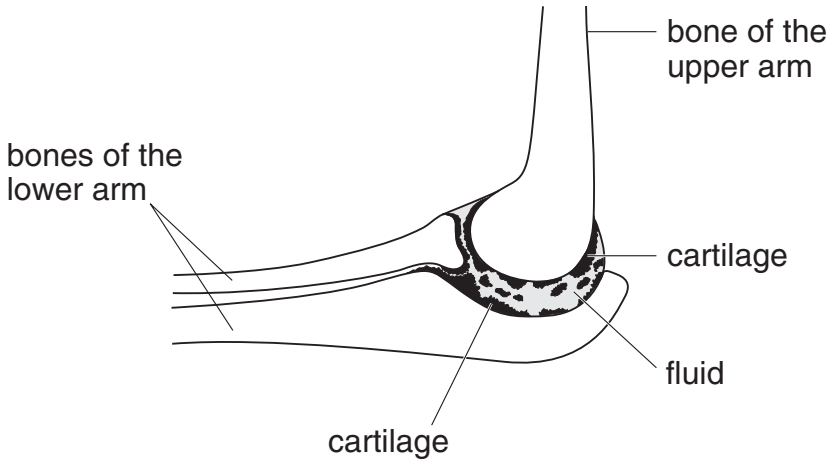
_____

_____

11ci

1 mark

(ii) In the joint shown below, some of the cartilage has broken off.



Suggest one way this damage will affect the joint.

_____

_____

11cii

1 mark

maximum 4 marks

Total

4

12. An alloy is a mixture of elements.
The table shows the mass of each element present in 100 g of five different alloys, bronze, solder, steel, stainless steel and brass.

alloy	mass of each element in 100 g of alloy							
	lead (g)	tin (g)	copper (g)	zinc (g)	carbon (g)	iron (g)	chromium (g)	nickel (g)
bronze		4	95	1				
solder	62	38						
steel					1	99		
stainless steel						70	20	10
brass			67	33				

(a) Which alloy in the table above contains an element which is a non-metal?

_____

12a

1 mark

(b) Which two alloys in the table contain only two metals?

_____ and _____

12b

1 mark

(c) Another alloy called nichrome contains only the elements chromium and nickel.
100 g of nichrome contains 20 g of chromium.

How much nickel does it contain?

_____ g

12c

1 mark

(d) Before 1992, two-pence coins were made of bronze.
Steel rusts but bronze does not rust.

(i) Why does bronze not rust?
Use information in the table opposite to help you.

_____

_____

12di

1 mark

(ii) Rusting requires water and a gas from the air.
Give the name of this gas.

_____

12dii

1 mark

maximum 5 marks

Total

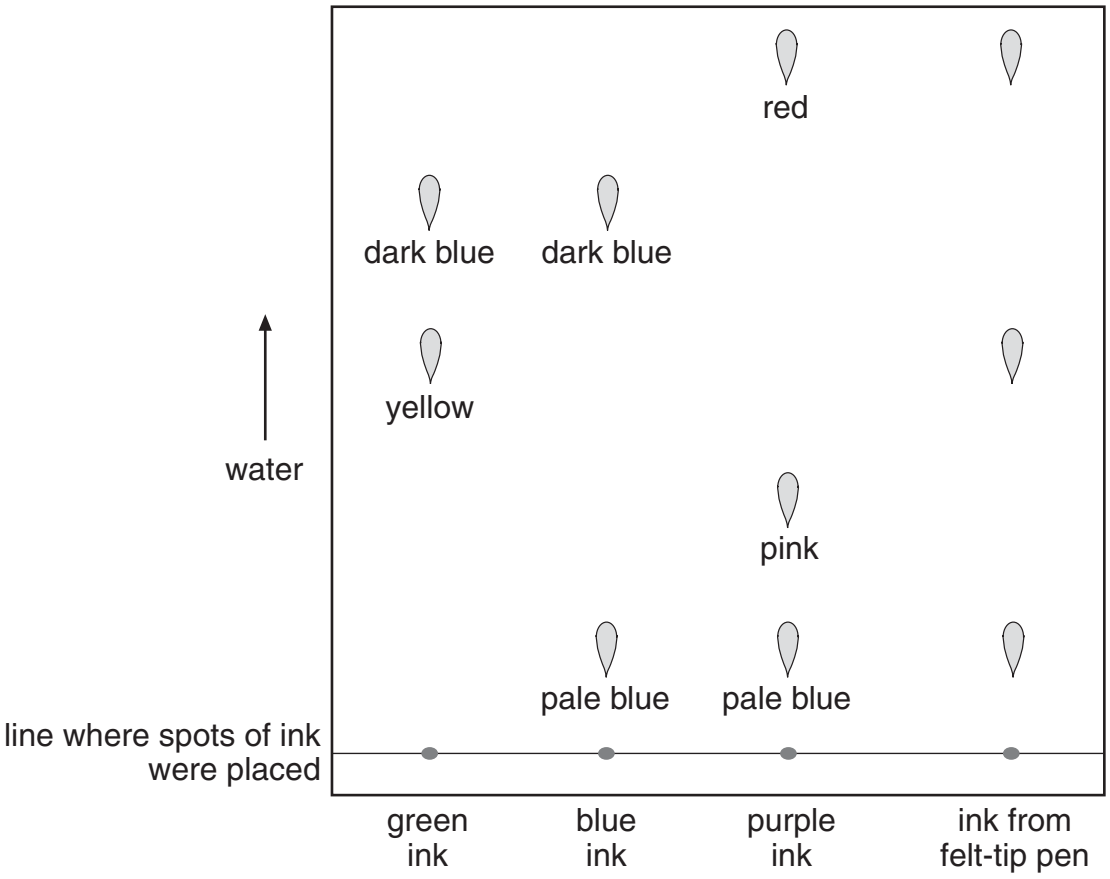
5

13. Susie used chromatography to identify the coloured substances in the ink from a felt-tip pen.

She used:

- green ink
- blue ink
- purple ink
- ink from her felt-tip pen.

She used water as the solvent.



Look at the diagram above.

(a) (i) Which colours were present in the ink from the felt-tip pen?

13ai

1 mark

(ii) How many coloured substances were there in green ink?

_____

How can you tell?

_____

_____

13aii

1 mark

(iii) Susie placed the spots of ink on a line on the chromatography paper as shown in the diagram.
To draw the line, Susie had to choose a felt-tip pen or a pencil.

Which one should she use?

_____

Give the reason for your answer.

_____

_____

13aiii

1 mark

(b) Susie used water as the solvent in this experiment.
When she repeated the experiment with a different set of pens, it did not work.
She then used ethanol instead of water.

Suggest why the experiment worked with ethanol but not with water.

_____

_____

13b

1 mark

maximum 4 marks

Total

4

14. Two pupils were given a sample of 'biological' washing powder and a sample of 'non-biological' washing powder.
They investigated how the two powders compare in removing egg-stains from cloth.

Our Report

1. We put 'biological' powder into one bowl and 'non-biological' powder into the other bowl. We added water.

2. We put some egg-stained cloth into each bowl.

3. We left the bowls for 30 minutes. We dried out the cloth and saw what happened.



Look at their report.

(a) Give one way they made their investigation fair.

_____

_____

14a

1 mark

(b) Give two ways they could improve their investigation.

1. _____

2. _____

14b

1 mark

14b

1 mark

(c) What should they observe to compare the two types of washing powder?

_____

_____

14c

1 mark

maximum 4 marks

15. Each of the observations shown below has one explanation.

Draw a line from each observation to the correct explanation.

observation	explanation
A ship going out to sea goes out of sight.	The Earth spins on its axis.
We have day and night.	The Earth is a sphere.
We have summer and winter.	The Earth orbits the Sun and the Earth's axis is tilted.
One year on Earth is 365 days.	Gravity attracts objects towards the Earth.
	The Earth orbits the Sun.

15 1 mark

15 1 mark

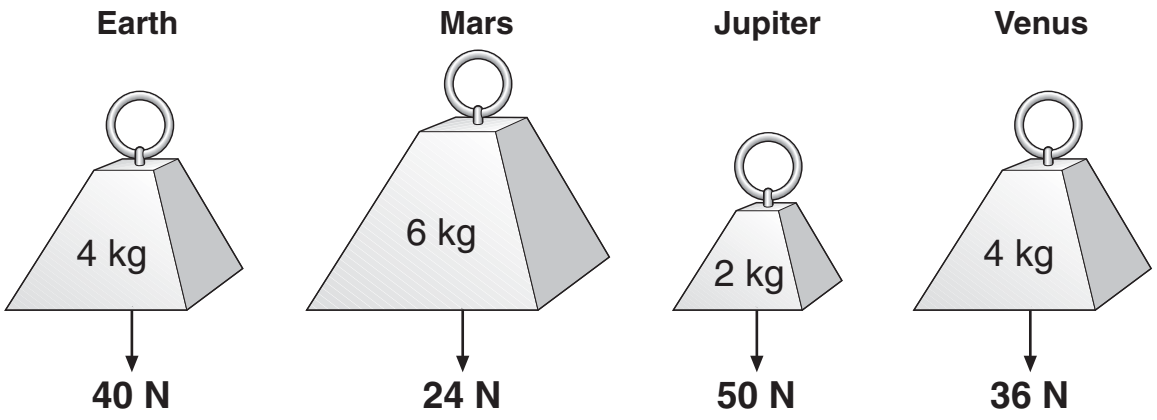
15 1 mark

15 1 mark

maximum 4 marks

Total 8

16. 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?

_____

16a

1 mark

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

_____

_____

16b

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 the astronaut on the Earth.

16c

1 mark

The mass of an astronaut on the Moon is _____ the

mass of the astronaut on the Earth.

16c

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?

_____

_____

16di

1 mark

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

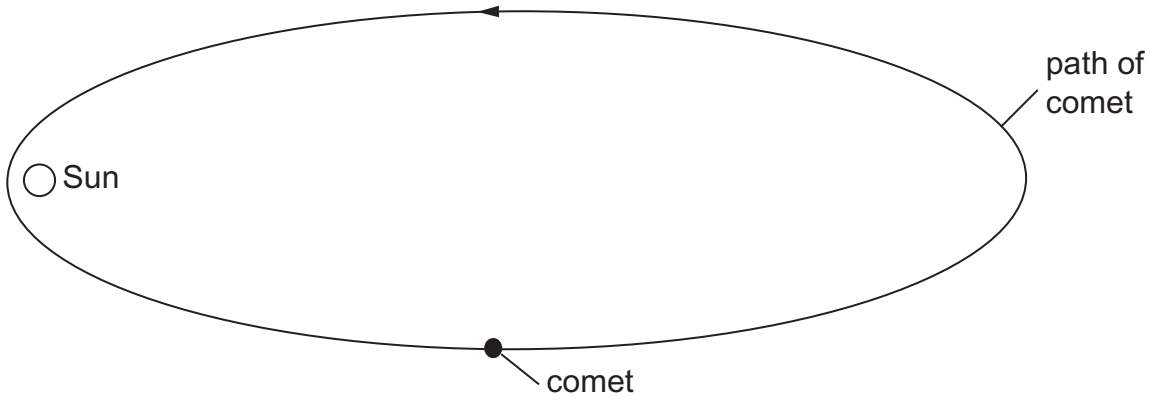
_____ Earth-years

16dii

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

16e

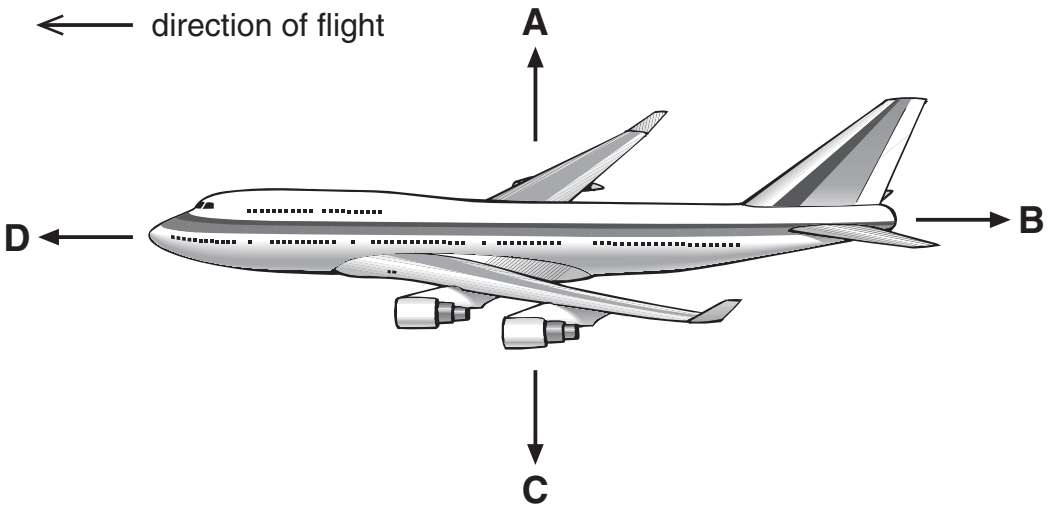
1 mark

maximum 7 marks

Total

7

17. The diagram shows four forces acting on a plane in flight.



(a) Which arrow represents air resistance?
Give the letter.

_____

17a

1 mark

(b) (i) When the plane is flying at a constant height, which two forces must be balanced?
Give the letters.

_____ and _____

17bi

1 mark

(ii) When the plane is flying at a constant speed in the direction shown, which two forces must be balanced?
Give the letters.

_____ and _____

17bii

1 mark

(c) (i) Just before take-off, the plane is speeding up along the ground.

Which statement is true?
Tick the correct box.

Force B is zero. ☐

Force B is greater than force D. ☐

Force D is equal to force B. ☐

Force D is greater than force B. ☐ 17ci

1 mark

(ii) Which statement is true about the plane just as it leaves the ground?
Tick the correct box.

Force C is zero. ☐

Force C is greater than force A. ☐

Force A is equal to force C. ☐

Force A is greater than force C. ☐ 17cii

1 mark

maximum 5 marks

Total

5

END OF TEST

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QCA, Key Stage 3 Team, 83 Piccadilly, London W1J 8QA

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