Sc

KEY STAGE
3

TIER
3–6

2007

Science test

Paper 1

First name _____

Last name _____

School _____

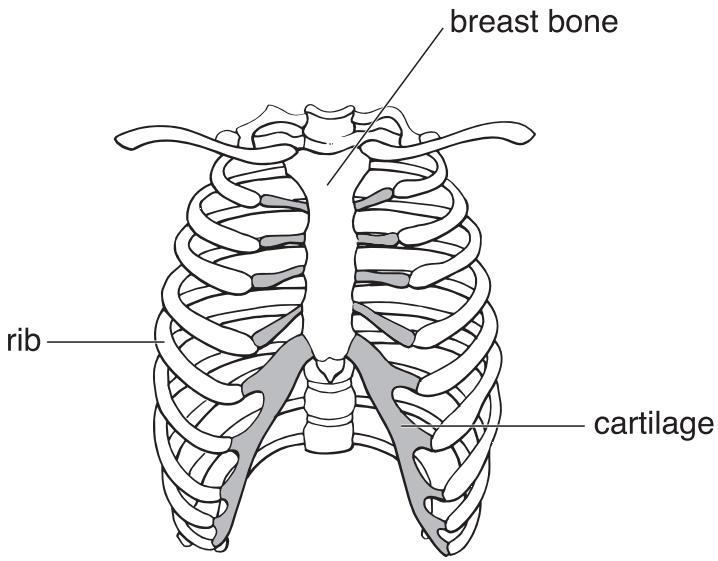
Remember

- 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.
- 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	

1. The drawing below shows the human rib cage.



(a) The rib cage protects organs in the chest.

Give the names of **two** organs in the chest.

1. _____

2. _____

1a
1 mark

1a
1 mark

(b) The ribs are attached to the breast bone by cartilage which bends easily. This lets the space in the chest get bigger.

Why is it important that the space can get bigger?

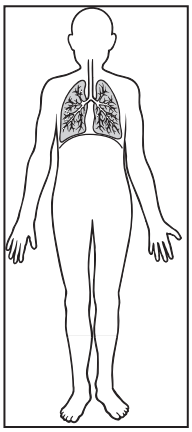
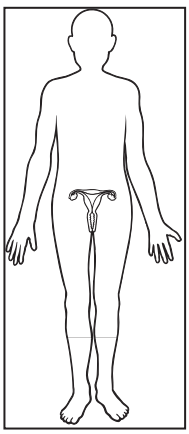
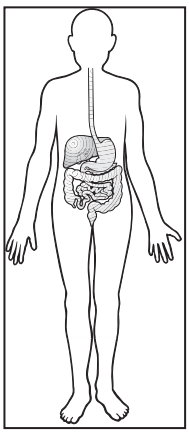
_____

_____

1b
1 mark

(c) The drawings below show parts of three different organ systems.

Draw a line from each organ system to its function.
Draw only **three** lines.

organ system	**function**
	digestion of food
	reproduction
	control of the body
	taking in oxygen from the air
	movement of the body

maximum 6 marks

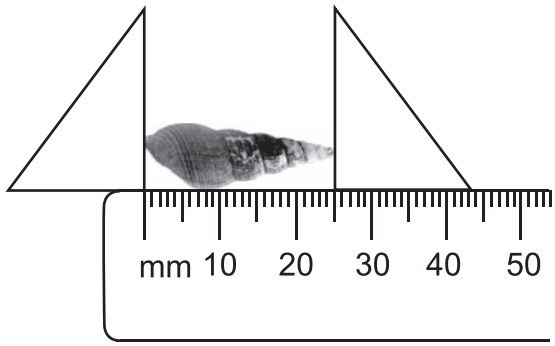
1c
1 mark

1c
1 mark

1c
1 mark

Total
6

2. Jay collected pond snails from the school pond.
He measured the lengths of all their shells.



(a) What is the length of the shell above?

_____ mm

2a

1 mark

(b) Jay made a tally chart of the lengths of **all** the shells he found.

range of lengths of shells (mm)	0-5	6-10	11-15	16-20	21-25	26-30
number of shells	I	I	I	III	IIII	I

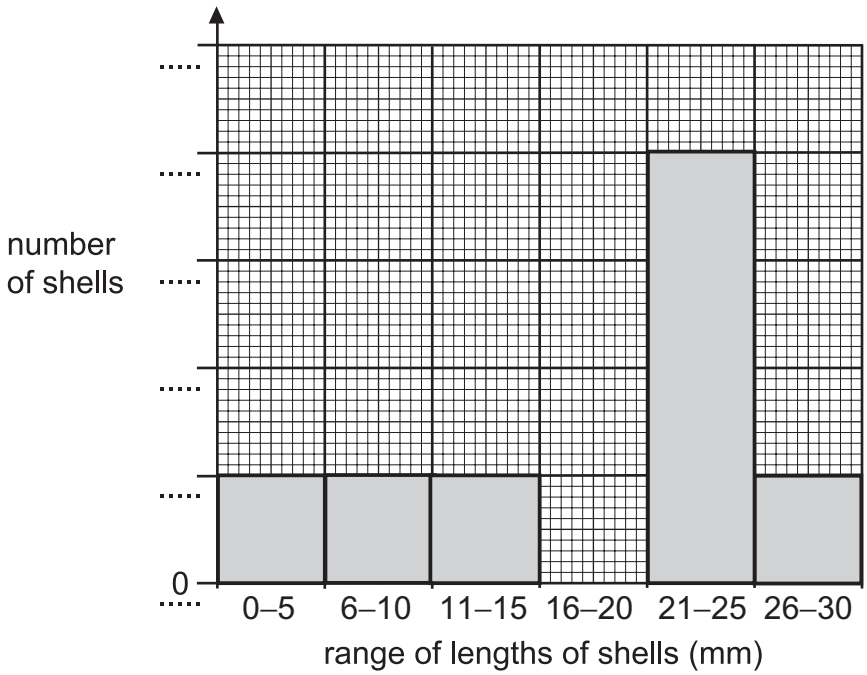
What was the most common **range** of lengths of shells Jay collected?

_____ mm

2b

1 mark

(c) Jay recorded his results in a bar chart.



(i) Add the missing numbers to the side of the bar chart labelled 'number of shells'.

2ci
1 mark

(ii) **On the chart above**, draw the bar for the number of shells measuring 16–20 mm.

2cii
1 mark

(d) Look at Jay's results and decide if each conclusion below is **true** or **false** or if you **cannot tell**.
Tick the correct box for each conclusion.

conclusions	true	false	cannot tell
The oldest snails have the darkest shells.	☐	☐	☐
He did **not** find any shells longer than 30 mm.	☐	☐	☐
He found a total of eight snails.	☐	☐	☐
All the snails he found are the same type.	☐	☐	☐

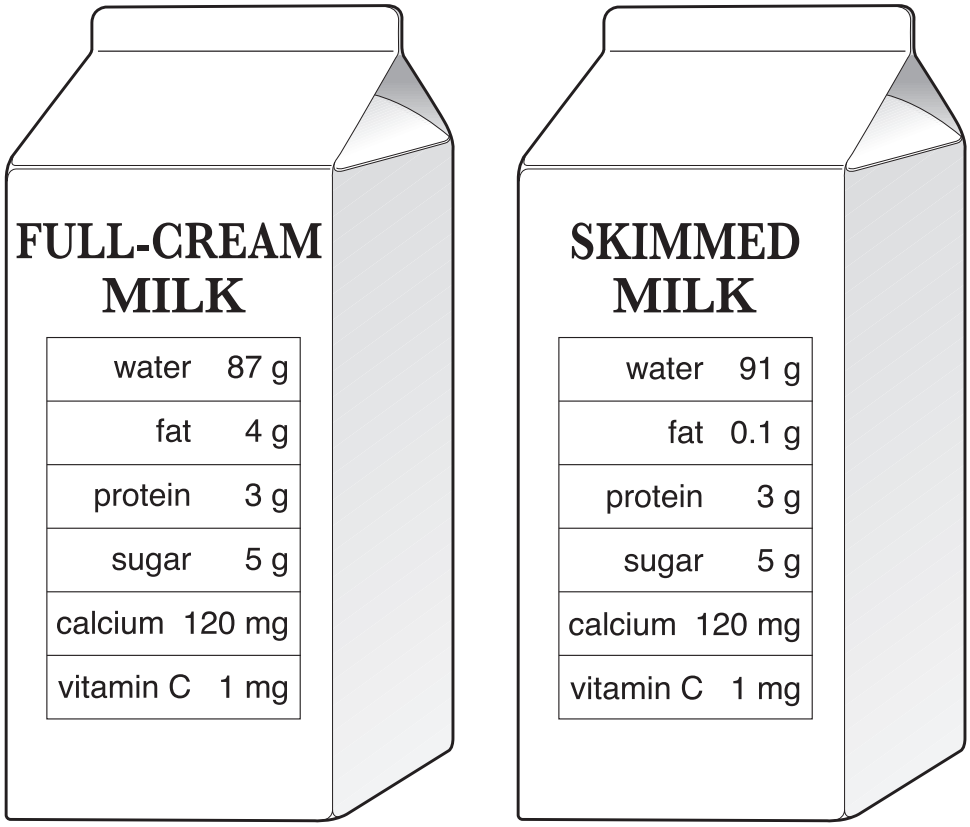
2d
1 mark

2d
1 mark

maximum 6 marks

Total
6

3. The drawings show the amounts of different substances in 100 g of full-cream milk and 100 g of skimmed milk.



(a) Use the information in the drawings to complete the sentence.

When skimmed milk is made from full-cream milk, most of the

_____ is taken out.

3a

1 mark

(b) (i) Look at the drawings.
Which substance in milk do we need for strong bones and teeth?

_____

3bi

1 mark

(ii) How are substances carried around the body?

_____

3bii

1 mark

(c) (i) Which animals produce milk to feed their young?
Tick the correct box.

amphibians	☐	birds	☐
mammals	☐	reptiles	☐

☐ 3ci
1 mark

(ii) A baby fed on its mother's milk gets fewer infections.
What is the reason for this?
Tick the correct box.

The milk contains antibodies.	☐
The milk contains water.	☐
The milk is at body temperature.	☐
The milk is a liquid.	☐

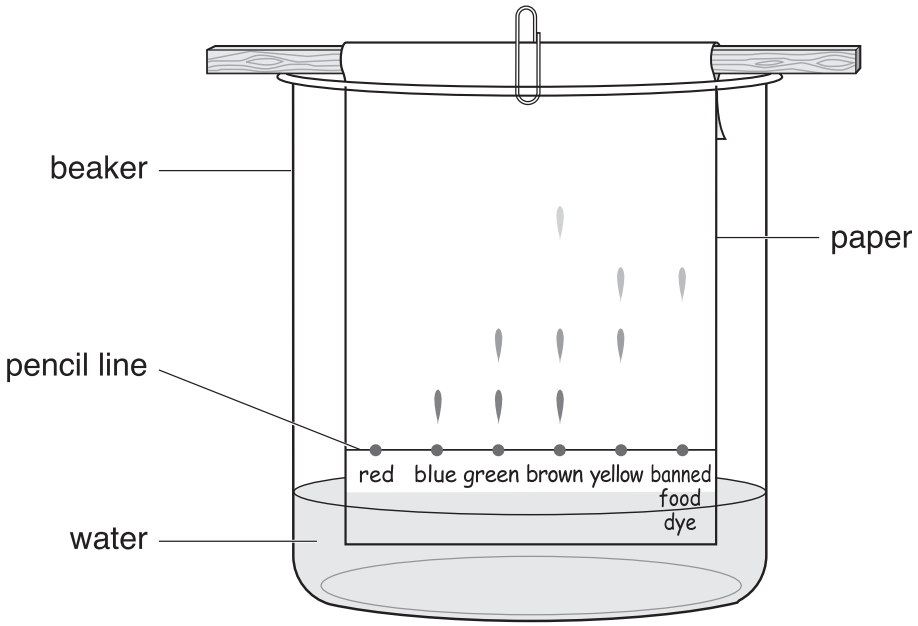
☐ 3cii
1 mark

maximum 5 marks

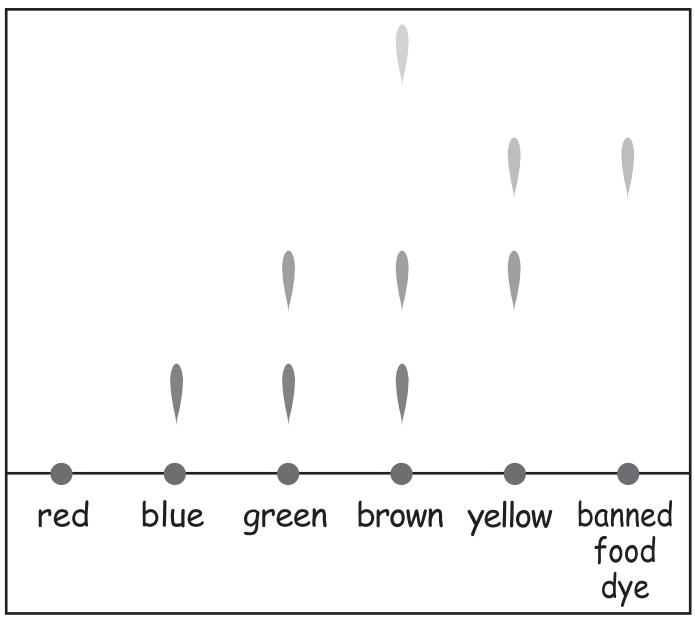
Total
☐
5

4. Gary wanted to find out if some food colourings contained a banned food dye.

He put a drop of each food colouring and the banned food dye onto some special paper.
He hung the paper in a beaker of water.



After 10 minutes, the banned food dye and some of the dyes from the food colourings had moved up the paper.
Gary's results are shown below.



(a) Gary wrote the labels on the paper in pencil.
Why should he **not** write them in ink?

_____

_____

4a
1 mark

(b) Look at Gary's results.
The different dyes in some of the food colourings had moved up the paper.

(i) Which food colouring contained the banned food dye?

_____

4bi
1 mark

(ii) Which food colouring contained the most dyes?

_____

4bii
1 mark

(c) Which food colouring did **not** dissolve in the water?

_____

4c
1 mark

(d) Which method did Gary use to separate the dyes?
Tick the correct box.

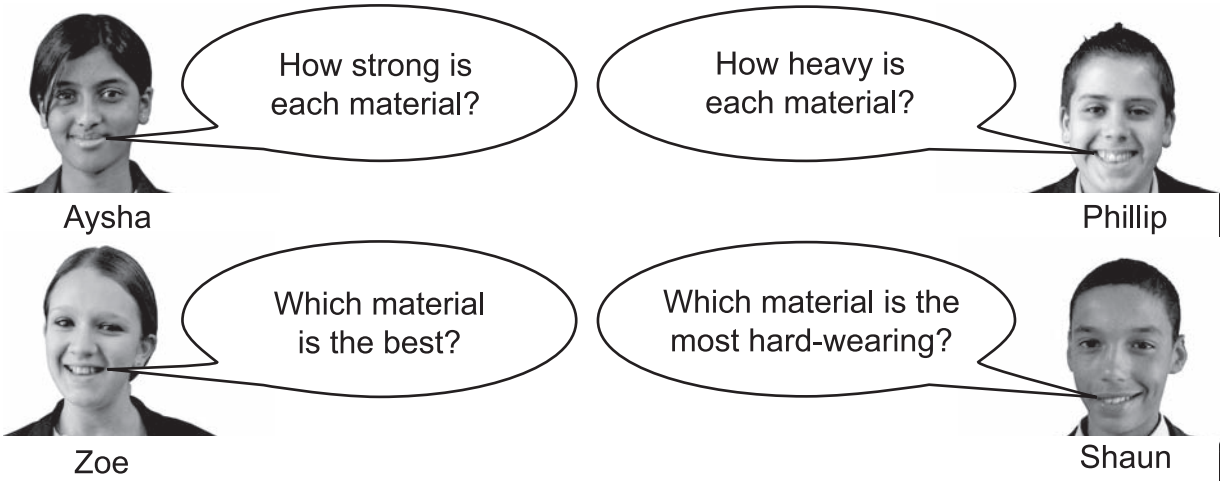
chromatography	☐	distillation	☐
evaporation	☐	filtration	☐

4d
1 mark

maximum 5 marks

Total
5

5. Some pupils investigated different materials used to make rucksacks.
Here are some of the questions they asked.



(a) Which pupil asked a question that cannot be investigated?
Tick the correct box.

5a
1 mark

Aysha ☐ Phillip ☐ Zoe ☐ Shaun ☐

Give a reason for your answer.

5a
1 mark

_____

_____

(b) Zara took four different rucksack materials and investigated how waterproof they were.

She poured 100 cm^3 of water through each material in turn.
She measured the volume of water passing through each material in 30 minutes.



(i) Give **one** way of making Zara's test fair.

_____

5bi

1 mark

(ii) Look at the photograph of the investigation.

Name **one** measuring instrument Zara used.

_____

5bii

1 mark

(c) The table below shows Zara's results.

material	volume of water passing through each material (cm^3)
A	11
B	5
C	20
D	15

Which material was the most waterproof?
Tick the correct box.

A ☐ B ☐ C ☐ D ☐

5c

1 mark

Explain your answer.

_____

_____

5c

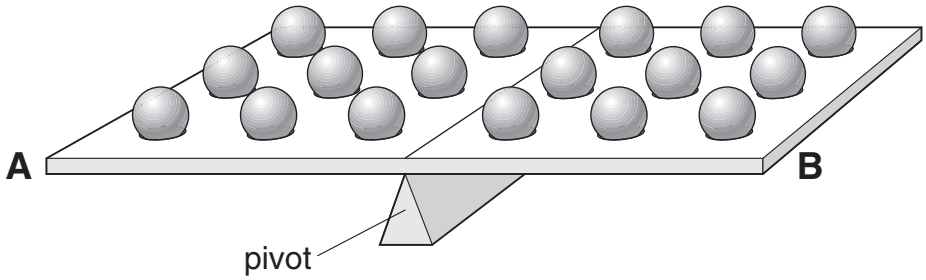
1 mark

maximum 6 marks

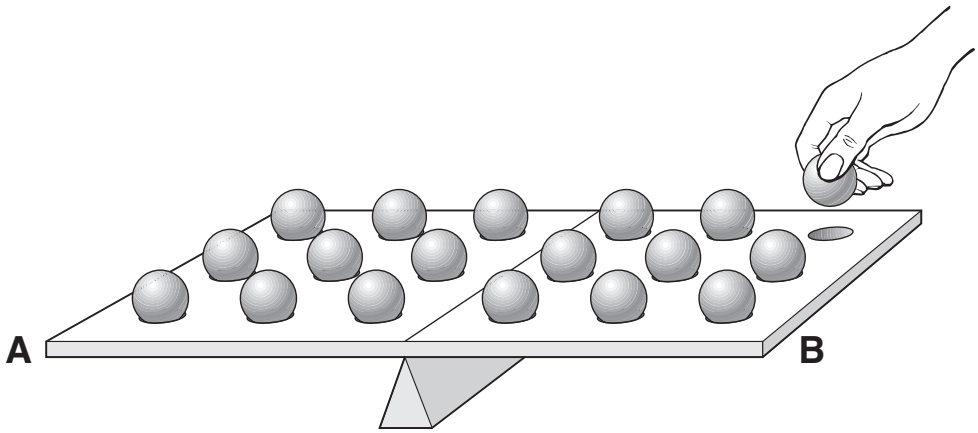
Total

6

6. Fran has a balancing game.
On each side of the pivot there are nine steel balls. The tray is balanced.



(a) Fran removes one of the steel balls as shown below.



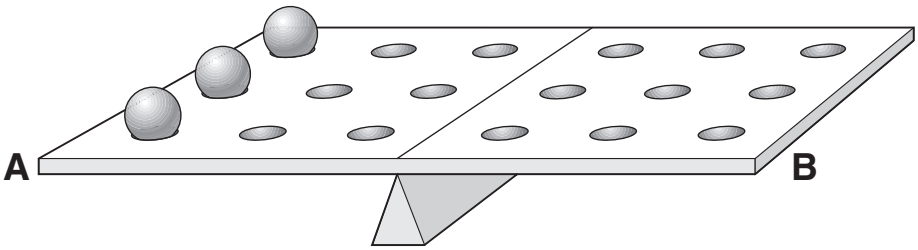
What will happen to end A?

6a

1 mark

(b) There are three balls on side A as shown below.

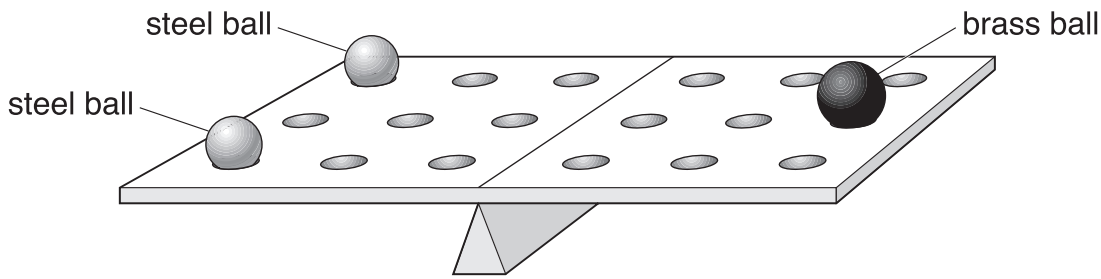
Draw **three** other balls in the correct positions to balance the tray.



6b

1 mark

(c) Fran puts two steel balls on one side and one brass ball on the other side. The tray is balanced.



The mass of each steel ball is 50 g.

What is the mass of the brass ball?

_____ g

6c
1 mark

(d) The table below gives information about the brass and steel balls.

	Is it attracted to a magnet?	**elements in the ball**
brass	no	copper and zinc
steel	yes	iron and carbon

(i) Which element is **not** a metal?
Tick the correct box.

carbon ☐ copper ☐

iron ☐ zinc ☐

6di
1 mark

(ii) Look at the elements in the brass ball and the steel ball.

Why is steel attracted to a magnet but brass is **not**?

_____

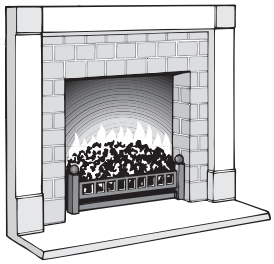
maximum 5 marks

6dii
1 mark

Total
5

7. The drawings below show six ways of providing energy.

coal fire



burns coal to provide heat

A

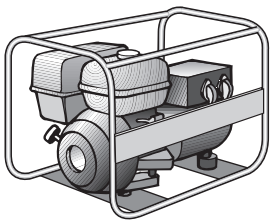
turbine



turns a generator to provide electricity

B

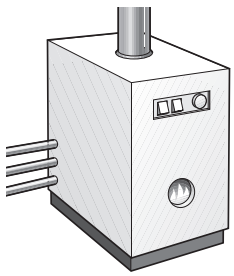
petrol generator



burns petrol to provide electricity

C

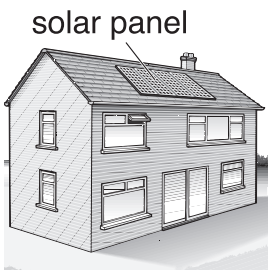
gas boiler



burns gas to provide heat

D

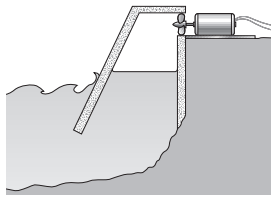
solar panel



uses solar energy to provide heat

E

wave turbine



uses wave energy to provide electricity

F

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

1. _____

2. _____

7a
1 mark

7a
1 mark

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

_____

7bi
1 mark

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

_____

7bii
1 mark

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

_____

7c
1 mark

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

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

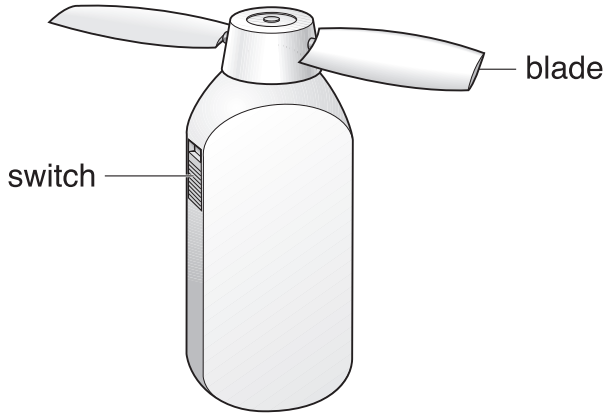
_____

7d
1 mark

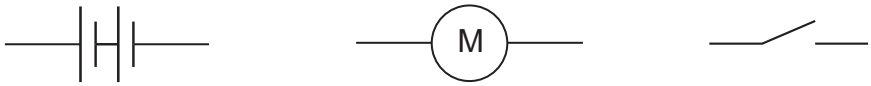
maximum 6 marks

Total
6

8. Susan has a small fan to keep herself cool.
When she switches it on, a motor turns the blades to blow air.



(a) The diagrams below show the symbols for a battery, a motor and a switch.



battery **motor** **switch**

In the space below, draw a series circuit diagram for the fan using these symbols.

8a

1 mark

(b) (i) Which part provides energy for the circuit?

_____

8bi
1 mark

(ii) Some of this energy is used to turn the blades.
The rest of the energy is wasted.

Complete the sentence below. Choose words from the list.

chemical **heat** **light** **sound**

When the blades are turning, energy is wasted as

_____ energy and _____ energy.

8bii
1 mark

8bii
1 mark

(c) Susan built a circuit using a battery, a motor and a switch.
She closed the switch to turn the motor on.

(i) Susan added a bulb to the circuit.
The current in the circuit **decreased**.

How did this affect the motor?

_____

8ci
1 mark

(ii) Susan removed the motor from the circuit.
The current in the circuit **increased**.

How did this affect the bulb?

_____

8cii
1 mark

maximum 6 marks

Total
6

9. **Diagram 1** shows a baby in its mother's uterus.

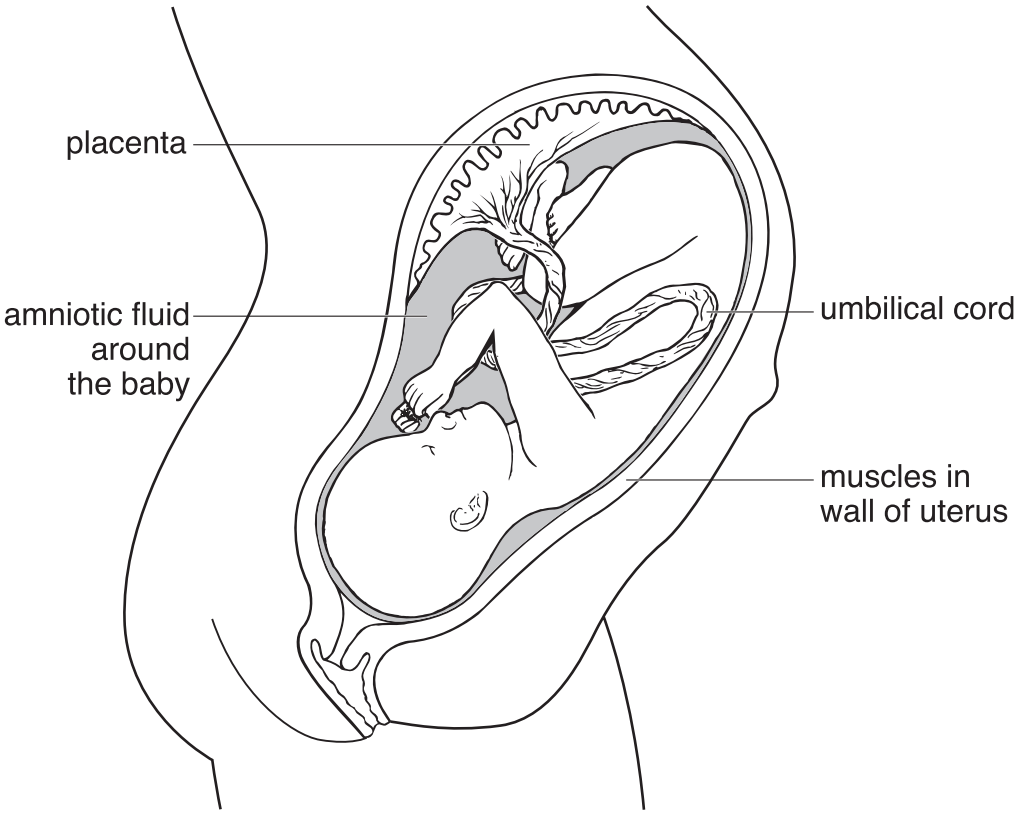


diagram 1

(a) What is the normal length of pregnancy in humans?

_____ months

9a

1 mark

(b) (i) What is the function of the amniotic fluid around the baby?

_____

9bi

1 mark

(ii) As a baby is born, it is pushed out of the mother's body.

Look at the diagram above.
What happens in the wall of the uterus to push the baby out?

_____

_____

9bii

1 mark

(c) How does a baby get oxygen from its mother while it is inside its mother's uterus?

_____

_____

9c

1 mark

(d) **Diagram 2** shows a section through the mother's lungs.

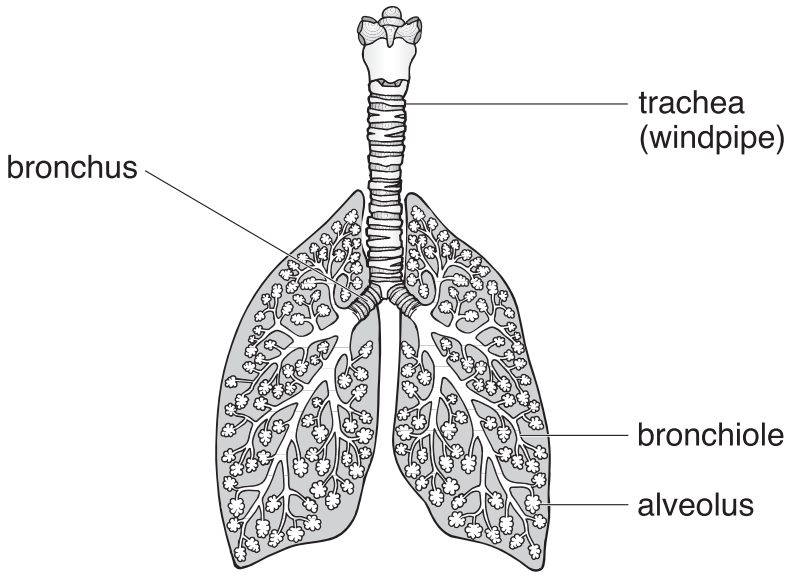


diagram 2

Look at **diagram 2**.

From which labelled part is oxygen absorbed into the blood?

_____

9d

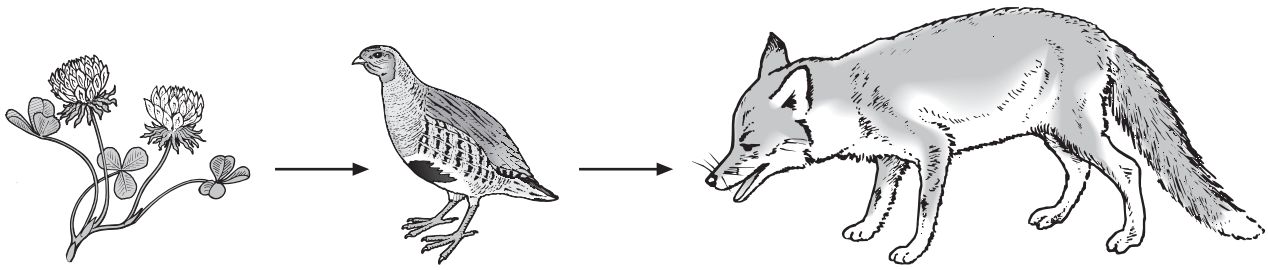
1 mark

maximum 5 marks

Total

5

10. The drawings show part of a farmland food chain.

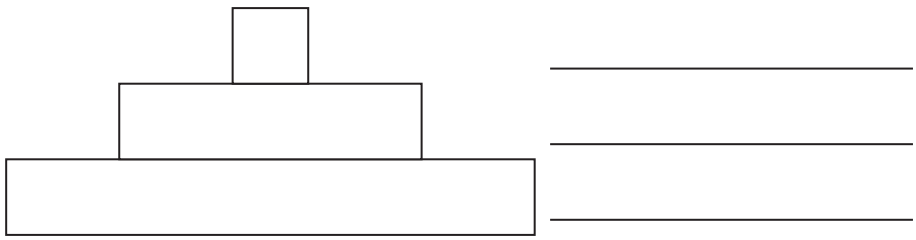


plant **partridge** **fox**

not to scale

(a) A pyramid of numbers represents the number of organisms at each stage in a food chain.

On each line by the pyramid of numbers below, write the name of the correct organism from the food chain above.



10a

1 mark

(b) Partridges feed mainly on insects and wild plants (weeds).

Some farmers spray their crops with chemicals to kill insects and weeds.

How would this affect the number of foxes?

_____

Explain your answer.

_____

_____

10b

1 mark

(c) Partridges build their nests on the ground among plants.
They lay up to 18 eggs in the nest.

Suggest why partridges need to lay so many eggs.

_____

_____

10c

1 mark

(d) Some farmers leave a strip of land around the edge of each field which they do **not** spray with chemicals.

Suggest **two** reasons why this will lead to an increase in the number of partridges on these farms.

1. _____

_____

10d

1 mark

2. _____

_____

10d

1 mark

maximum 5 marks

Total

5

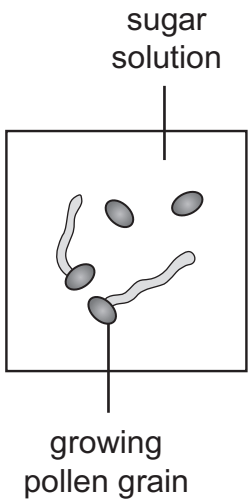
11. Amy and Tom investigated how sugar affects the growth of pollen grains. They looked at pollen grains under a microscope.

Amy's Plan

- Add some pollen grains to one drop of very concentrated sugar solution.
- Add some pollen grains to one drop of dilute sugar solution.
- Count how many pollen grains have started to grow.

Tom's Plan

- Add one drop of different concentrations (0%, 5%, 10%, 15%, 20% and 25%) of sugar solution to each slide.
- Add the same amount of pollen to each drop.
- One hour later count how many pollen grains have started to grow.
  Work out the percentage.



11a 1 mark

(a) Give **two** ways in which Tom's plan is better than Amy's plan.

1. _____

2. _____

11a 1 mark

11b 1 mark

(b) In Tom's investigation, what factor did he change (the independent variable)?

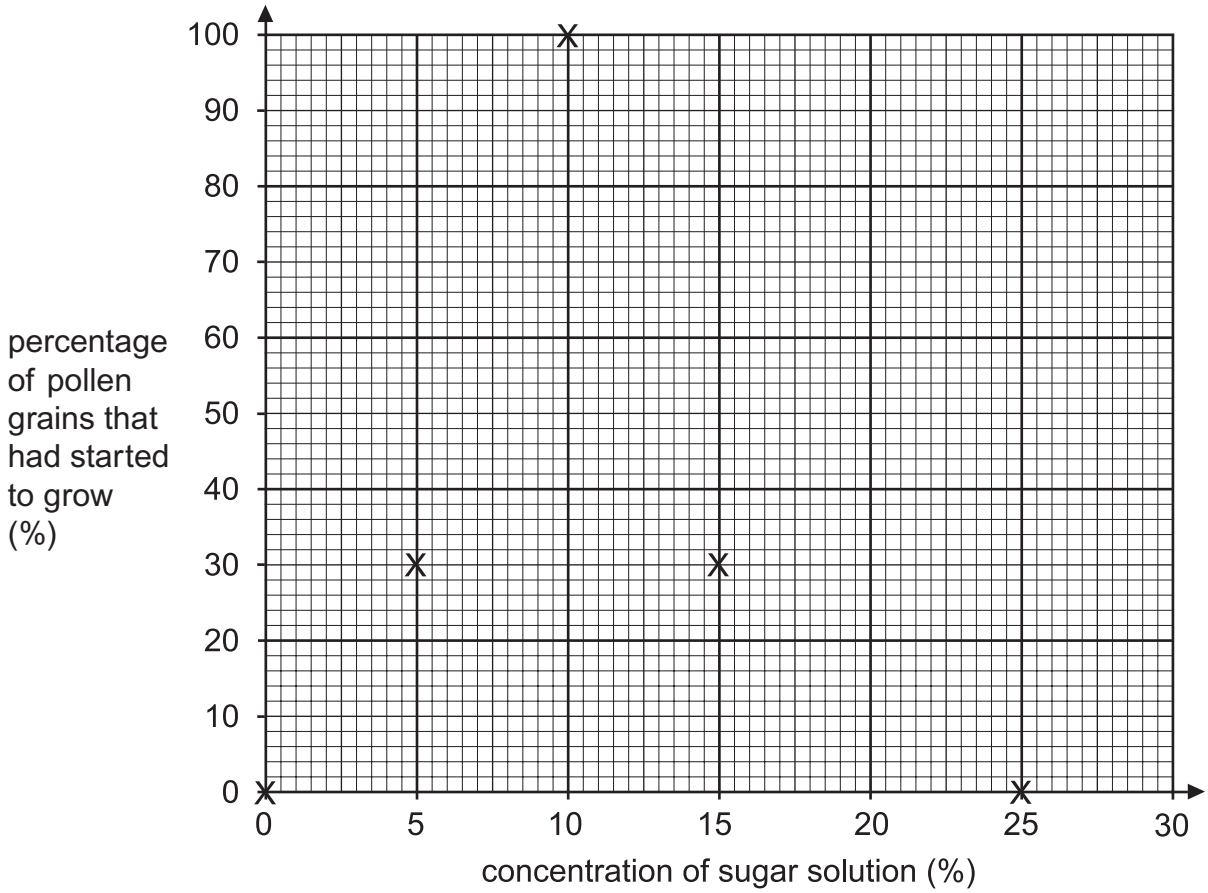
_____

(c) Look at Tom's results in the table below.

concentration of sugar solution (%)	percentage of pollen grains that had started to grow (%)
0	0
5	30
10	100
15	30
20	10
25	0

He plotted five of his results on graph paper.

Plot the result for 20% sugar solution.



11c

1 mark

(d) Tom's conclusion was, 'The greater the concentration of sugar solution, the greater the percentage of pollen grains that had grown.'

Do his results support his conclusion?
Tick one box.

yes ☐ no ☐

Use the results in the graph to explain your answer.

_____

_____

11d

1 mark

maximum 5 marks

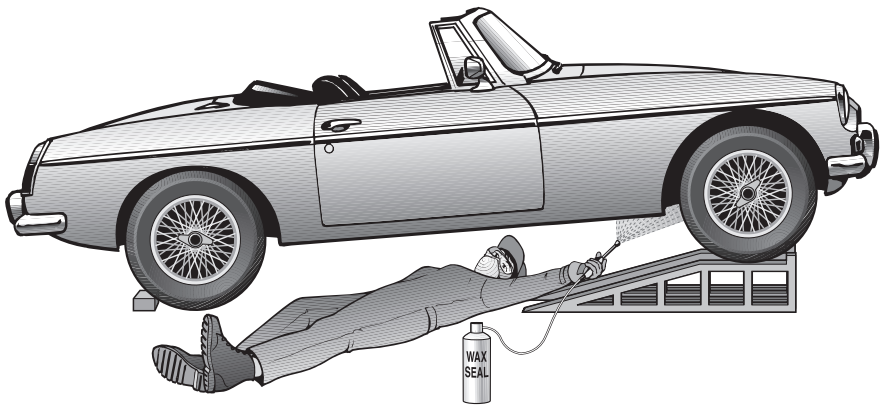
Total

5

12. Jill bought a can of Wax Seal to spray the parts underneath her car.



Wax Seal helps to prevent these parts rusting.
It is a mixture of wax and a liquid called white spirit.



(a) (i) The body of Jill's car is made from steel. Steel contains iron.

Give **two** substances that are needed for iron to rust.

1. _____

2. _____

12ai
1 mark

12ai
1 mark

(ii) How does Wax Seal help to protect the car from rusting?

_____

_____

12aii
1 mark

(iii) Wax Seal can also be used on the upper parts of a car.
What else protects parts such as the doors from rusting?

_____

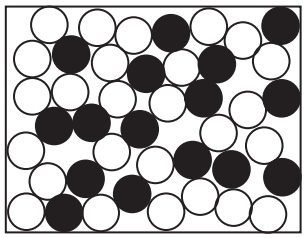
12aiii
1 mark

(b) The metal parts of a car may corrode.
What type of air pollution could cause corrosion?

_____

12b
1 mark

(c) The diagram below shows the mixture of particles of wax and white spirit in Wax Seal.



key

○ = particle of white spirit

● = particle of wax

not to scale

After Jill sprays the car, the white spirit evaporates leaving a layer of solid wax on the surface.

(i) In the box below, draw **eight** circles, ○, to show the arrangement of particles in a gas.

particles in a **gas**

12ci

1 mark

(ii) In the box below, draw **eight** circles, ●, to show the arrangement of particles in a solid.

particles in a **solid**

12cii

1 mark

maximum 7 marks

Total

7

13. (a) Helen weighed three pieces of rock and soaked them in water.
The next day, she weighed them again.
Her results are shown below.

rock	mass before soaking in water (g)	mass after soaking in water (g)
granite	26.3	26.3
marble	20.4	20.4
sandstone	25.5	27.6

Rocks that have lots of small spaces are described as **porous**.

What evidence is there in the table that sandstone is porous, but granite and marble are **not** porous?

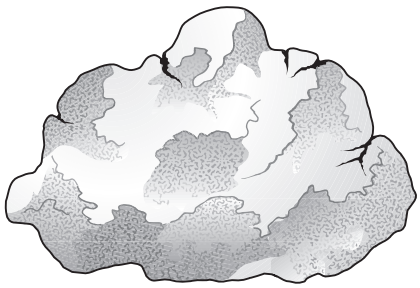
_____

_____

13a

1 mark

(b) Helen put the soaked sandstone into a freezer for 24 hours.



Water in the spaces in the sandstone froze and expanded.

(i) What would happen to the sandstone as the water froze and expanded?

_____

13bi

1 mark

(ii) In the winter this process happens in rocks in the countryside.
What is the name of this process?

_____

13bii

1 mark

(c) Helen placed fresh pieces of granite, marble and sandstone in beakers of dilute sulphuric acid.
Only the marble reacted with the acid.

Use Helen's results to explain why granite is more suitable than marble for a statue in a city centre.

_____

_____

13c
1 mark

(d) (i) Draw a line from the name of each rock below to the group of rocks it belongs to.

(ii) Draw a line from each group of rocks below to the way the group of rocks was formed.

name of rock	**group of rocks**	**way the group of rocks was formed**
granite	sedimentary	the effect of high temperature and pressure on limestone
marble	igneous	formed when magma cools
sandstone	metamorphic	particles are deposited in layers

13di
1 mark

13di
1 mark

13dii
1 mark

13dii
1 mark

maximum 8 marks

Total
8

14. James shone a ray of light at a mirror as shown below.

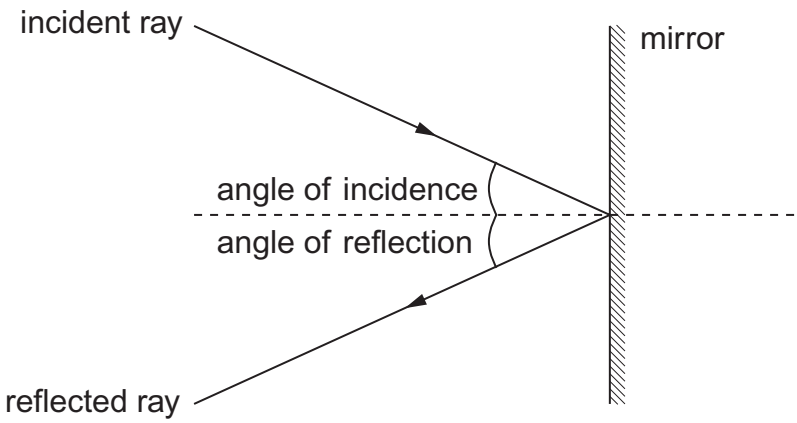


diagram 1

He measured the angle of **reflection** for different angles of incidence.
His results are shown below.

angle of **incidence** (°)	30	40	50	60	70
angle of **reflection** (°)	30	40	50	65	70

(a) Which angle of reflection was **not** measured accurately?

_____°

How can you tell this from the table?

_____

_____

14a

1 mark

(b) James set up a different experiment as shown below.

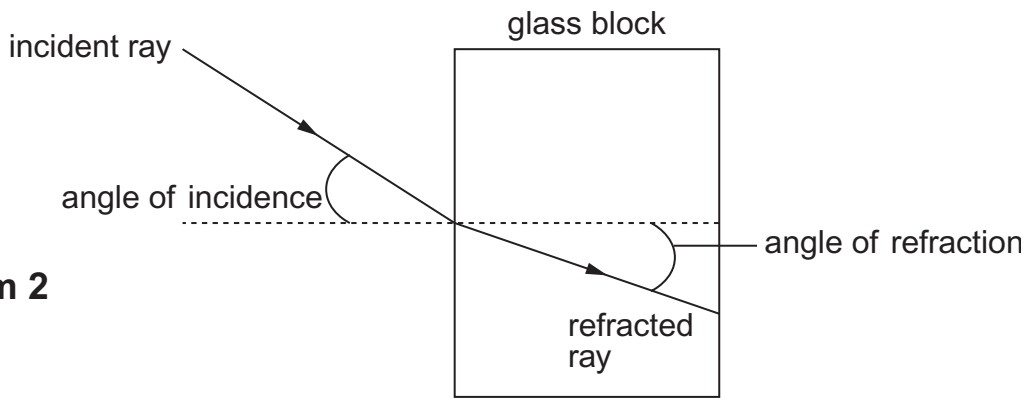
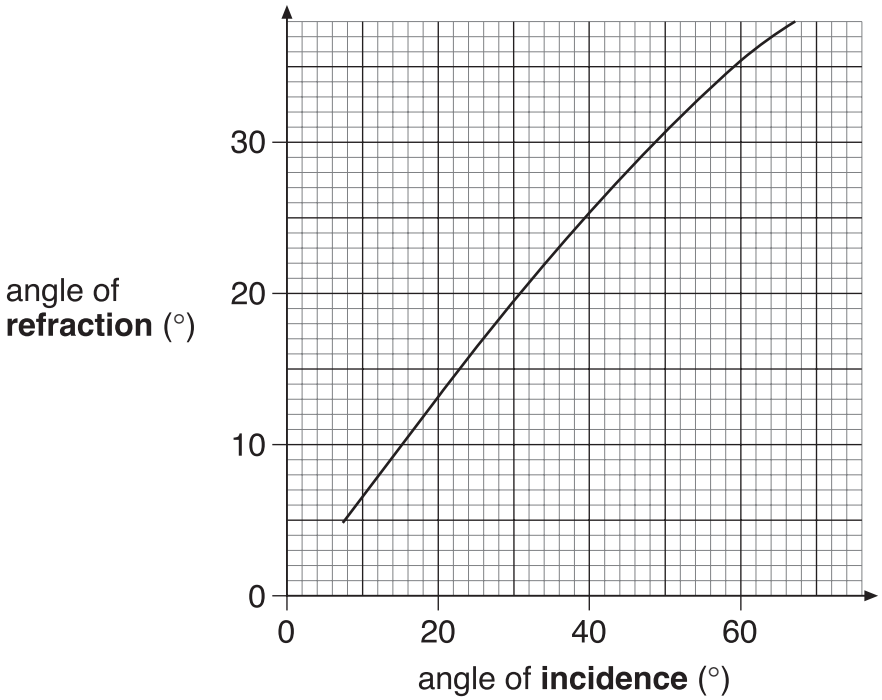


diagram 2

He measured the angle of **refraction** for different angles of incidence.
His results are shown in the graph.



Use the graph to answer the questions below.

(i) When the angle of **refraction** is 20°, what is the angle of **incidence**?

_____°

14bi

1 mark

(ii) What conclusion could James draw from his graph?
Complete the sentence below.

When light passes from air into glass, the angle of **incidence** is

always _____ the angle of **refraction**.

14bii

1 mark

(c) **On diagram 2, on the opposite page**, draw a line to continue the refracted ray as it leaves the glass block.

14c

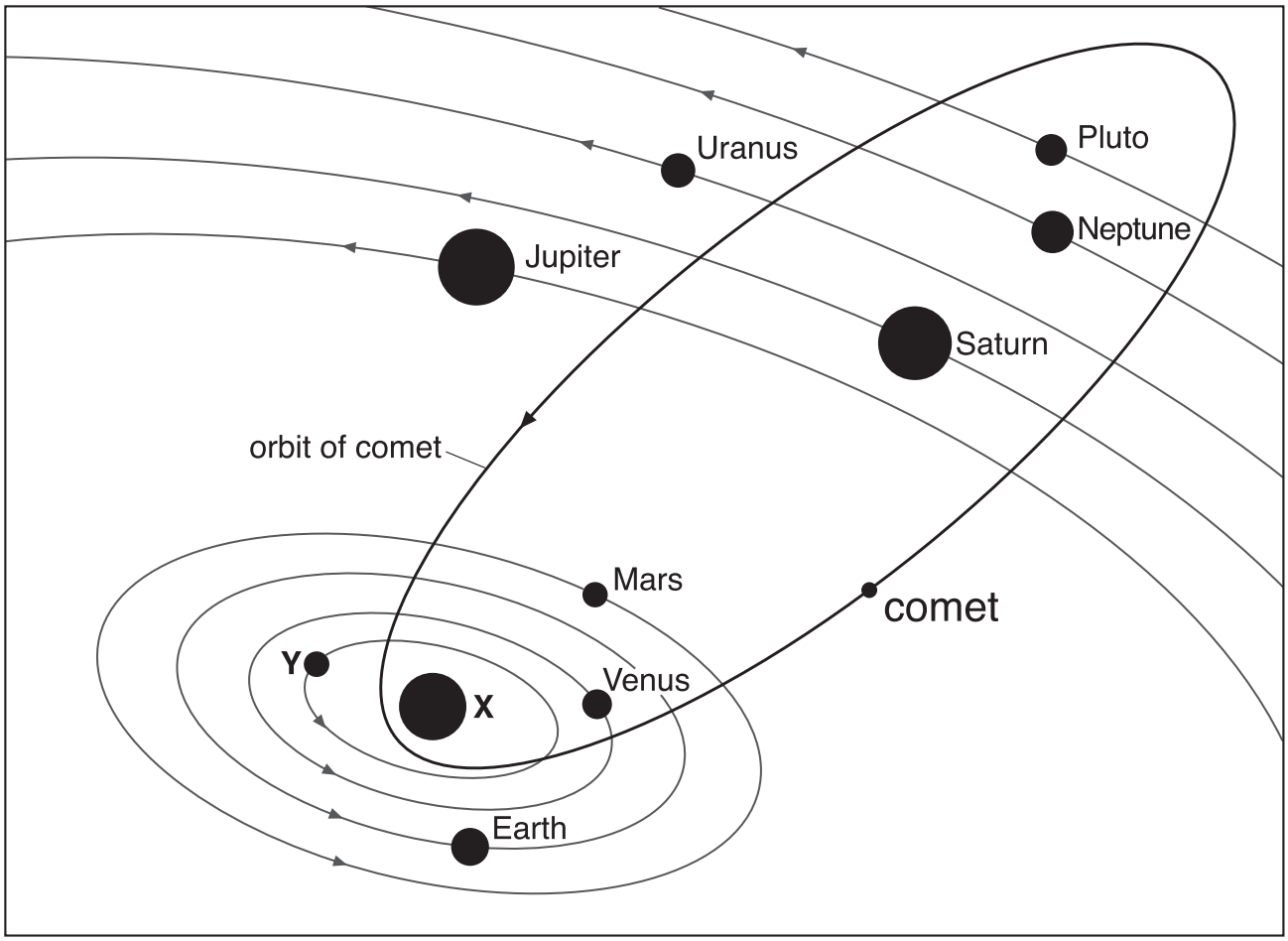
1 mark

maximum 4 marks

Total

4

15. The diagram below shows part of the solar system.



not to scale

(a) Look at the diagram.
Give the names of X and Y.

15a
1 mark

X _____

15a
1 mark

Y _____

(b) It takes Jupiter much longer than Mars to complete one orbit.
Give **two** reasons for this.

15b
1 mark

1. _____

_____

15b
1 mark

2. _____

_____

(c) The diagram opposite also shows the orbit of a comet.

In 1531, 1607 and 1683 scientists recorded that they had seen a comet in the sky.

(i) Edmund Halley looked at these dates and suggested the scientists had all seen the same comet.

Explain how he worked out that it was the same comet each time.

_____

_____

15ci

1 mark

(ii) The comet was last seen in 1986.

Predict when it will be seen next.

_____

15cii

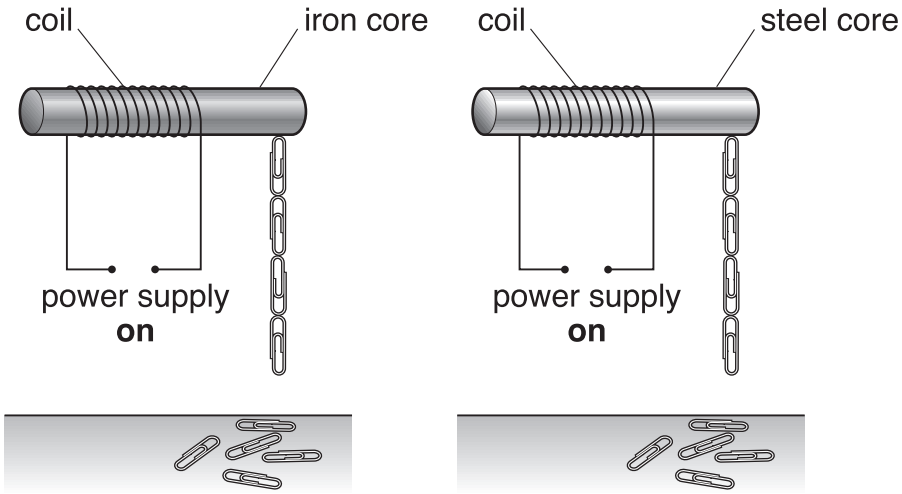
1 mark

maximum 6 marks

Total

6

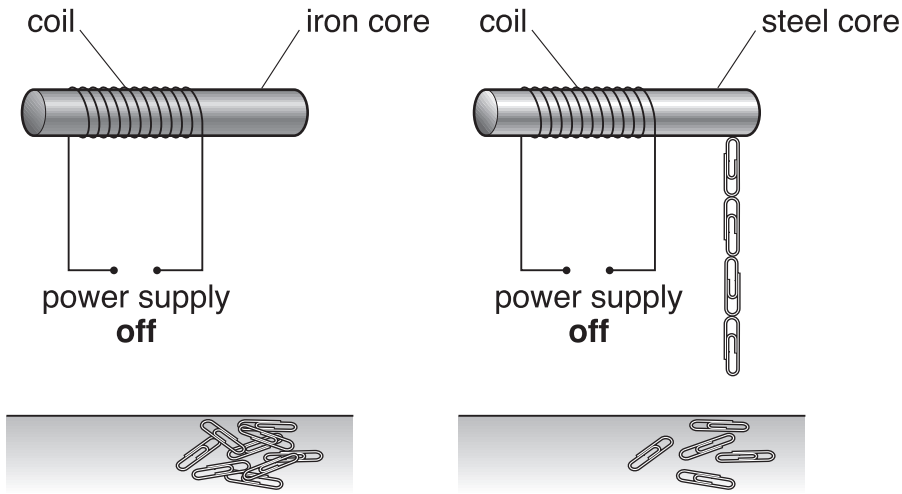
16. David made two electromagnets as shown below.
He used paper-clips to test the strength of each electromagnet.
He switched on the power supply in both circuits.



(a) How can you tell that the strength of both electromagnets is the same?

16a
1 mark

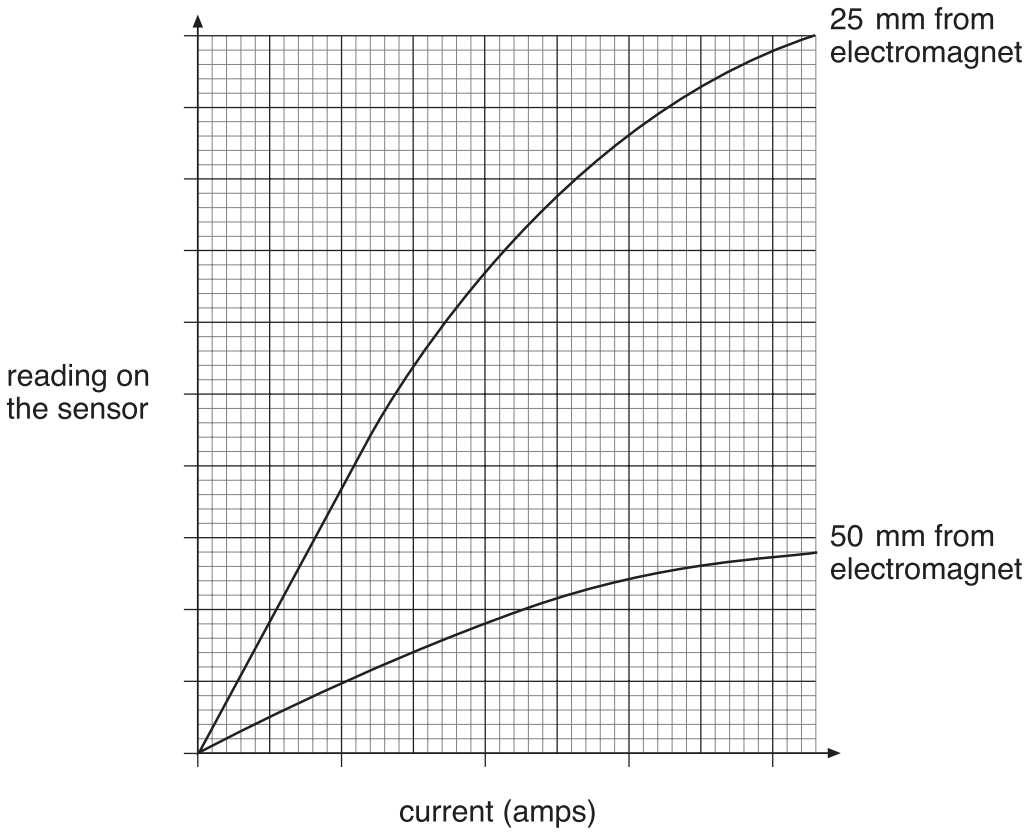
(b) David switched off the power supply in both circuits.
The paper-clips fell off the iron core, but **not** off the steel core.



Why is iron used, rather than steel, for the core of an electromagnet?
Use the diagrams above to help you.

16b
1 mark

(c) David used a sensor to measure the strength of an electromagnet.
He placed the sensor 25 mm from the electromagnet and increased the current in the coil.
He repeated the experiment with the sensor 50 mm from the electromagnet.
The graph below shows his results.



(i) How did the distance of the sensor from the electromagnet affect the reading on the sensor?

_____

_____

16ci

1 mark

(ii) How did the size of the current in the coil affect the strength of the electromagnet?

_____

_____

16cii

1 mark

(iii) What else could David do to an electromagnet to change its strength?

_____

_____

16ciii

1 mark

maximum 5 marks

Total

5

END OF TEST

© Qualifications and Curriculum Authority 2007

QCA/06/2791 (Pupil pack)
QCA/06/2790 (Mark scheme pack)
275650