Sc

KEY STAGE
3

TIER
3–6

2008

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. Nadine mixed grass seeds with sand.
She put the mixture into three mesh bags to make three model heads.
She soaked two of the bags in water.

(a) The drawings below show the model heads after one week.

A **B** **C**

(i) Which **two** model heads did Nadine soak in water?
Give the letters.

_____ and _____

How can you tell this from the drawings?

_____

_____

1ai
1 mark

(ii) Nadine watered both of these models for two weeks.
She watered one more often than the other.

How would the model that was watered more often look different from the other one?

_____

_____

1aii
1 mark

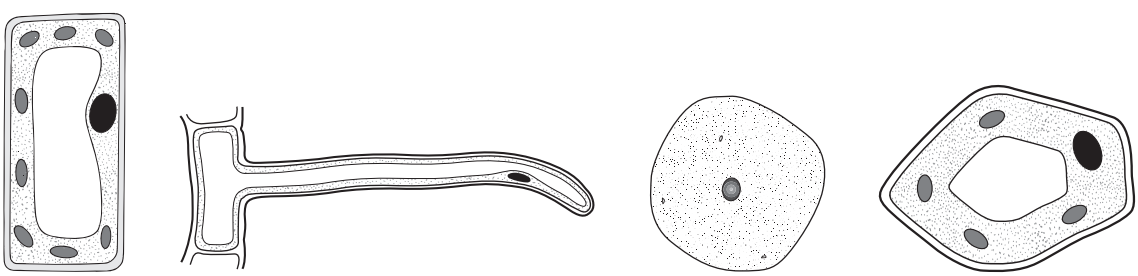
(b) Nadine put one of the watered models near a window.

Why did the grass grow towards the window?

_____

1b
1 mark

(c) (i) Grass plants have root hairs. Which diagram shows a root hair cell? Tick the correct box.



A ☐ B ☐ C ☐ D ☐

1ci
1 mark

(ii) Fill the gaps in the sentence below.

Root hairs take in _____ and

_____ from the soil.

1cii
1 mark

1cii
1 mark

maximum 6 marks

Total
6

2. (a) Drinking alcohol can cause changes in the body.

(i) Draw a line from each **change** to the **effect** on the body.
Draw only **three** lines.

change	**effect**
more blood travels to the surface of the body	reactions are slower
activity of the brain slows down	a person loses weight
sense of pain is reduced	skin gets warmer
	a person can get hurt without knowing it

2ai
1 mark

2ai
1 mark

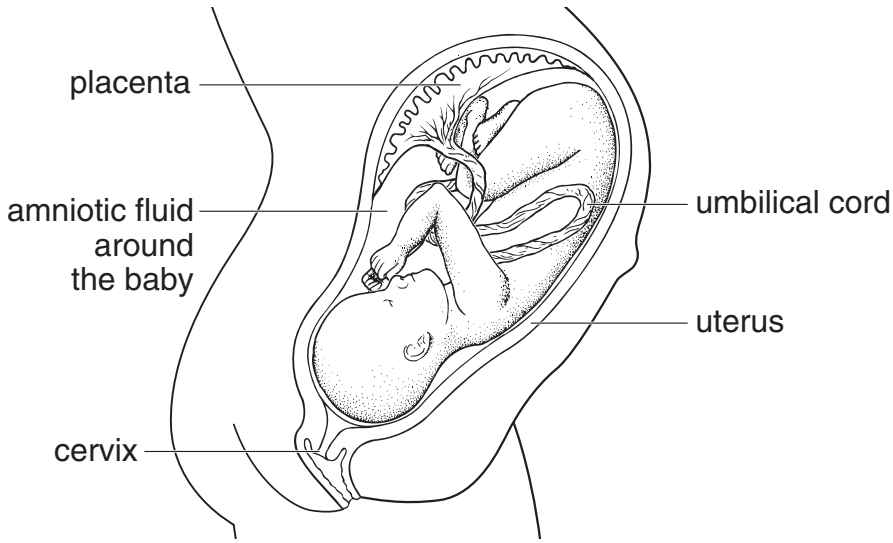
(ii) People who drink alcohol and then drive a car are likely to have accidents.

From the information above, which **effect** of drinking alcohol causes accidents?

_____

2aii
1 mark

(b) The drawing below shows a baby in its mother's uterus.



(i) Through which labelled part can alcohol pass from mother to baby?

_____

2bi
1 mark

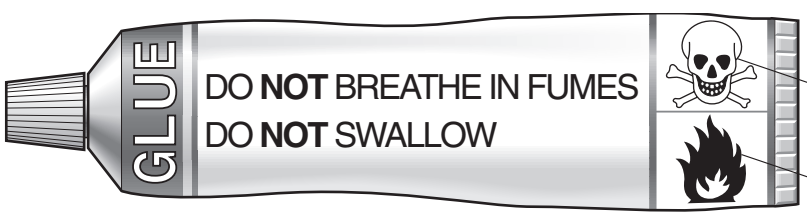
(ii) Which labelled part protects the baby from damage?

_____

2bii
1 mark

(c) (i) What do the hazard warning symbols, **A** and **B**, on this tube of glue mean?
Choose from the box below and write your answers on the lines.

corrosive	**explosive**	**flammable**	**toxic**	**radioactive**



A _____

2ci
1 mark

B _____

2ci
1 mark

(ii) The glue contains a solvent.
Why is it dangerous to breathe in the fumes from the glue?

_____

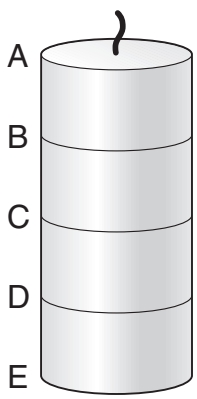
_____

2cii
1 mark

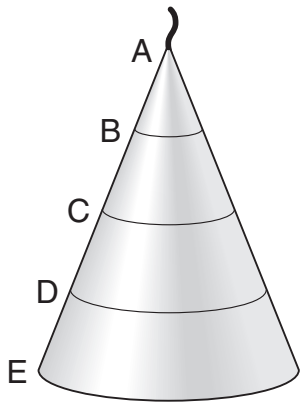
maximum 8 marks

Total
8

3. Simon made two candles from the same amount of wax.
He drew lines on both candles.



candle 1



candle 2

(a) What would Simon use to measure the **distance** between the lines?

_____

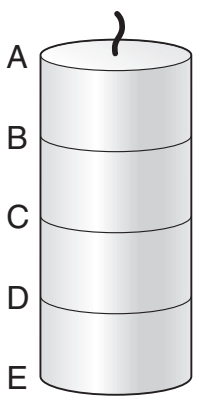
3a

1 mark

(b) He timed how long **candle 1** took to burn.
His results are shown below.

(i) How long would it take for **candle 1** to burn from C to D?
Write your answer in the table.

part that burned	time for candle 1 to burn (minutes)
A to B	30
B to C	30
C to D	
D to E	30



candle 1

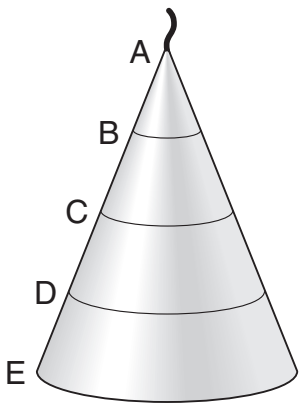
3bi

1 mark

(ii) Simon timed how long **candle 2** took to burn.

How long would it take for **candle 2** to burn from A to B **and** from D to E?
Write your answers in the table.

part that burned	time for candle 2 to burn (minutes)
A to B	
B to C	20
C to D	40
D to E	

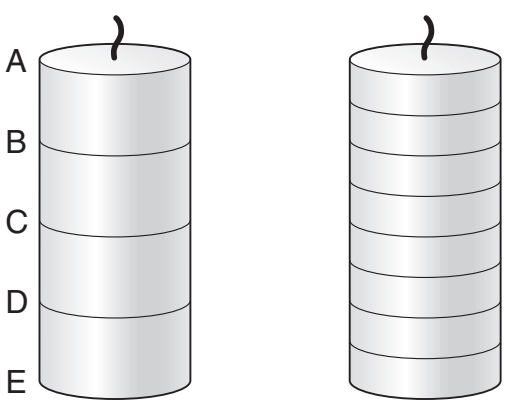


candle 2

3bii
1 mark

3bii
1 mark

(c) Simon wanted to use a candle to measure time.
He made **candle 3** the same size as **candle 1**.



candle 1 **candle 3**

Why is **candle 3** more useful than **candle 1** for measuring time?

_____

_____

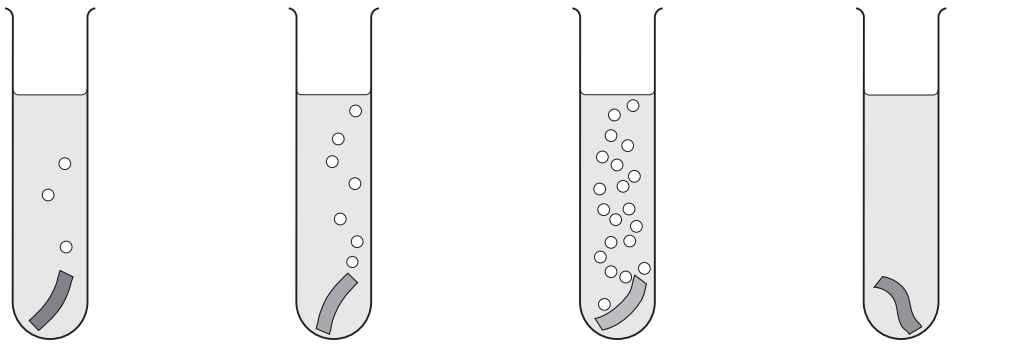
3c
1 mark

maximum 5 marks

Total
5

4. (a) Ruth put a piece of a different metal in each of four test tubes.

She poured 10 cm^3 of hydrochloric acid onto each metal.



iron + hydrochloric acid

zinc + hydrochloric acid

magnesium + hydrochloric acid

copper + hydrochloric acid

Look at the diagrams above.

(i) How do these show if a metal reacts with the acid?

_____

4ai

1 mark

(ii) **On the lines below**, put the **four** metals in the order of how strongly they react with the acid.

most reactive _____

_____

_____

least reactive _____

4aii

1 mark

(b) Choose the name of a metal from the box below to answer each question.

copper	iron	magnesium	zinc

(i) Which metal from the box is used for electrical wires?

_____

4bi

1 mark

(ii) Which metal from the box goes rusty?

_____

4bii

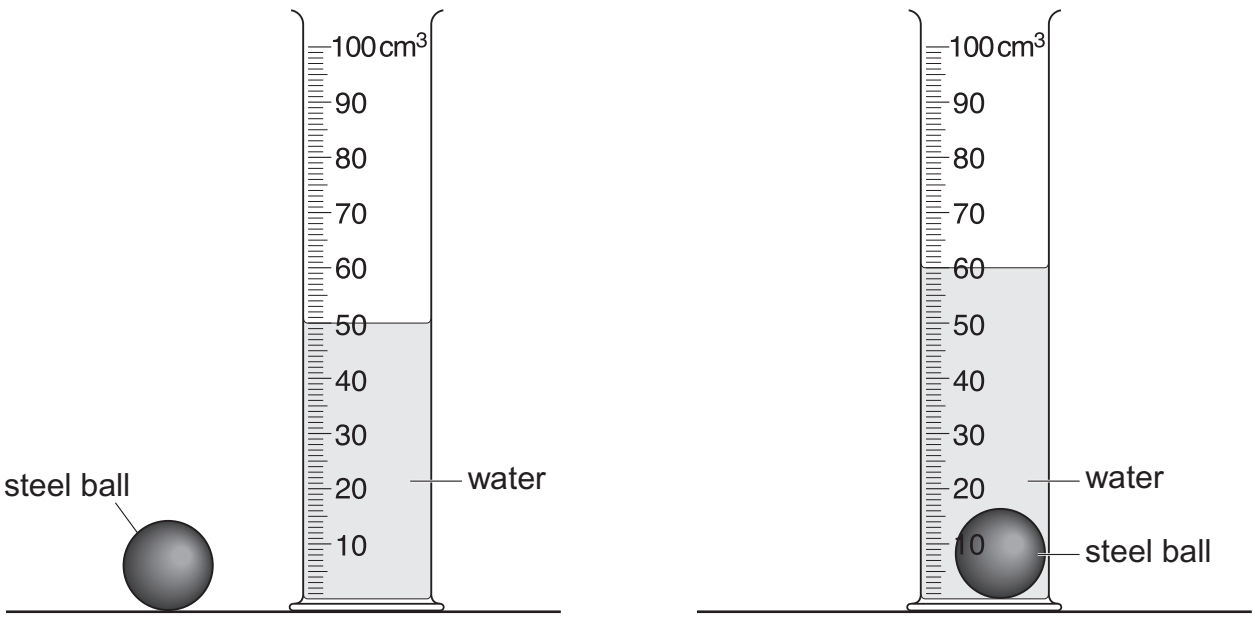
1 mark

maximum 4 marks

Total

4

5. (a) Gary poured 50 cm^3 of water into a measuring cylinder.
He then put a steel ball into the measuring cylinder.



(i) What is the new reading on the measuring cylinder?

_____ cm^3

5ai

1 mark

(ii) What is the volume of the steel ball?

_____ cm^3

5aii

1 mark

(b) The table below shows the mass and volume of four objects.

object	mass (g)	volume (cm^3)
aluminium figure	230	85
lead weight	800	70
steel block	200	25
wood puzzle	400	500

(i) Which object is the heaviest? _____

5bi
1 mark

(ii) Which object takes up the most space? _____

5bii
1 mark

(c) The frame of a bike is made of aluminium.

(i) Give **one** reason why aluminium is a suitable material for the frame.

_____

_____

5ci
1 mark

(ii) A force between the tyres and the road stops the bike skidding.

What is the name of this force?

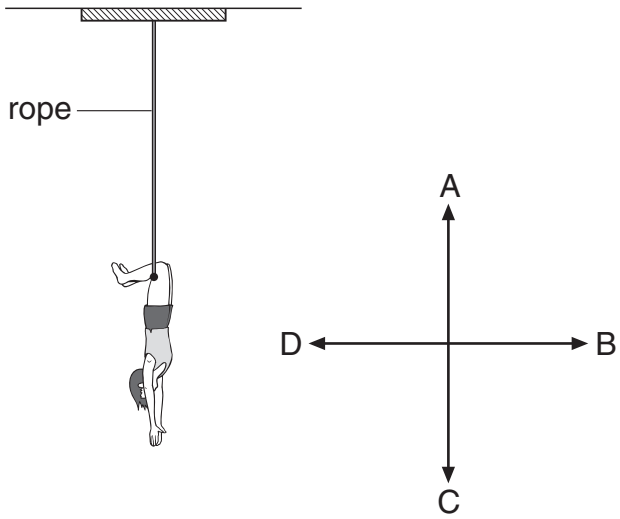
_____

5cii
1 mark

maximum 6 marks

Total
6

6. The diagram below shows Jo hanging on a trapeze (swing) in a circus.



(a) (i) Which arrow, A, B, C or D, shows the direction of Jo's weight?

6ai

1 mark

_____

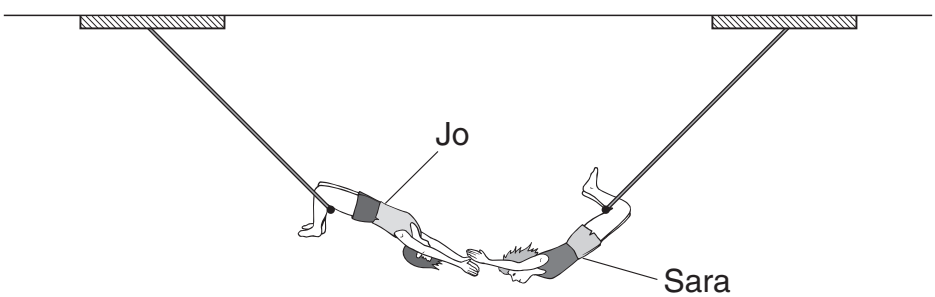
(ii) Which arrow, A, B, C or D, shows the direction of the force of the rope on Jo?

6aii

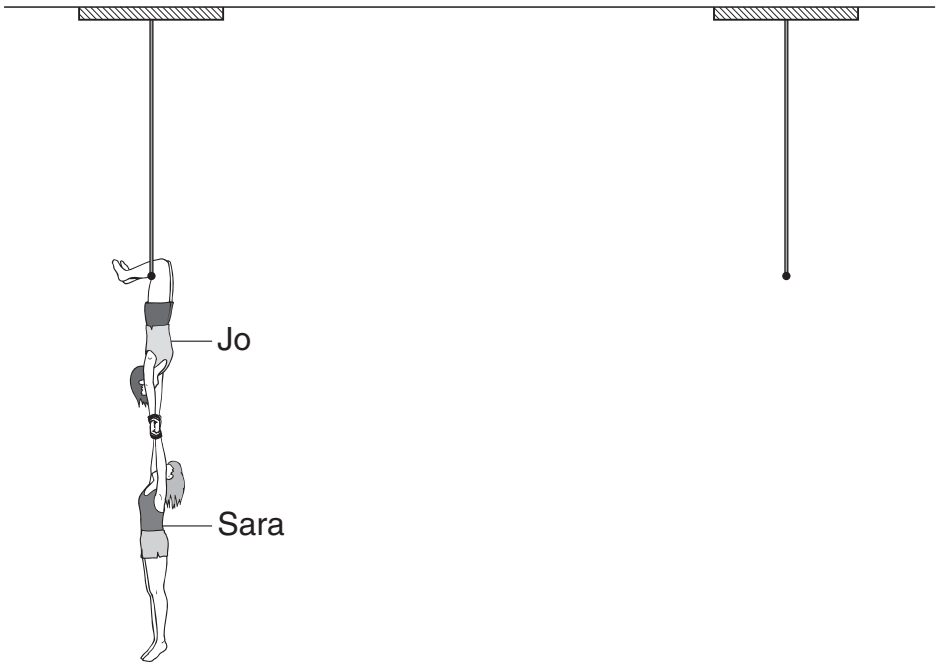
1 mark

_____

(b) Sara swings towards Jo.



Sara lets go of her trapeze and Jo catches her.



(i) What happens to the downward force on the rope of Jo's trapeze?
Tick the correct box.

increases	decreases	stays the same	there is **no** force
☐	☐	☐	☐

6bi
1 mark

(ii) Explain your answer.

_____

6bii
1 mark

(c) Jo lets go of the trapeze and both Sara and Jo fall into a safety net below them.

What happens to the downward force on the rope when Jo lets go?

_____

6c
1 mark

maximum 5 marks

Total
5

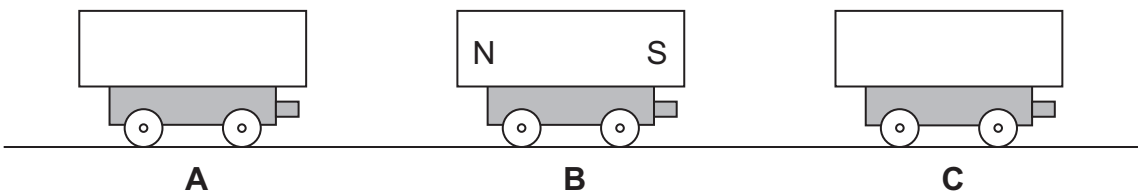
7. The diagram below shows three trolleys.
Peter put a bar magnet on each trolley.

(a) He pushed trolleys A, B and C together.

- Magnet B **attracted** magnet A.
- Magnet B **repelled** magnet C.

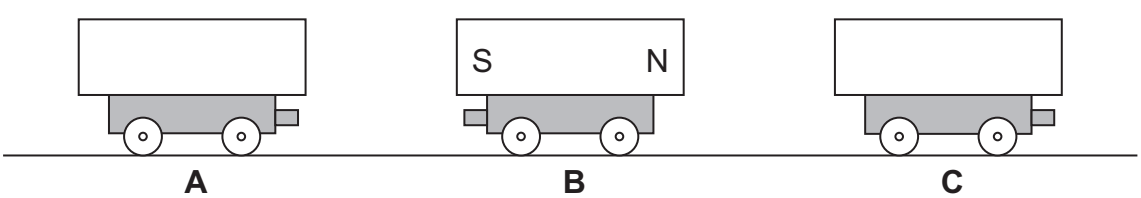
7a
1 mark

7a
1 mark



On the diagram above, label the north and south poles of magnets A and C.
Use the letters N and S.

(b) Peter turned trolley B around. Trolleys A and C were **not** turned around.



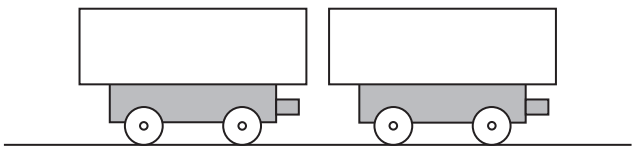
What would happen now when Peter pushed them all together?
Use either **attract** or **repel** to complete each sentence below.

Magnet B would _____ magnet A.

Magnet B would _____ magnet C.

7b
1 mark

(c) Peter held two trolleys close together and then let go.



The magnets repelled each other.

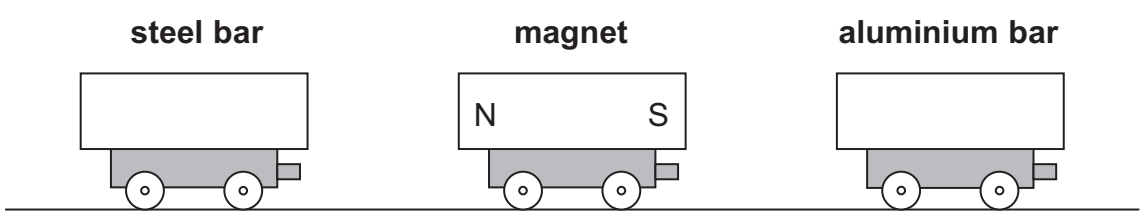
Draw an arrow on both magnets to show which way they would move.

7c

1 mark

(d) Peter took a magnet, a steel bar and an aluminium bar.

He put them on three trolleys as shown below.



(i) What happens to the steel bar as he moves it closer to the magnet?

_____

7di

1 mark

(ii) What happens to the aluminium bar as he moves it closer to the magnet?

_____

7dii

1 mark

maximum 6 marks

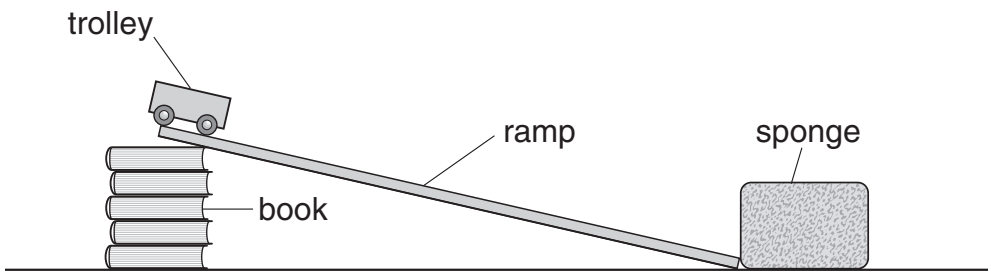
Total

6

8. Yasmin investigated the stopping distance of a trolley.

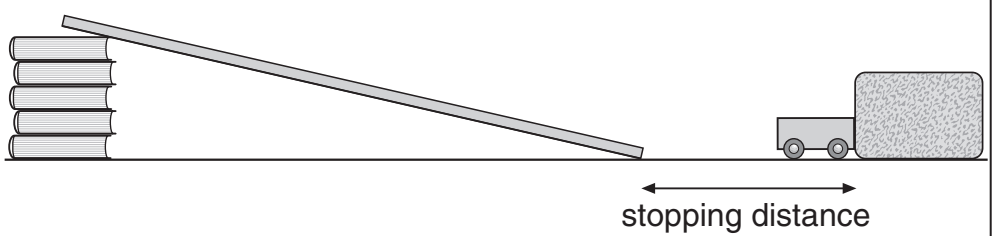
She let go of the trolley.

It hit a sponge at the bottom of the ramp.



She measured how far the sponge moved.

This is the stopping distance.



(a) Yasmin did the investigation five times.
She changed the steepness of the ramp each time.

(i) How could she make this ramp steeper?

_____

_____

8ai

1 mark

(ii) Yasmin's results are shown in the table.

steepness of ramp	stopping distance (cm)
A	10
B	16
C	16
D	28
E	34

She predicted, 'The steeper the ramp, the greater the stopping distance'.
If Yasmin was correct, which ramp was the steepest? Write the letter.

_____

8aii

1 mark

(iii) Yasmin looked at her results and decided she should repeat her investigation.
Look at Yasmin's results.

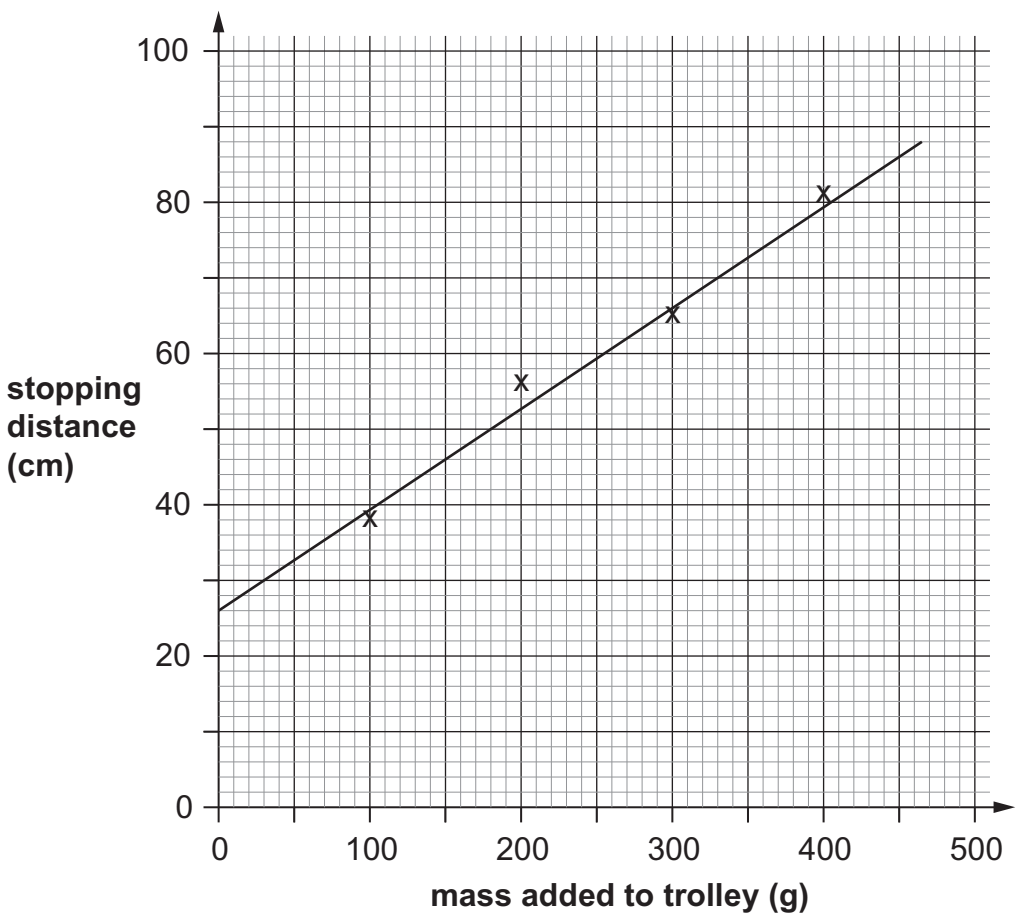
Suggest why she decided to repeat her investigation.

_____

8aiii

1 mark

(b) Yasmin then investigated the stopping distance of a trolley with different masses on it.
The graph shows her results.



(i) What would be the stopping distance if 0 g were on the trolley?

_____ cm

8bi

1 mark

(ii) Complete the sentence with **decreases**, **increases** or **stays the same**.

As the mass added to the trolley increases,

the stopping distance _____ .

8bii

1 mark

maximum 5 marks

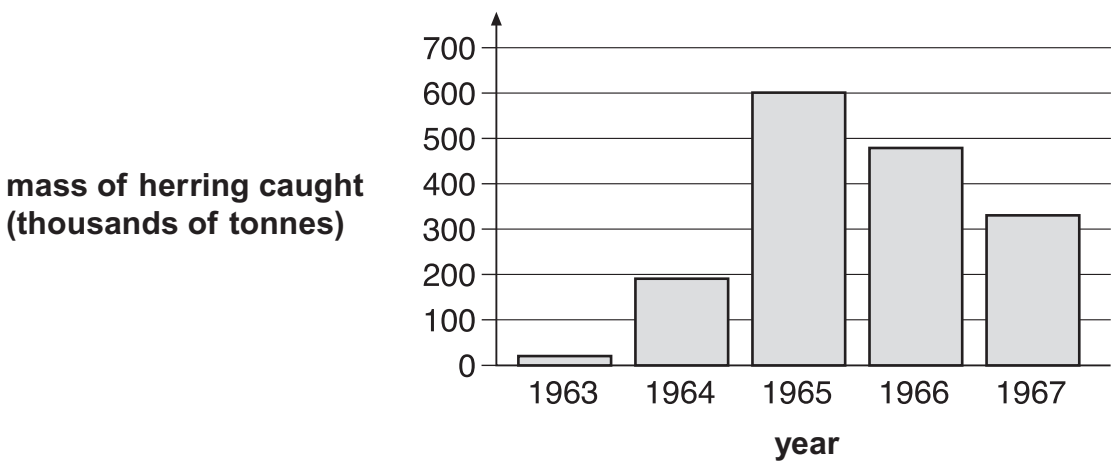
Total

5

9. The table below shows the number of boats used for catching herring fish in the Norwegian Sea between 1963 and 1967.

year	number of fishing boats
1963	16
1965	284
1967	326

The bar chart below shows the total mass of herring caught in the Norwegian Sea between 1963 and 1967.



Use the information above to help you answer parts (a) (i), (ii) and (iii).

(a) (i) Why did the mass of herring caught increase between 1963 and 1965?

9ai

1 mark

(ii) Suggest why the mass of herring caught decreased between 1965 and 1967.

9aii

1 mark

(iii) Herring **cannot** breed until they are four years old.
Fishing for herring was banned in the Norwegian Sea from 1972 to 1976.
Suggest **one** reason why fishing for herring was banned **for this period**.

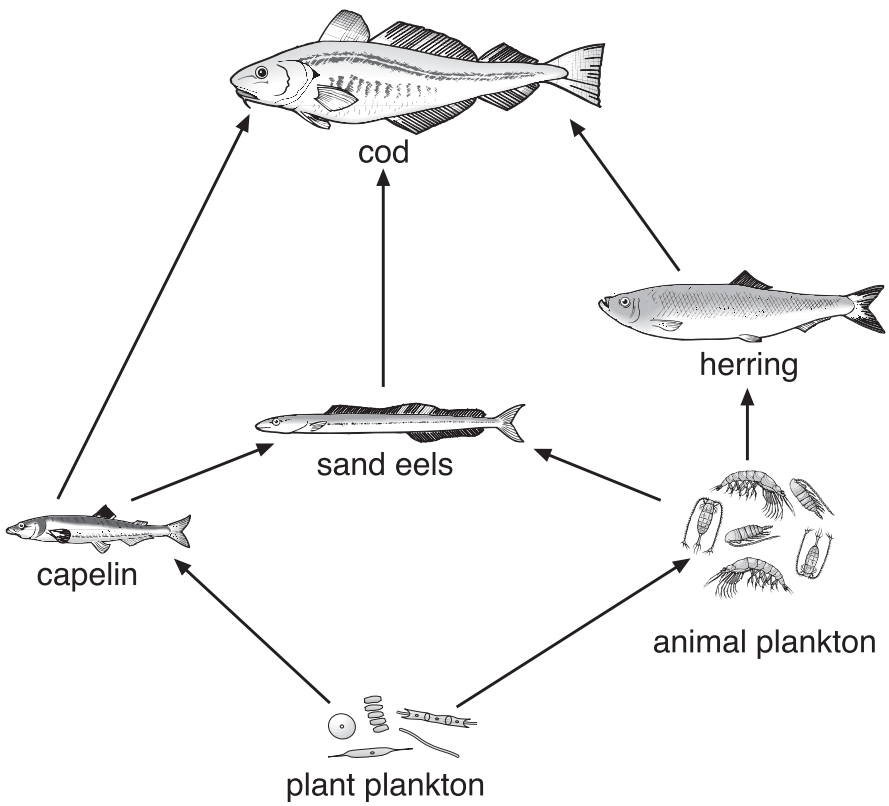
_____

_____

9aiii

1 mark

(b) The diagram below shows a food web in the Norwegian Sea.



not to scale

(i) How could a decrease in the number of herring cause a **decrease** in the number of sand eels?

_____

_____

9bi

1 mark

(ii) How could a decrease in the number of herring cause an **increase** in the number of sand eels?

_____

_____

9bii

1 mark

maximum 5 marks

Total

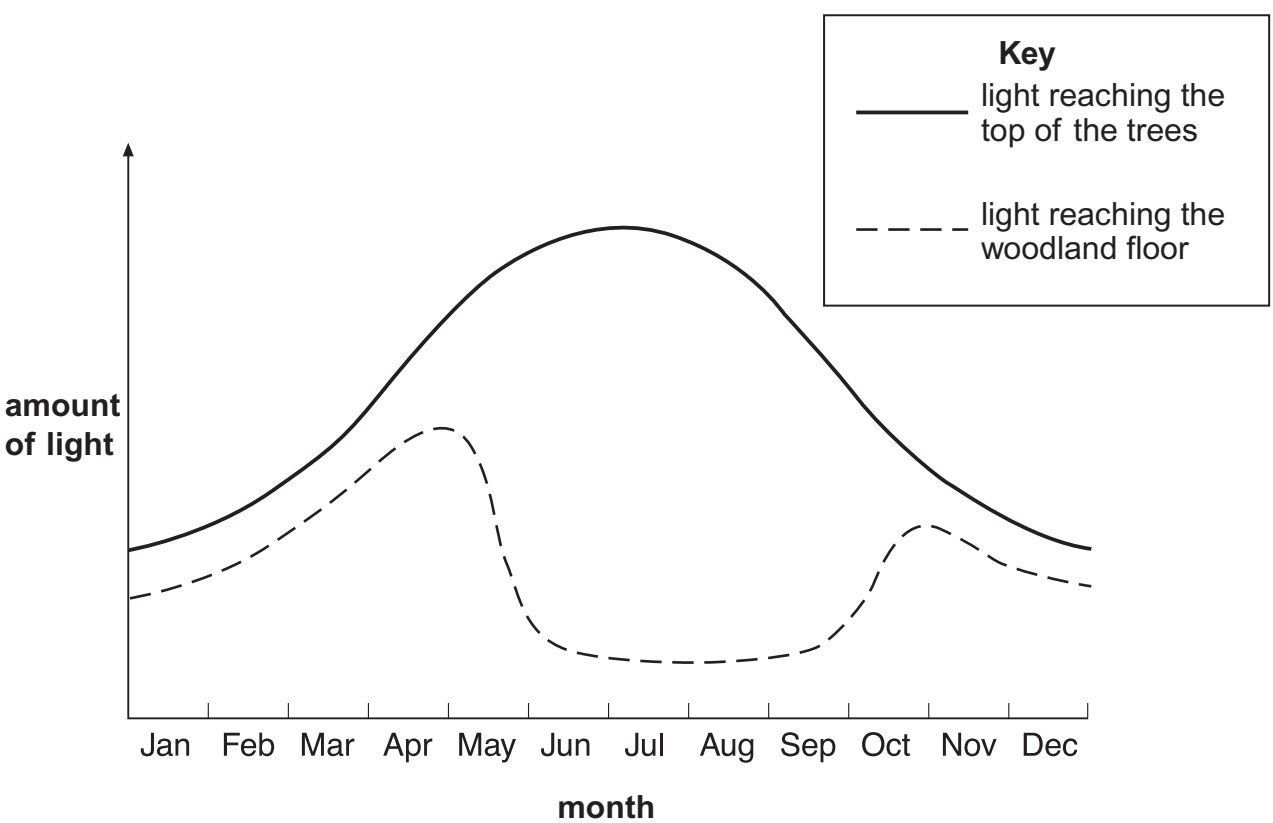
5

10. The drawings below show the trees in a woodland area at the beginning of May and at the end of May.

beginning of May

end of May

The graph below shows the amount of light reaching the top of the trees and the woodland floor over one year.



(a) Why does the amount of light reaching the woodland floor decrease during May?

_____

_____

10a

1 mark

(b) Plants grow on the woodland floor.

Explain why these plants grow bigger **and** faster when there is plenty of light.

_____

_____

_____

_____

10b

1 mark

10b

1 mark

(c) **Respiration** takes place in the cells of all plants.

Complete the word equation for **respiration**.

oxygen + _____ ⟶ carbon dioxide + _____

10c

1 mark

10c

1 mark

maximum 5 marks

Total

5

11. (a) The average life span of a lion in a zoo is 22 years.
The average life span of a lion in the wild is 17 years.

Suggest **two** reasons why lions live longer in a zoo than in the wild.

1. _____

2. _____

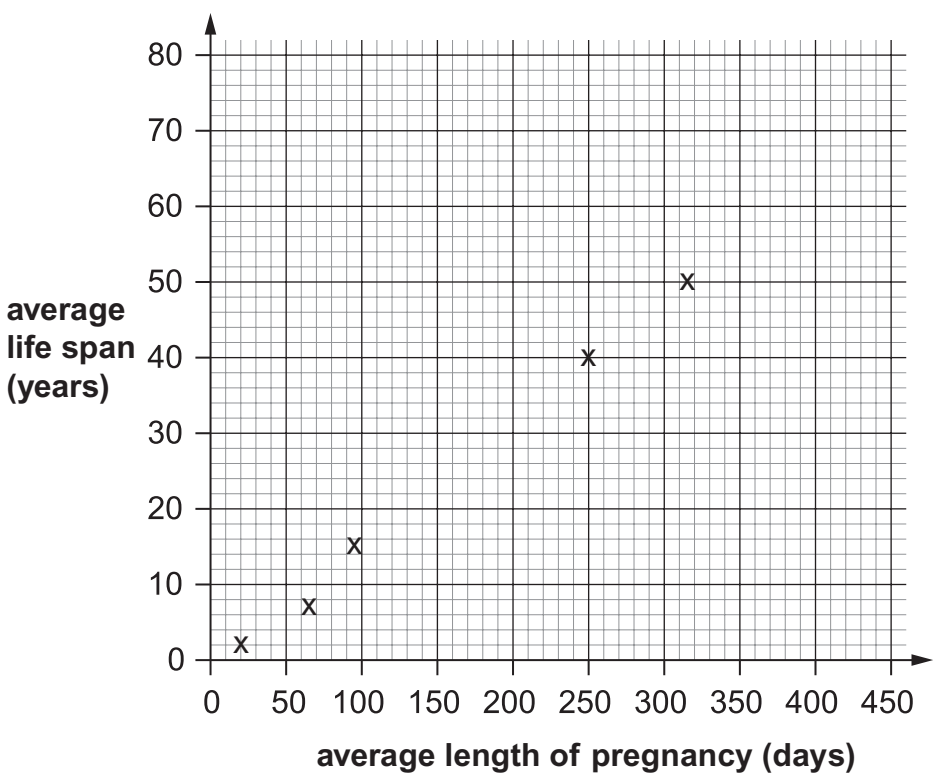
11a

1 mark

(b) John found the following data about five mammals.

mammal	average length of pregnancy (days)	average life span (years)
mouse	20	2
guinea pig	65	7
leopard	96	15
chimpanzee	250	40
whale	315	50

He plotted points using data from the table.



(i) Using the points John plotted, draw a line of best fit.

11bi

1 mark

(ii) From the graph, describe the relationship between the average length of pregnancy and the average life span.

11bii

1 mark

(c) John found data about three other mammals.

mammal	average length of pregnancy (days)	average life span (years)
human	266	72
horse	340	25
giraffe	440	17

(i) Plot these **three** points on the graph on the opposite page.

11ci

1 mark

(ii) Do these points fit the relationship you described in part (b) (ii)? Tick the correct box.

11ci

1 mark

yes ☐ no ☐

Use the graph to give a reason for your answer.

11cii

1 mark

maximum 6 marks

Total

6

12. (a) The table below shows the melting points and boiling points of four elements.

element	melting point (°C)	boiling point (°C)
aluminium	660	2520
iron	1540	2760
magnesium	650	1100
mercury	–39	357

When answering the questions below, you may give the name of an element more than once.

Which element in the table is:

(i) a liquid at 0°C?

_____

12ai

1 mark

(ii) a solid at 1500°C?

_____

12aii

1 mark

(iii) a gas at 500°C?

_____

12aiii

1 mark

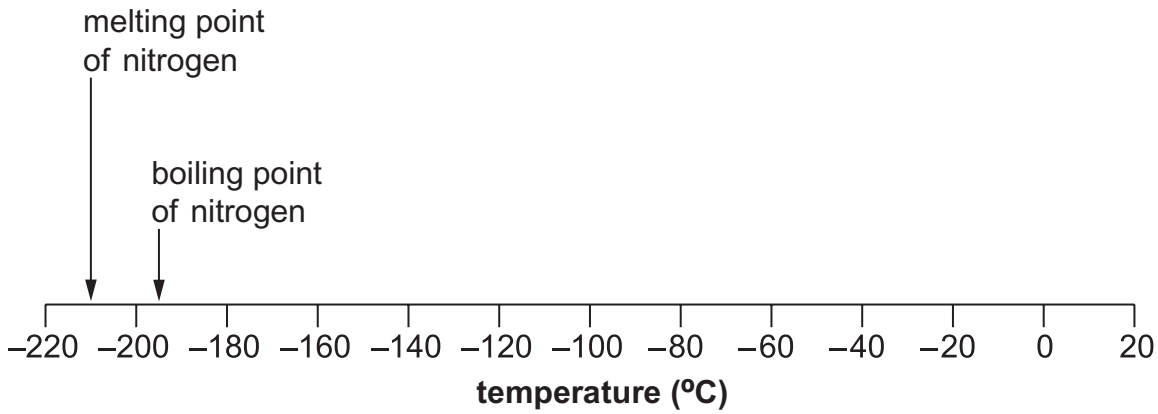
(iv) a liquid over the biggest temperature range?

_____

12aiv

1 mark

(b) The melting point and boiling point of nitrogen are marked on the scale below.



(i) **Draw an arrow** on the scale above to show the temperature at which water freezes.

12bi
1 mark

(ii) When water is a liquid, what is the physical state of nitrogen?
Tick the correct box.

solid ☐ liquid ☐ gas ☐

12bii
1 mark

(iii) What is the physical state of nitrogen at –200°C?
Tick the correct box.

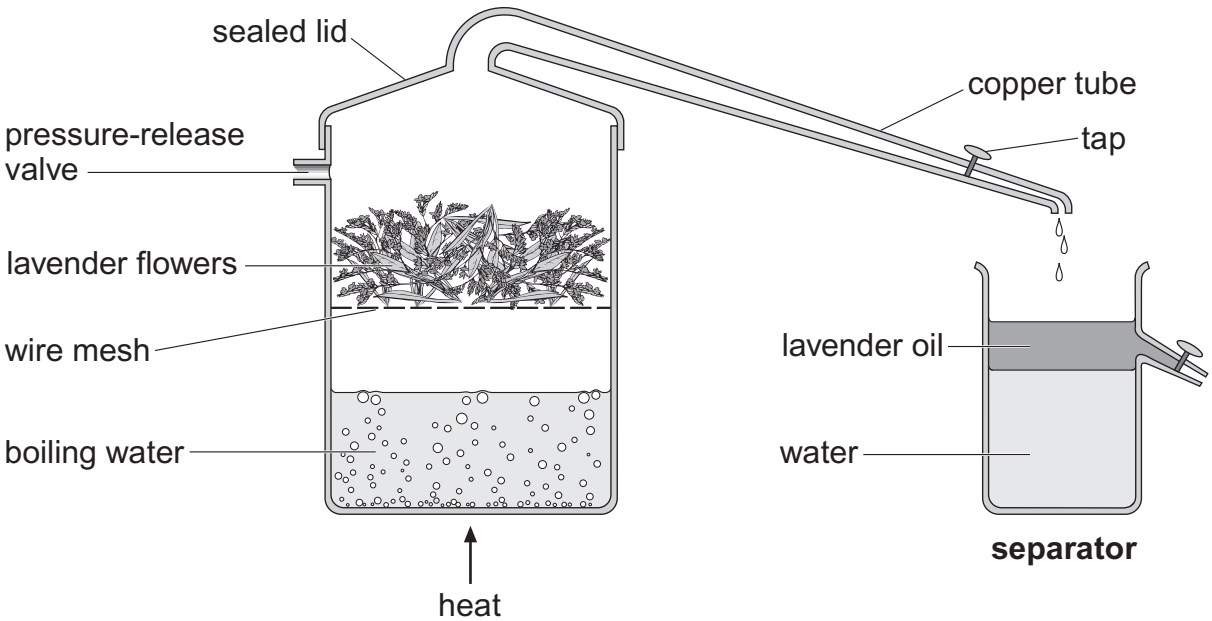
solid ☐ liquid ☐ gas ☐

12biii
1 mark

maximum 7 marks

Total
7

13. Lavender oil is a perfume obtained from lavender flowers.
Steam at 100°C is passed through the flowers in the apparatus below.



not to scale

Water vapour and lavender oil vapour pass down a copper tube towards a separator.

(a) (i) The lavender flowers are heated in a container with a sealed lid.

Why must the lid be sealed?

_____

_____

13ai

1 mark

(ii) What would happen if the container did **not** have a pressure-release valve?

_____

_____

13aii

1 mark

(b) Lavender oil vapour and water vapour cool as they pass down the copper tube.
A mixture of lavender oil and water collects in the separator.

(i) What is the change in the physical state of both lavender oil vapour and water vapour as they cool?

from _____ to _____

13bi
1 mark

(ii) Look at the separator.

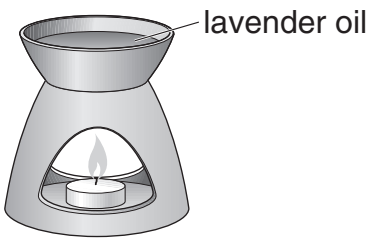
How does this show that the water is denser than lavender oil?

_____

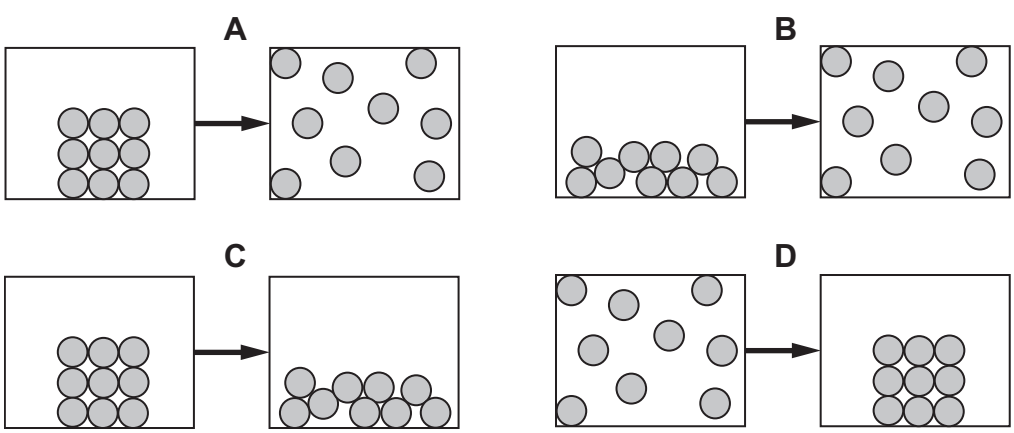
_____

13bii
1 mark

(c) Rosie poured some lavender oil into an oil burner.
She heated it with a candle.



The oil changed state.



Which diagram represents this change of state?
Write the letter.

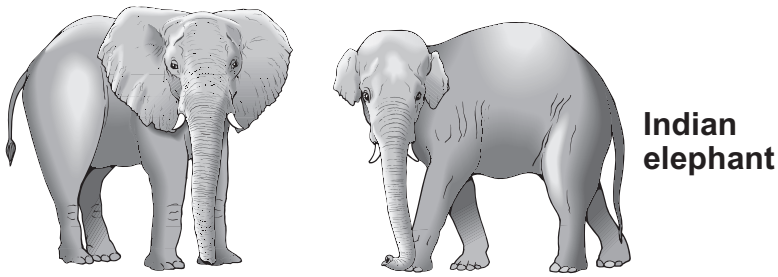
_____

13c
1 mark

maximum 5 marks

Total
5

14. (a) Elephants keep cool by losing heat from their ears.



Predict which elephant can lose more heat from its ears.

_____ elephant

Give the reason for your answer.

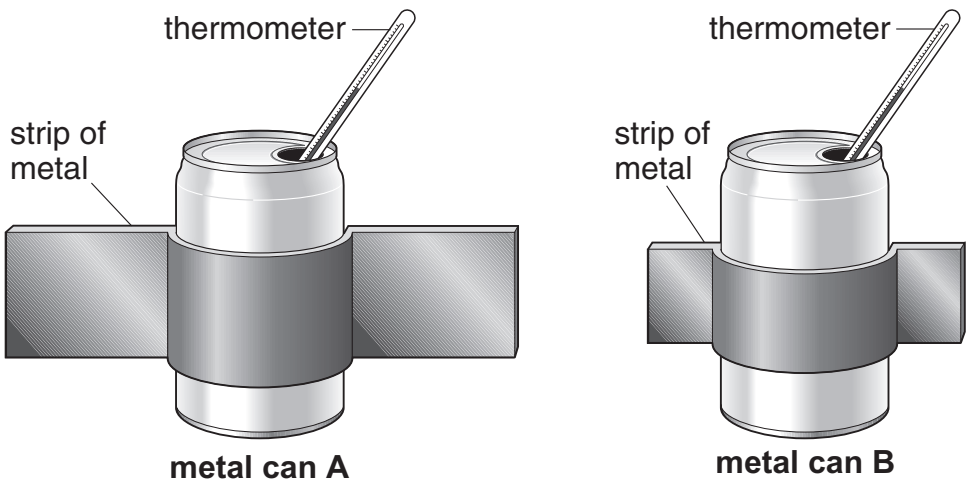
_____

_____

14a

1 mark

(b) Ben filled two identical cans with 250 cm^3 of hot water.
He wrapped strips of metal around them to model the elephants' ears.



metal can A **metal can B**

He recorded the temperature of the water in each can every 5 minutes.
The table shows his results.

time (minutes)	temperature (°C)	
	can A	can B
0	60	60
5	54	57
10	50	54
15	46	52
20	43	50

(i) Ben started with water at the same temperature in both cans.
Give **one** other way he made his test fair.

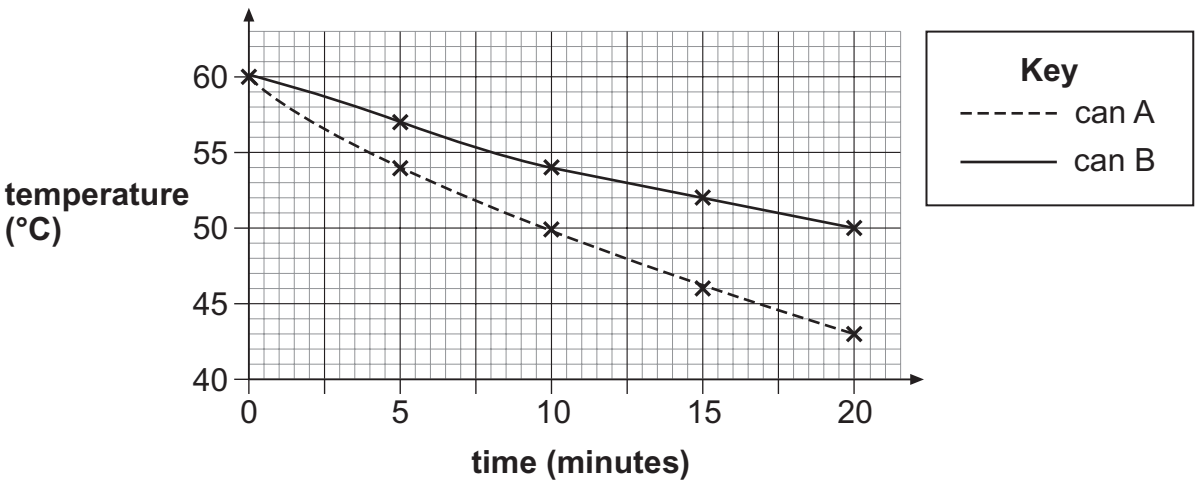
_____

_____

14bi

1 mark

(ii) He plotted the results for **can A** and **can B** and drew lines of best fit.



Why is it more useful to present these results in a graph rather than a table?

_____

_____

14bii

1 mark

(iii) The water in **can A** cooled more quickly than the water in **can B**.
Does this support your prediction in part (a)?
Tick the correct box.

yes ☐ no ☐

Explain your answer.

_____

_____

14biii

1 mark

(c) Ben repeated the investigation. Instead of a thermometer he used a temperature sensor and a data logger.
Give **one** advantage of this.

_____

_____

maximum 5 marks

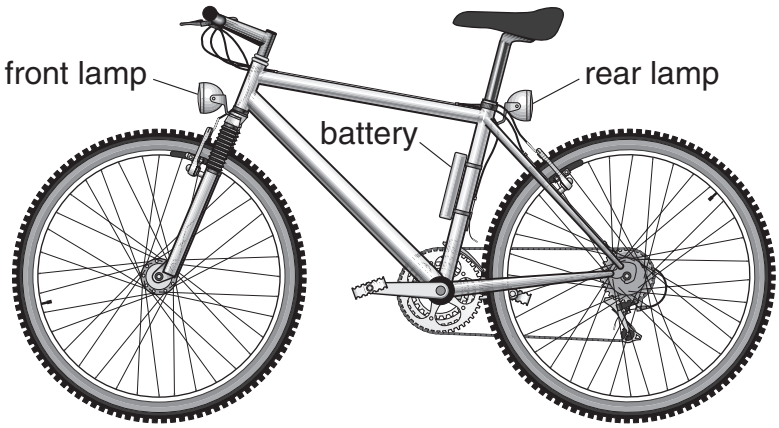
14c

1 mark

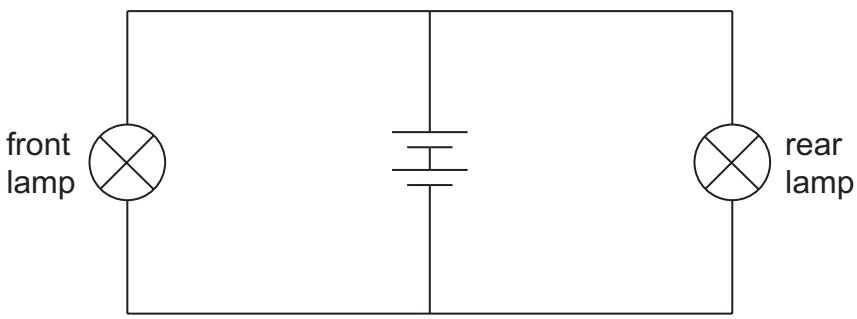
Total

5

15. Nina's bicycle has a front lamp and a rear lamp.
Both lamps are connected to the same battery.



(a) The circuit diagram for the lamps is drawn below.



(i) **On the circuit diagram above**, place a letter **A** to show the position of a switch to turn **only** the front lamp on and off.

15ai

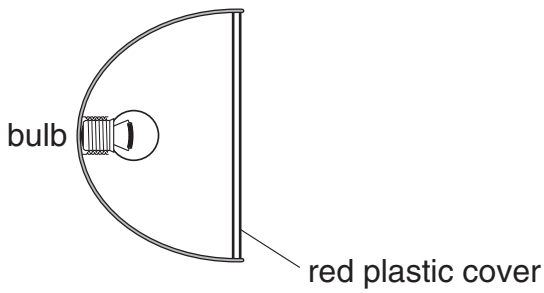
1 mark

(ii) **On the circuit diagram above**, place a letter **B** to show the position of a switch to turn **both** lamps on and off at the same time.

15aii

1 mark

(b) The bulb in the rear lamp gives out white light.
White light is a mixture of all the colours of light.



The plastic cover acts as a red filter.
Red light passes through the filter.

What happens to the other colours that do **not** pass through?

_____

15b
1 mark

(c) Nina replaces the battery with a generator called a dynamo.
When Nina pedals her bicycle, the back wheel turns the generator.

Complete the sentences below using words from the box.

chemical	**electrical**	**gravitational**
kinetic	**light**	**sound**	**thermal**

As Nina pedals, _____ energy in her muscles is

changed to kinetic energy.

15c
1 mark

When the generator turns, kinetic energy is changed to useful

_____ energy in the wires. This energy in the wires is

15c
1 mark

changed to useful _____ energy in the bulb.

15c
1 mark

When the lamps are on, some of the energy in the bulb is wasted as

_____ energy.

15c
1 mark

maximum 7 marks

Total
7

16. The table shows information about three planets in our solar system.

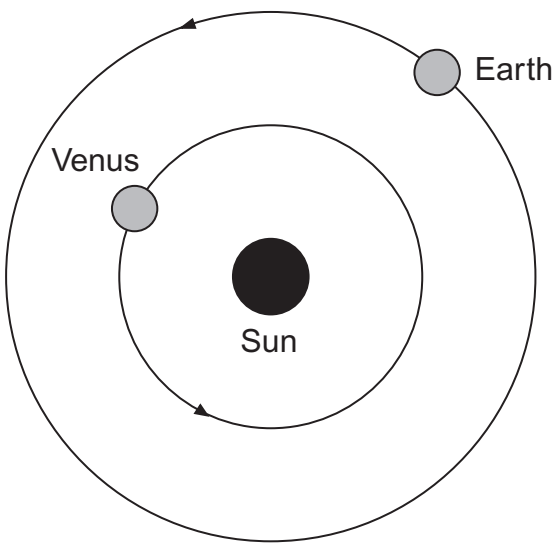
planet	time taken to orbit the Sun (Earth-years)
Mars	2.0
Venus	0.6
Earth	1.0

(a) Give **one** reason why Venus takes less time than Earth to orbit the Sun.

16a

1 mark

(b) The diagram below shows the orbits of Venus and Earth.
The Sun is a source of light. Venus does **not** produce its own light.



not to scale

16b

1 mark

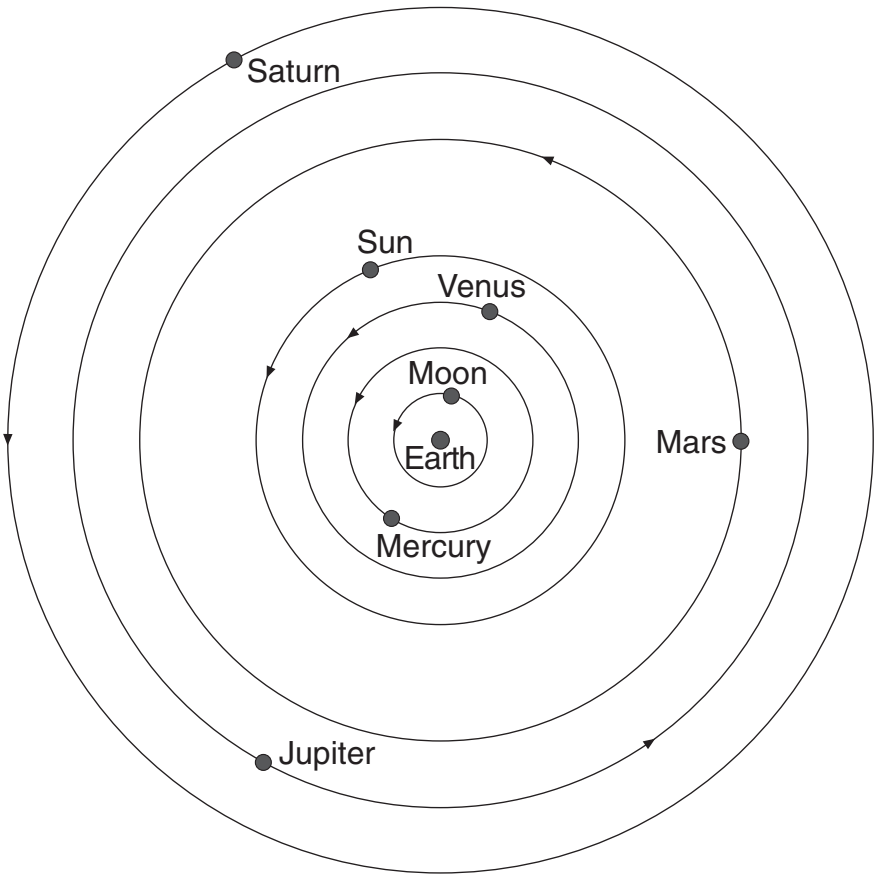
On the diagram above, draw rays of light to show how Venus can be seen from Earth. Use a ruler.

16b

1 mark

Draw an arrow **on each** ray to show the direction of light.

(c) The diagram below shows how the astronomer Ptolemy drew the solar system 2000 years ago.



not to scale

(i) The planets Uranus and Neptune are missing from his diagram.

Suggest why Ptolemy did **not** include these planets in his diagram.

_____

_____

16ci

1 mark

(ii) Today we know the correct arrangement of the planets in our solar system.

Give **one** way the diagram above is incorrect.
Complete the sentence below.

In the correct arrangement _____

_____

16cii

1 mark

maximum 5 marks

Total

5

END OF TEST

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QCA/08/3298 (Mark scheme pack)
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