Sc

KEY STAGE
3

TIER
3–6

2009

Science test

Paper 1

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.
- Do not use any rough paper.
- Check your work carefully.
- Ask your teacher if you are not sure what to do.

TOTAL MARKS	

1. Stefan is on holiday in the mountains. It is snowing.

(a) (i) Choose words from the box to complete the sentence below.

solid	**liquid**	**gas**

A snowflake falls on Stefan's nose and melts.
When the snowflake melts, it changes

from a _____ to a _____ .

1ai
1 mark

(ii) Snow that falls on the ground melts slowly.
Snow that falls on Stefan's nose melts **very quickly**.
Give a reason for this.

_____

1aii
1 mark

(iii) In his hotel, Stefan sees some changes.
Are the changes below reversible?
Write **yes** or **no**.

ice melting _____

wood burning _____

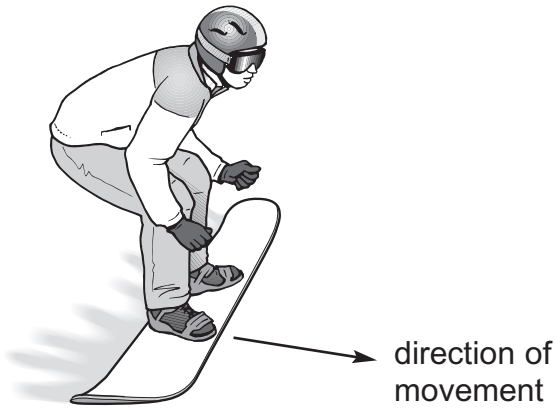
toasting bread _____

1aiii
1 mark

(b) (i) Stefan is snowboarding. Gravity acts on Stefan.
On the diagram below, draw an arrow to show the direction of the force of gravity.

1bi
1 mark

(ii) When Stefan wants to slow down, he pushes one edge of the snowboard into the snow.



What force between the board and the snow makes him slow down?

_____

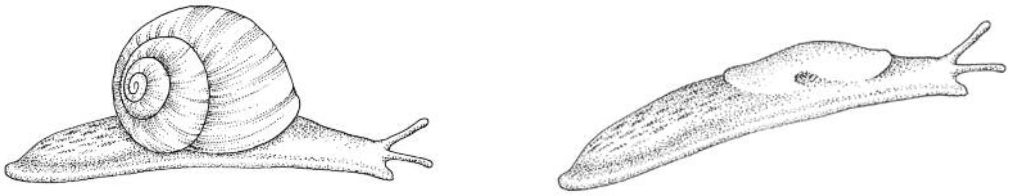
1bii
1 mark

maximum 5 marks

Total
5

2. The drawings below show a snail and a slug.

snail **slug**



(a) Look at the drawings above.

(i) Give one way the snail and slug are **different** from each other.

2ai

1 mark

_____

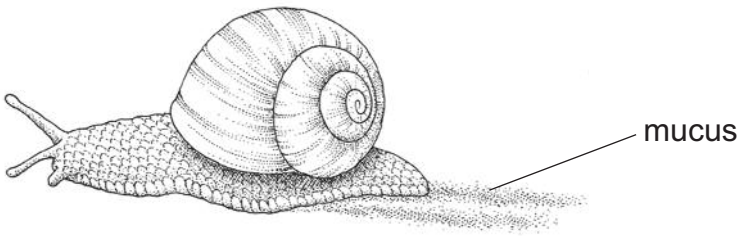
(ii) Give one way the snail and slug are the **same**.

2aii

1 mark

_____

(b) Snails produce mucus to help them move along the ground.



How does mucus help snails to move?
Tick the correct box.

Mucus is cold.	☐	Mucus reduces friction.	☐
Mucus increases weight.	☐	Mucus leaves a trail.	☐

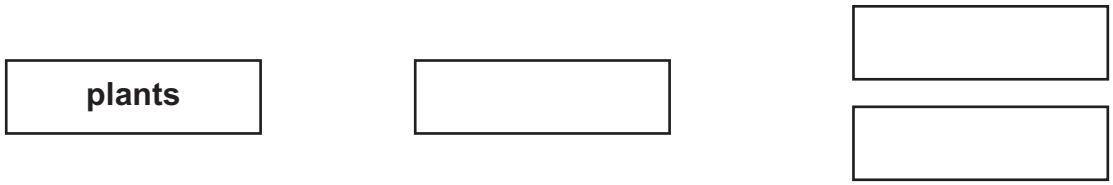
2b

1 mark

(c) Snails are herbivores. Thrushes and blackbirds eat snails.

Complete the food web below to show the relationship between plants, snails, thrushes and blackbirds.

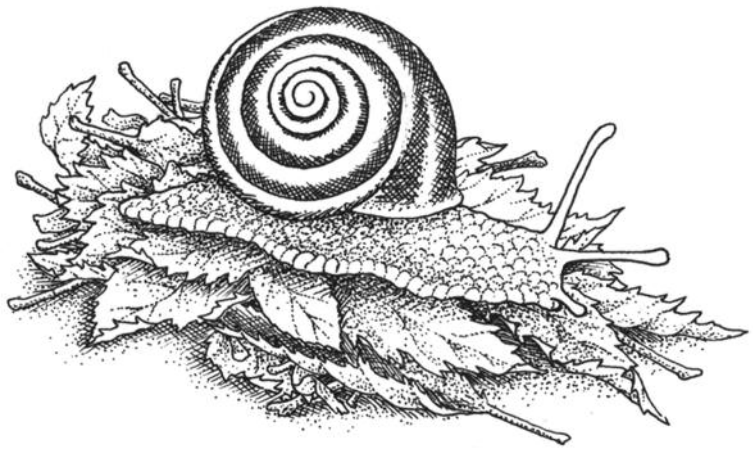
Draw arrows on the diagram.



2c
1 mark

2c
1 mark

(d) Snails that live in woodland areas are usually brown or red.



Suggest how the colour of snails in woodland areas protects them from birds.

_____

2d
1 mark

maximum 6 marks

Total
6

3. (a) Tasha puts a small block of wood on a smooth surface.

She puts different forces on the block.
The diagrams below show the size and direction of these forces.

Will each block move to the **left**, to the **right** or **stay still**?
Tick the correct box in each row.

	forces on block	moves to the left ←	moves to the right →	stays still
(i)		☐	☐	☐
(ii)		☐	☐	☐
(iii)		☐	☐	☐
(iv)		☐	☐	☐

☐ 3ai
1 mark

☐ 3aii
1 mark

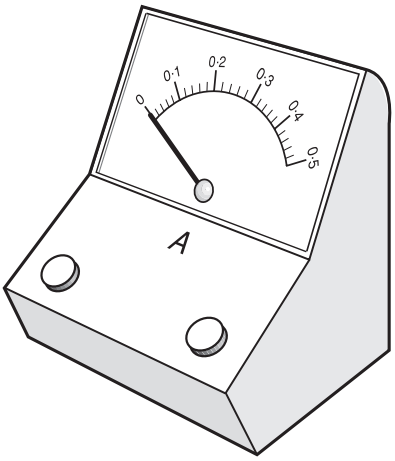
☐ 3aiii
1 mark

☐ 3aiv
1 mark

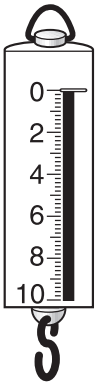
(b) (i) Which piece of equipment should Tasha use to measure the forces on the block?

Tick the correct box.

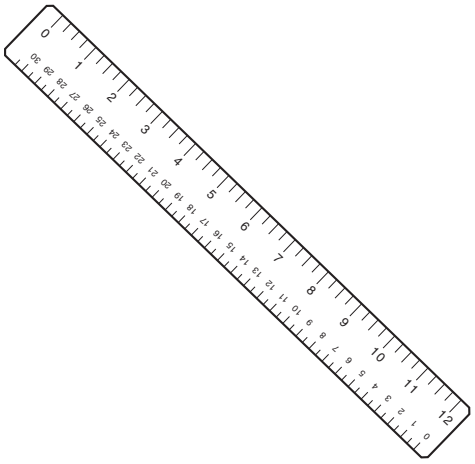
☐



☐



☐



☐

3bi

1 mark

(ii) Give the name of the equipment used to measure force.

_____

3bii

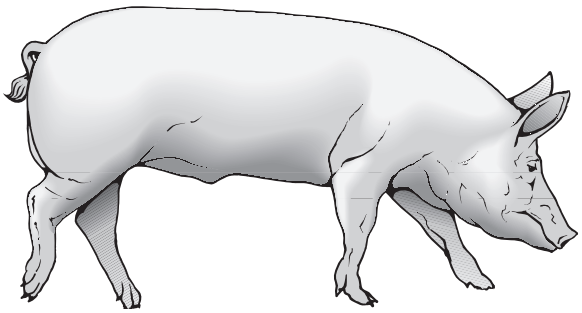
1 mark

maximum 6 marks

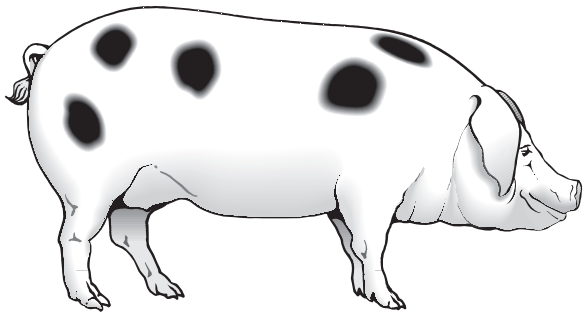
Total

6

4. The drawings below show pigs from two different breeds.



Tamworth



Gloucester Old Spot

4ai
1 mark

(a) (i) From the drawings above, give **two** ways in which the pigs are different.

1. _____

2. _____

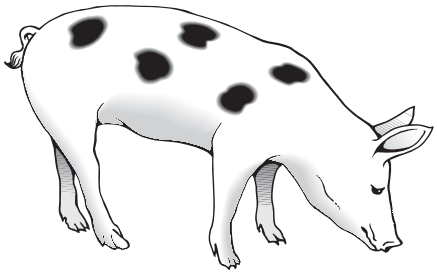
4ai
1 mark

(ii) What are these differences called?
Tick the correct box.

adaptations	☐	classification	☐
fertilisation	☐	variations	☐

4aii
1 mark

(b) The drawing below shows a piglet bred from a Tamworth and a Gloucester Old Spot.



Give **one** way you can tell that one of its parents is a Tamworth.

_____

4b
1 mark

(c) (i) When pigs reproduce, which **two** types of cell pass information from the pigs to their piglets?
Tick the **two** correct boxes.

blood cell	☐	nerve cell	☐	cheek cell	☐
egg cell	☐	muscle cell	☐	sperm cell	☐

4ci
1 mark

4ci
1 mark

(ii) When pigs reproduce, two cells join together.

What is this process called?
Tick the correct box.

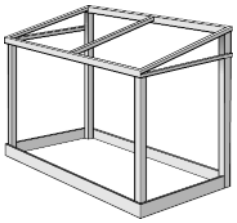
adaptation	☐	classification	☐
fertilisation	☐	variation	☐

4cii
1 mark

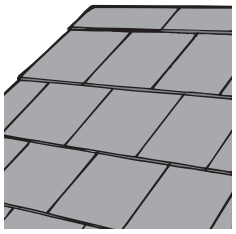
maximum 7 marks

Total
7

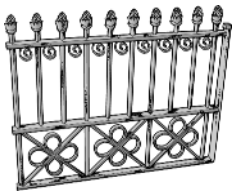
5. The drawings below show six objects found in Sophie's garden.
The objects are all made of different materials as shown.



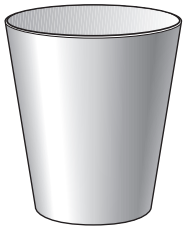
aluminium
greenhouse frame



slate
roof tile

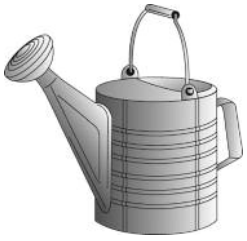


iron
gate



plastic
plant pot

marble
statue



steel
watering can

not to scale

(a) Which two **objects** shown above are made of **rock**?

1. _____

2. _____

5a

1 mark

(b) Write two of the **objects** shown above which are made of **metal.**

1. _____

2. _____

5b

1 mark

(c) (i) A gas in the air reacts with iron to make it rusty.
Give the name of this gas.

_____

5ci
1 mark

(ii) What could you do to an iron gate to protect it from this gas in the air?

_____

5cii
1 mark

(d) Sophie tests each material with a magnet.

Which two materials are attracted to the magnet?
Tick the **two** correct boxes.

aluminium	☐	slate	☐
iron	☐	plastic	☐
marble	☐	steel	☐

5d
1 mark

5d
1 mark

maximum 6 marks

Total
6

6. Richard wanted to find out the best conditions for growing lettuce plants.

He took 4 trays and planted 8 lettuce plants in each.
The results of his investigation are shown below.

	variables			
tray	**light level**	**air temperature (°C)**	**soil moisture**	**number of plants alive after 7 days**
A	medium	25	moist	8
B	medium	25	dry	6
C	medium	45	moist	2
D	medium	45	dry	0

(a) How many days did Richard's investigation last?
Use the table to help you.

_____ days

6a

1 mark

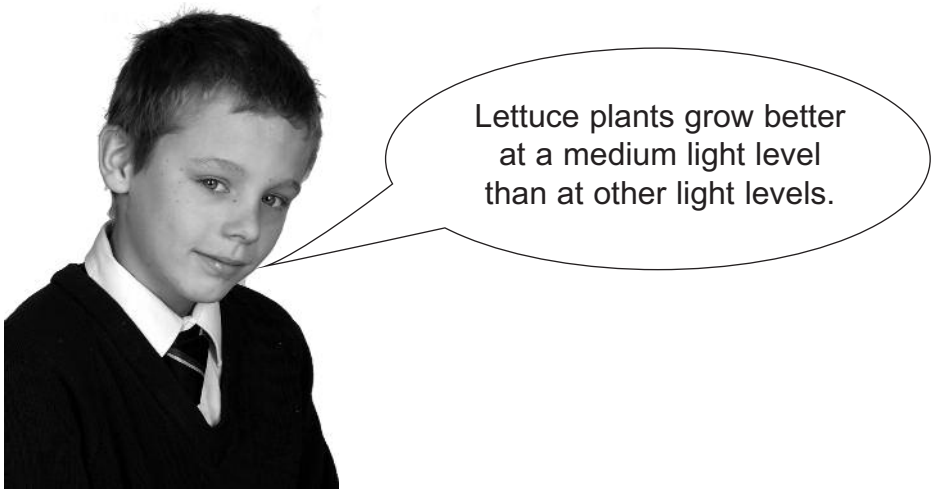
(b) Look at the table. Which variables did Richard **change** in his investigation?
Tick the correct box.

light level and air temperature	☐	soil moisture and type of soil	☐
air temperature and soil moisture	☐	type of soil and light level	☐

6b

1 mark

(c) Richard said:



Why is Richard **not** able to make this conclusion from his investigation?

_____

_____

6c

1 mark

(d) The table below shows the number of lettuce plants alive at the end of day 1 and day 7 of the investigation.

For each tray, A, B, C and D, suggest the number of plants that were alive on **day 4**. Write your answers in the table below.

	number of plants alive		
tray	**day 1**	**day 4**	**day 7**
A	8		8
B	8		6
C	8		2
D	4		0

6d

1 mark

6d

1 mark

maximum 5 marks

Total

5

7. Michelle added some universal indicator solution to four liquids.

Michelle uses the pH chart to fill in her table of results.

pH chart

pH	1	2	3	4	5	6	7	8	9	10	11	12	13	14
colour	red			orange			green	blue			purple			

(a) The table below shows some of Michelle's results.

Complete Michelle's table of results below.
Use the pH chart to help you.

liquid	colour of universal indicator solution	pH
milk	green	
rain water		5
hydrochloric acid	red	
bleach		11

7a
1 mark

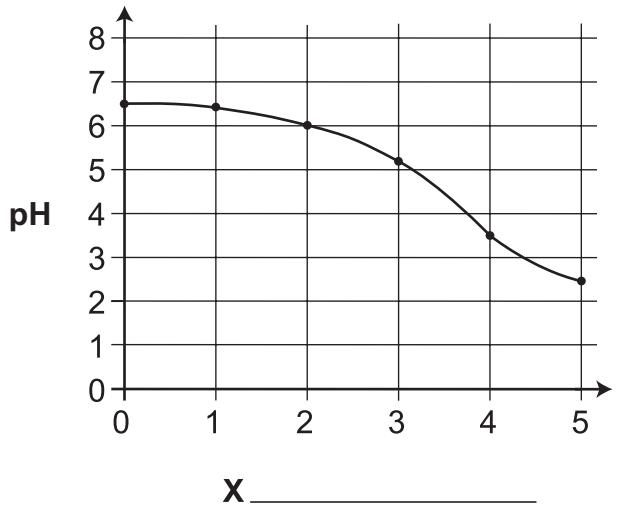
7a
1 mark

(b) Explain why using acids can be dangerous.

7b
1 mark

(c) Michelle measured the pH of some milk stored at room temperature for five days.

The graph of Michelle's results is shown below.
One of the axes has been labelled.



(i) Write the axis label for the graph **at X.**

7ci
1 mark

(ii) Use the graph. How does the pH of the milk change over the five days?

7cii
1 mark

maximum 5 marks

Total
5

8. The drawing below shows the remains of an animal found in a rock.

(a) Some scientists think the animal in the drawing above was a bird.

(i) Give **one** feature of the animal above that suggests it was a bird.

_____

8ai

1 mark

Other scientists think the animal was a reptile.

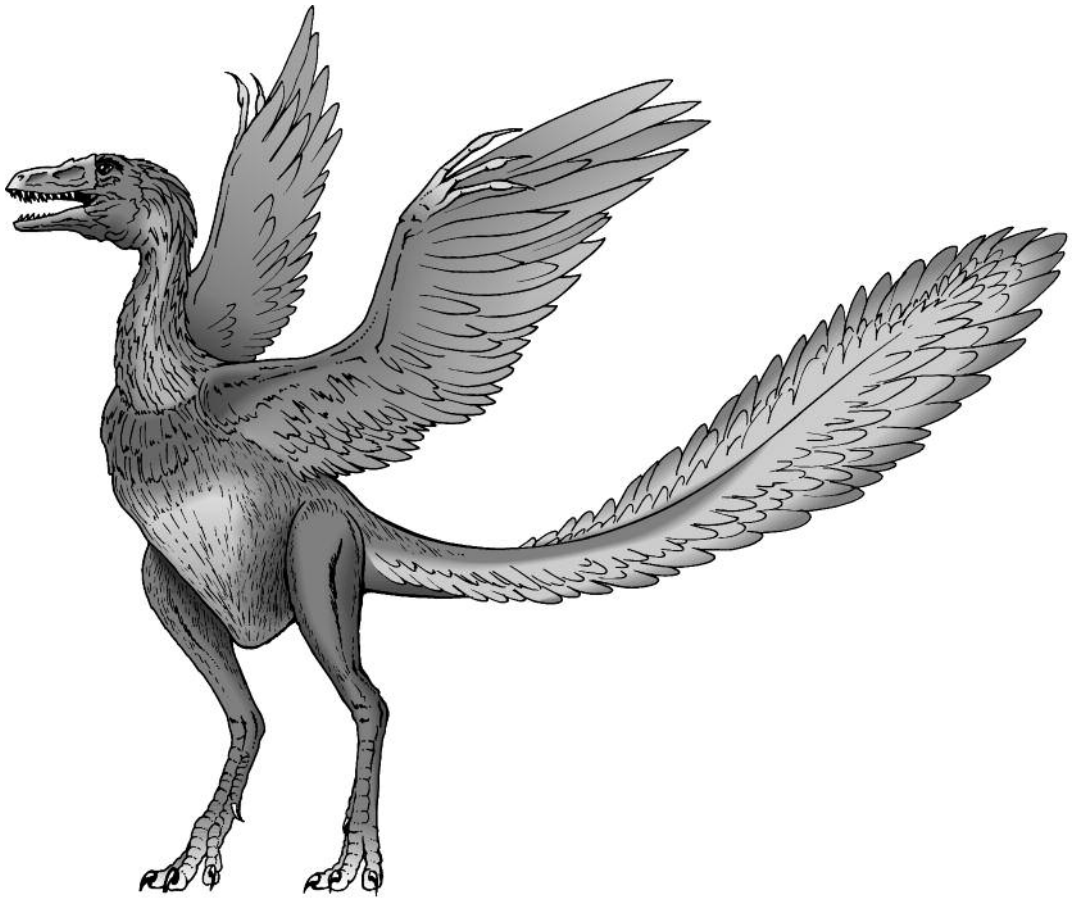
(ii) What are reptile skins covered with?

_____

8aii

1 mark

(b) The animal lived millions of years ago. Scientists used the remains to draw what they think the animal looked like when it was alive.



Why can scientists **not** be certain that the animal looked like the drawing above?

_____

_____

8b

1 mark

(c) Give the name for the remains of living things found in rocks.

_____

8c

1 mark

(d) Igneous rocks can be formed from lava from volcanoes.
The remains of living things are **not** found in rocks made from lava.
Why does lava destroy the remains of living things?

_____

8d

1 mark

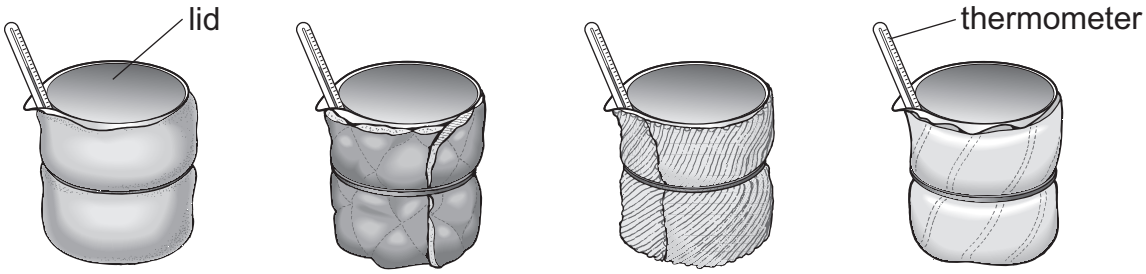
maximum 5 marks

Total

5

9. 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**?

9ai

1 mark

_____

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

9aii

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 ☐

☐ 9bi
1 mark

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

_____

_____

☐ 9bii
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. _____

2. _____

☐ 9c
1 mark

☐ 9c
1 mark

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

_____

☐ 9d
1 mark

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

_____

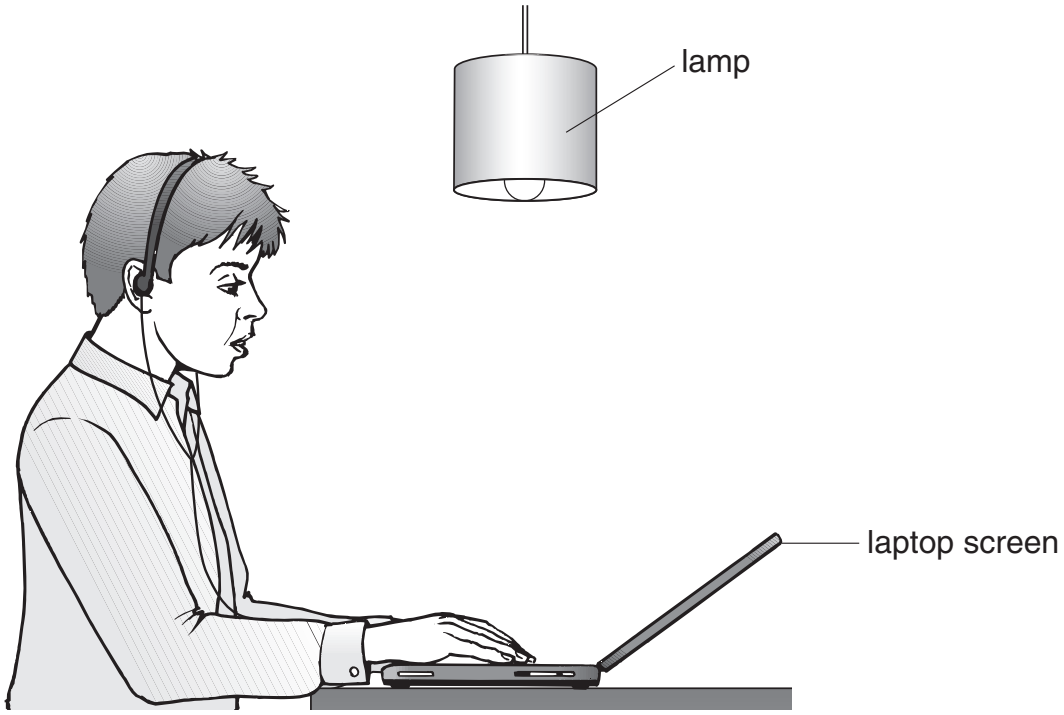
_____

maximum 8 marks

☐ 9e
1 mark

Total
☐
8

10. (a) The diagram below shows George using his laptop.
Light from the lamp is reflected by the laptop screen.



10ai
1 mark

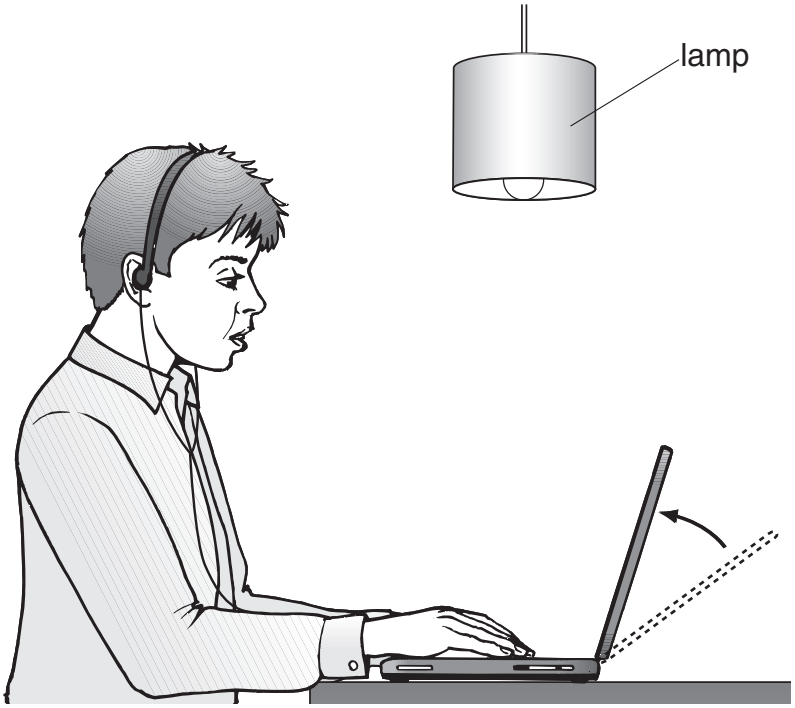
10ai
1 mark

10ai
1 mark

(i) **On the diagram above** draw a ray of light to show how George sees the light from the lamp reflected by the laptop screen. Use a ruler.

Draw arrows to show the direction of light.

(ii) With the laptop screen in the position shown in part a(i), George sees an image of the lamp on the screen.
George tilts the screen forwards as shown below.



When the screen is tilted forwards it is easier for George to see the words on the screen.
What happens to the reflected ray of light when the screen is tilted?

_____

_____

10aii
1 mark

(b) George listens to music on his headphones.

Complete the sentence below using words from the box.

chemical	**electrical**	**gravitational potential**
sound	**thermal**	

The useful energy change in the headphones is from _____

energy into _____ energy.

10b
1 mark

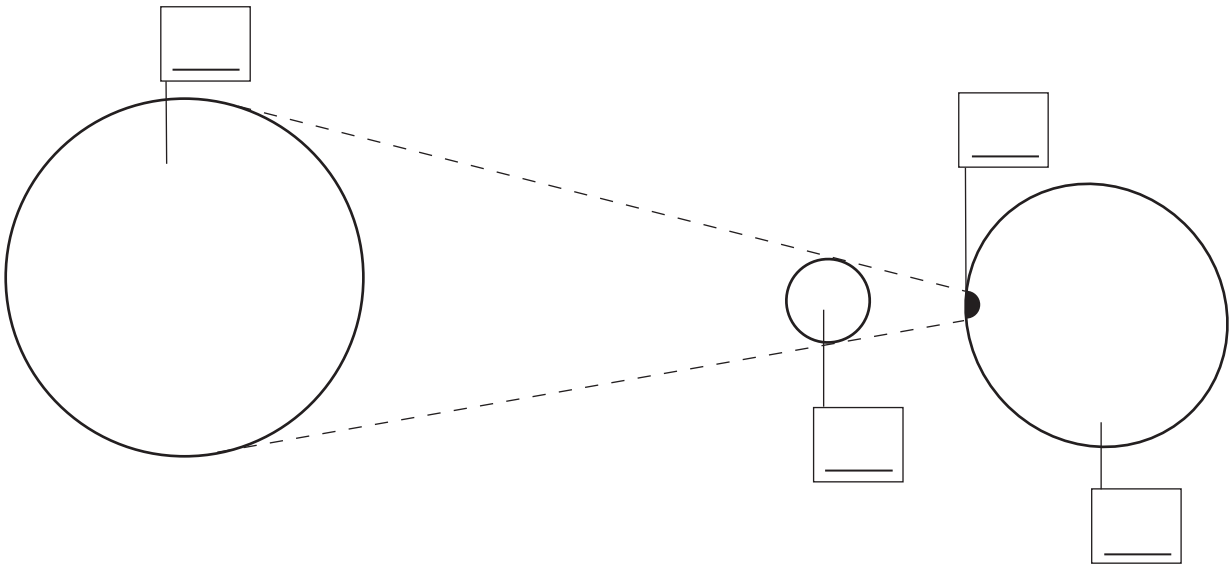
maximum 5 marks

Total
5

11. (a) The diagram below shows the positions of the Sun, Moon and Earth during a solar eclipse.

Write numbers (1–4) on the diagram below to label the features during an eclipse.

1. the Earth
2. the Moon
3. the Sun
4. a region where the total eclipse of the Sun is taking place



not to scale

11a
1 mark

11a
1 mark

(b) Scientists discovered a regular cycle of eclipses. It is called the Saros cycle. The table below shows the dates of some eclipses in this cycle.

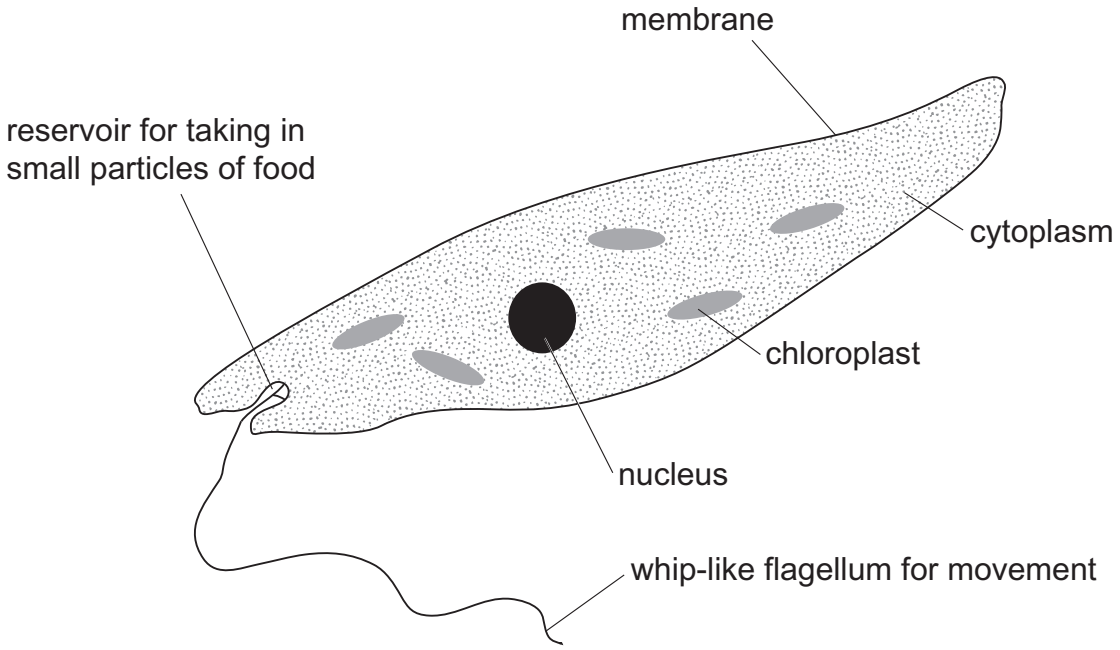
Complete the table by predicting the date of the next eclipse in the Saros cycle.

eclipse	date
eclipse 1	20th July 1963
eclipse 2	31st July 1981
eclipse 3	11th August 1999
eclipse 4	

11b
1 mark

11b
1 mark

12. The diagram below shows an organism called Euglena.
It is made of only one cell. It lives in ponds and streams.
Euglena have features of both plants and animals.



(a) Look at the diagram of Euglena.

Give **two** pieces of evidence which suggest it is an **animal** cell and **not** a plant cell.

1. _____

2. _____

12a
1 mark

12a
1 mark

(b) Plant cells can carry out photosynthesis.
How can you tell from the diagram that Euglena can carry out photosynthesis?

_____

12b
1 mark

(c) Complete the word equation for photosynthesis.

carbon dioxide + _____ → glucose + _____

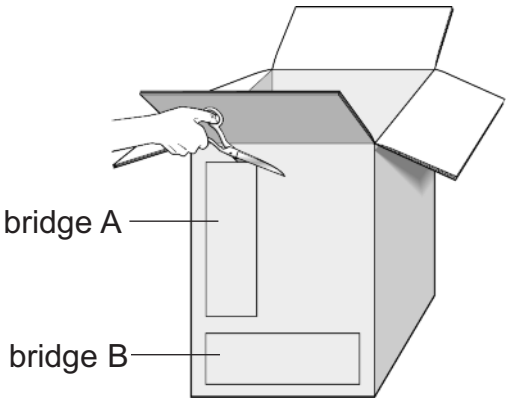
12c
1 mark

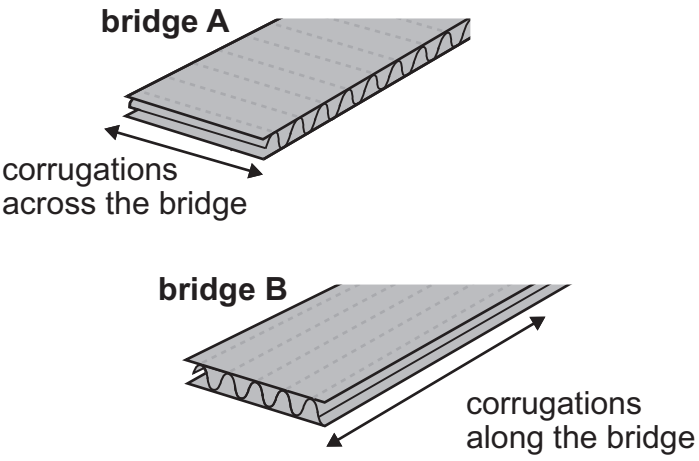
12c
1 mark

maximum 9 marks

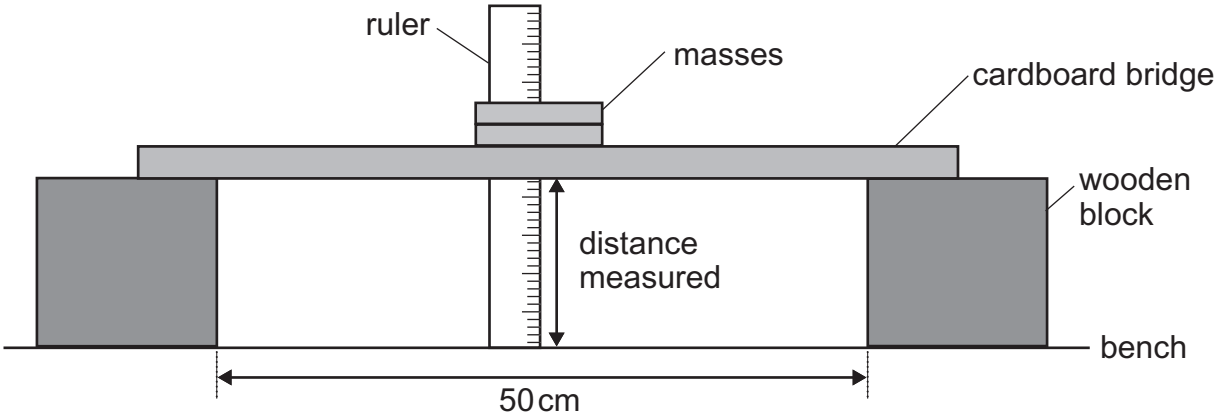
Total
9

13. Joe makes two bridges from strips of cardboard cut as shown.





Joe tests the bridges by adding masses to them. He measures the distance from the bench to the bottom of each bridge for different masses as shown.



13a
1 mark

(a) Suggest **two** things Joe must do to make his test fair.

1. _____

2. _____

13a
1 mark

Here are Joe's results.

mass added to bridge (g)	distance from bench to bottom of bridge (cm)	
	bridge A	bridge B
0	7.2	7.2
100	7.1	7.0
200	7.0	6.5
250	6.8	6.1
300	3.0	5.6
350	0.0	5.0

(b) (i) Joe put 325 g on each bridge.
Using the results table, estimate the distance from each bridge to the bench.

bridge A _____cm bridge B _____ cm

13bi
1 mark

(ii) Suggest what happened to **bridge A** when it was loaded with 350 g.

_____

13bii
1 mark

(c) (i) Which bridge would be better for carrying a **200 g** toy car?
Tick the correct box.

bridge A ☐ bridge B ☐

Explain your answer.

_____

_____

13ci
1 mark

(ii) Which bridge would be better for carrying a **300 g** toy car?
Tick the correct box.

bridge A ☐ bridge B ☐

Explain your answer.

_____

_____

13cii
1 mark

maximum 6 marks

Total
6

14. (a) Amy's family are at the beach during the summer.
Amy and her sister have a bucket containing seawater and sand.

Read the following statements.
Which are **true** and which are **false**?

Tick **one** box for each statement.

	true	**false**
Water is a solvent for salt.	☐	☐
Sand sinks in water because water is more dense than sand.	☐	☐
When a solid dissolves in water, the solid is called a solute.	☐	☐

☐ 14a
1 mark

☐ 14a
1 mark

(b) Seawater contains dissolved salt.
Describe what Amy can do to separate **and** collect pure water from seawater.

_____

_____

☐ 14b
1 mark

☐ 14b
1 mark

(c) Draw a line from each of the **substances** below to the **group** that it belongs to.
Draw only **three** lines.

Draw a line from each **group** to the correct **description**.
Draw only **three** lines.

substance	group	description
seawater	compound	It contains two or more types of atoms or molecules which can be physically separated.
salt	mixture	It contains only one type of atom.
oxygen	element	Two or more types of atoms are chemically joined together.

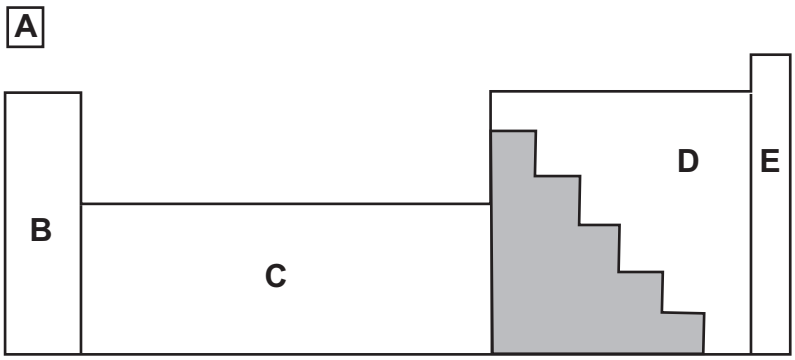
14c
1 mark

14c
1 mark

maximum 6 marks

Total
6

15. (a) The diagram below shows part of the periodic table of elements.



The shaded area contains **only** metal elements.

Two other areas also contain **only** metal elements.

Which areas contain only metal elements?
Tick the **two** correct boxes.

15a

1 mark

A ☐ B ☐ C ☐ D ☐ E ☐

(b) Copper is a metal.

At room temperature copper is a strong solid.
Give **two** other properties of copper that show it is a metal.

15b

1 mark

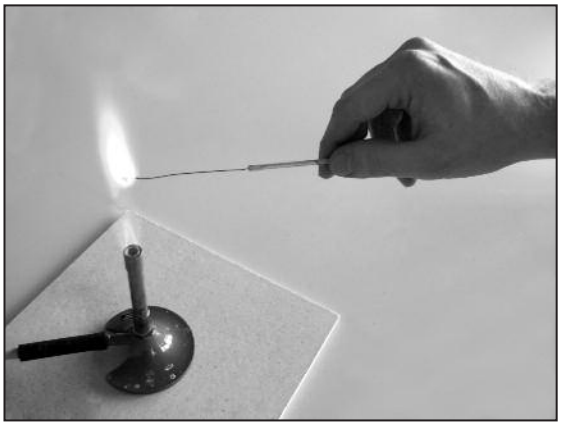
1. _____

15b

1 mark

2. _____

(c) When copper metal is heated it reacts with a gas in air.



What is the chemical name of the **product** formed when copper reacts with a gas in air?

_____

15c

1 mark

(d) Which statement below describes what happens in a **chemical change** but **not** in a physical change?

Tick the correct box.

The product is a solid.	☐
The change only happens at a high temperature.	☐
The atoms have combined in a different way to make a new substance.	☐
The types of atoms at the start are the same as in the end product.	☐

15d

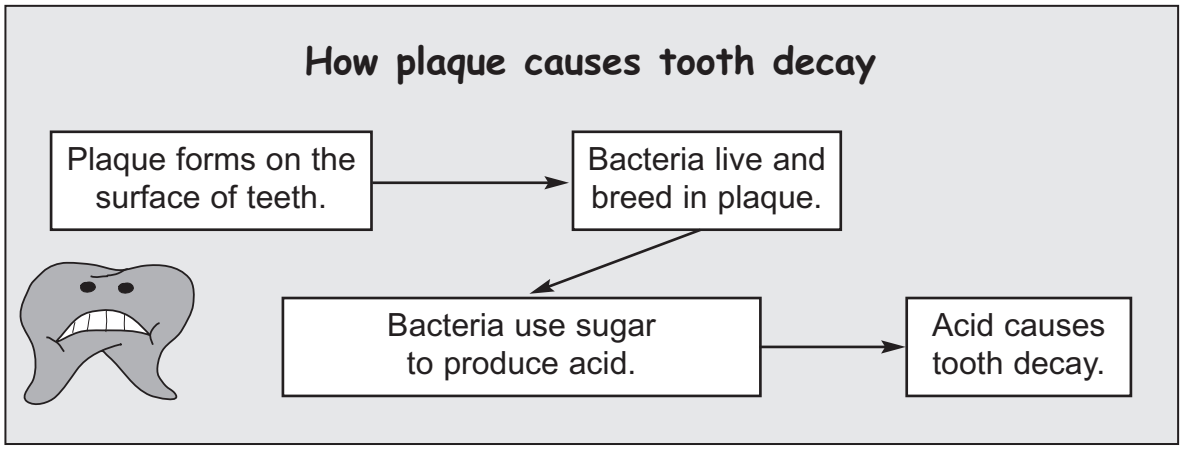
1 mark

maximum 5 marks

Total

5

16. The dentist's leaflet below shows how plaque causes tooth decay.



(a) (i) Explain how reducing the amount of plaque can reduce tooth decay. Use the leaflet to help you.

16ai
1 mark

16ai
1 mark

(ii) Using an alkaline toothpaste also reduces tooth decay. Give the reason for this.

16aii
1 mark

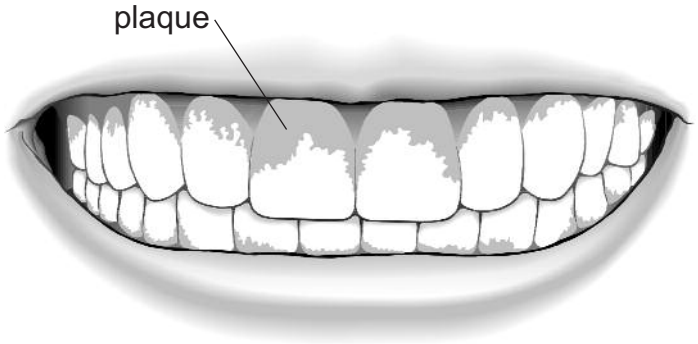
(b) A group of boys wanted to find out how well plaque is removed by brushing teeth.

Every day, before they brushed their teeth, the boys chewed a tablet that stains plaque red.

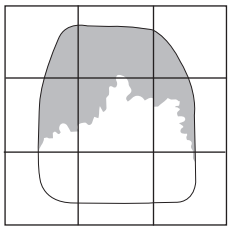
Explain why the boys looked at their teeth **before and after** brushing.

16b
1 mark

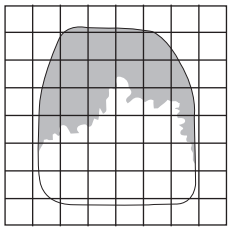
(c) The diagram below shows teeth with the plaque stained.



The boys used a grid drawn on clear plastic to measure the area of the plaque on their teeth.



A



B

(i) Grid B is better than grid A for measuring the area of plaque.

Why is a grid with smaller squares better for measuring the area of plaque?

_____

_____

16ci

1 mark

(ii) The squares on grid B represent 1 mm^2.

Use grid B to estimate the area of the tooth covered by plaque.

_____ mm^2

16cii

1 mark

END OF TEST

maximum 6 marks

Total

6

QCA/09/3799 (Pupil pack)
QCA/09/3798 (Mark scheme pack)