

Sc

KEY STAGE

3

TIER

3–6

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	
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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?

- (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?



1ai

1 mark



1aii

1 mark

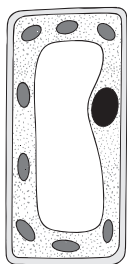
- (b) Nadine put one of the watered models near a window.



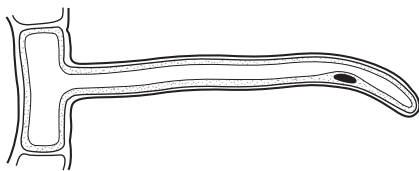
Why did the grass grow towards the window?

☐ 1b
1 mark

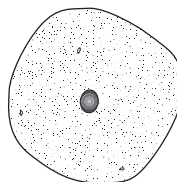
- (c) (i) Grass plants have root hairs. Which diagram shows a root hair cell?
Tick the correct box.



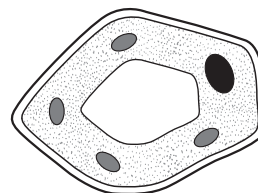
A

☐


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

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

- (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?



2ai

1 mark



2ai

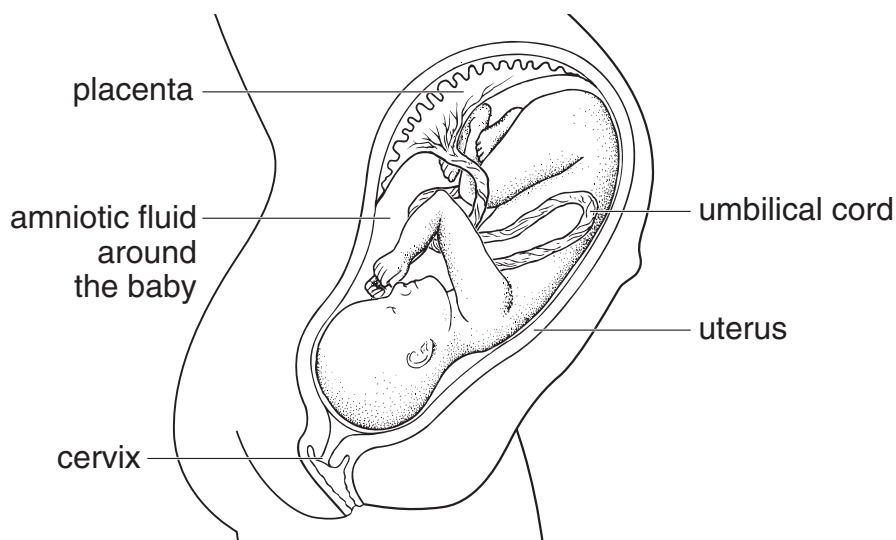
1 mark



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?

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

- (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



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

maximum 8 marks

1 mark

1 mark

1 mark

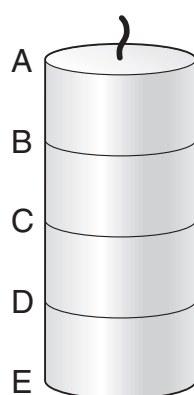
1 mark

1 mark

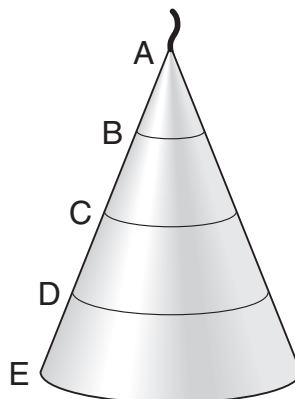
Total

8

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



candle 1



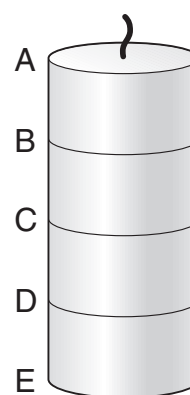
candle 2

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

- (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

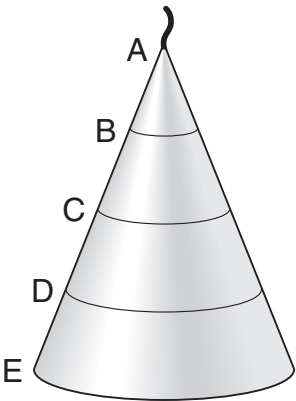


candle 1

(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	

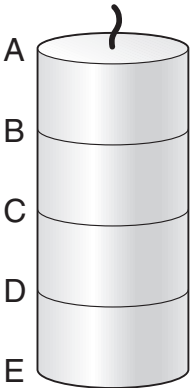


candle 2

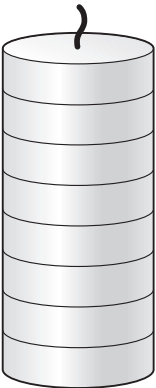
3bii
1 mark

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

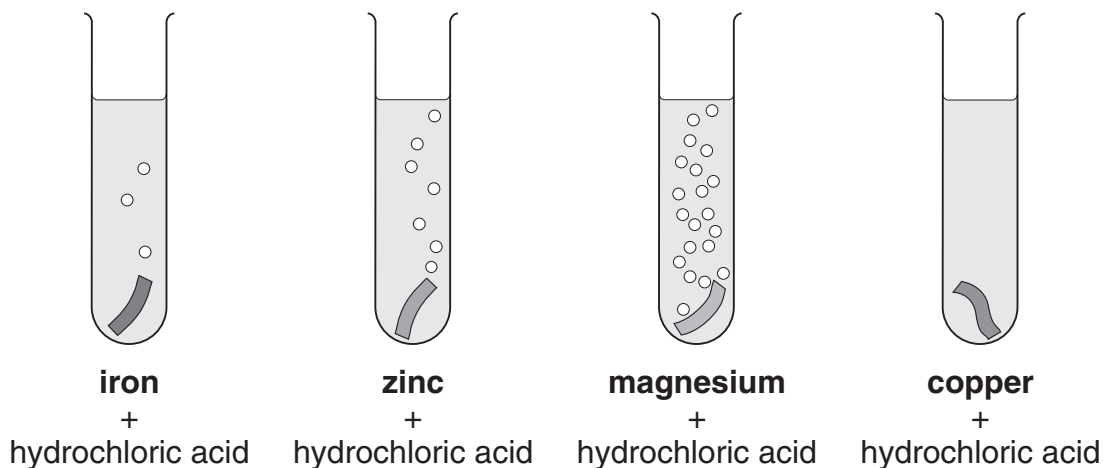
Why is **candle 3** more useful than **candle 1** for measuring time?

3c
1 mark

maximum 5 marks

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

She poured 10 cm³ of hydrochloric acid onto each metal.



Look at the diagrams above.

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

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

most reactive _____

least reactive _____



4ai

1 mark



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?

(ii) Which metal from the box goes rusty?

☐

4bi

1 mark

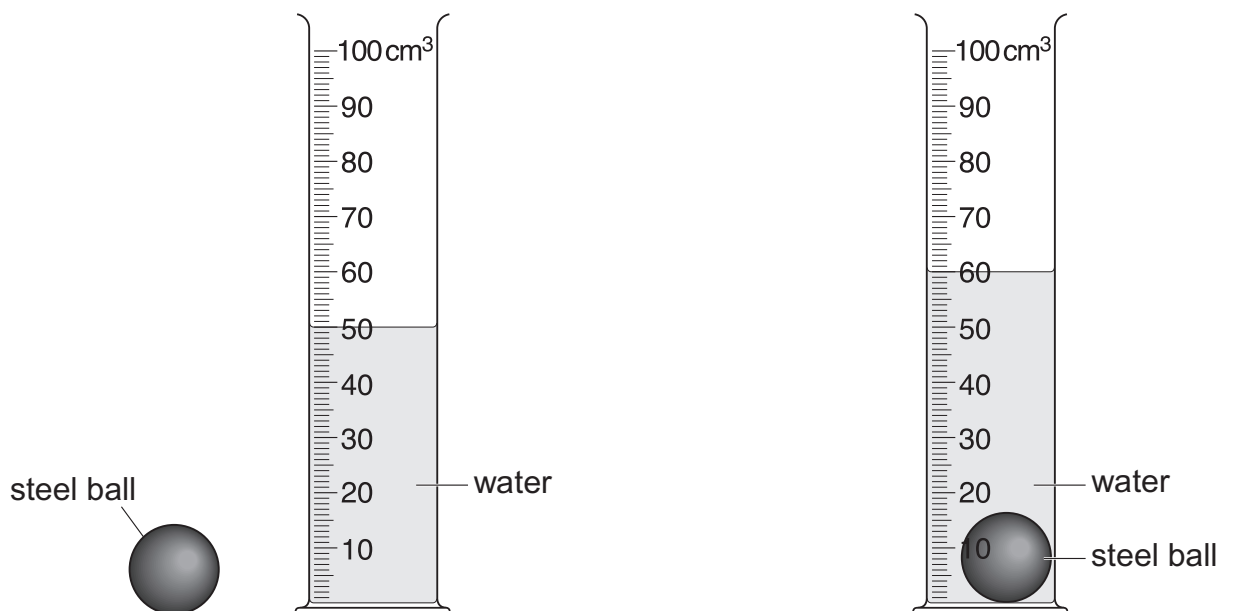
☐

4bii

1 mark

maximum 4 marks

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

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

_____ cm^3

5ai
1 mark

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? _____

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

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



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

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

What is the name of this force?

5bi
1 mark

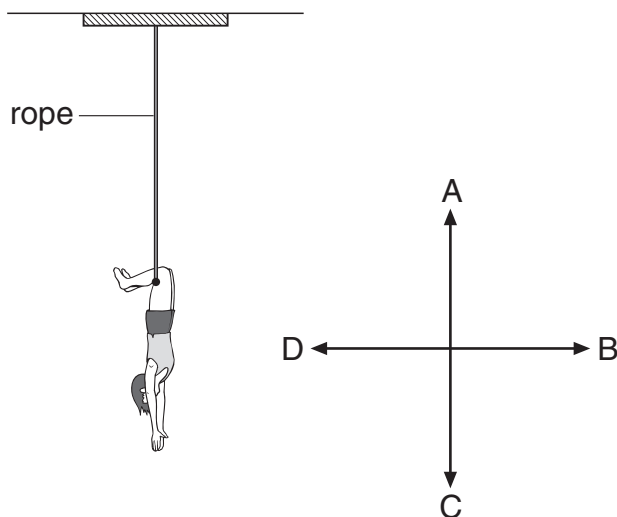
5bii
1 mark

5ci
1 mark

5cii
1 mark

maximum 6 marks

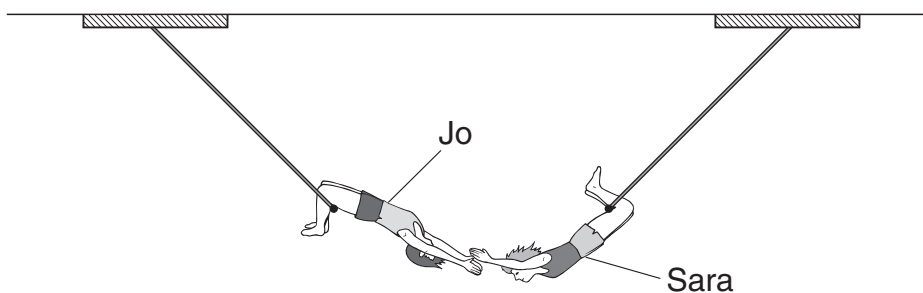
6. The diagram below shows Jo hanging on a trapeze (swing) in a circus.



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

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

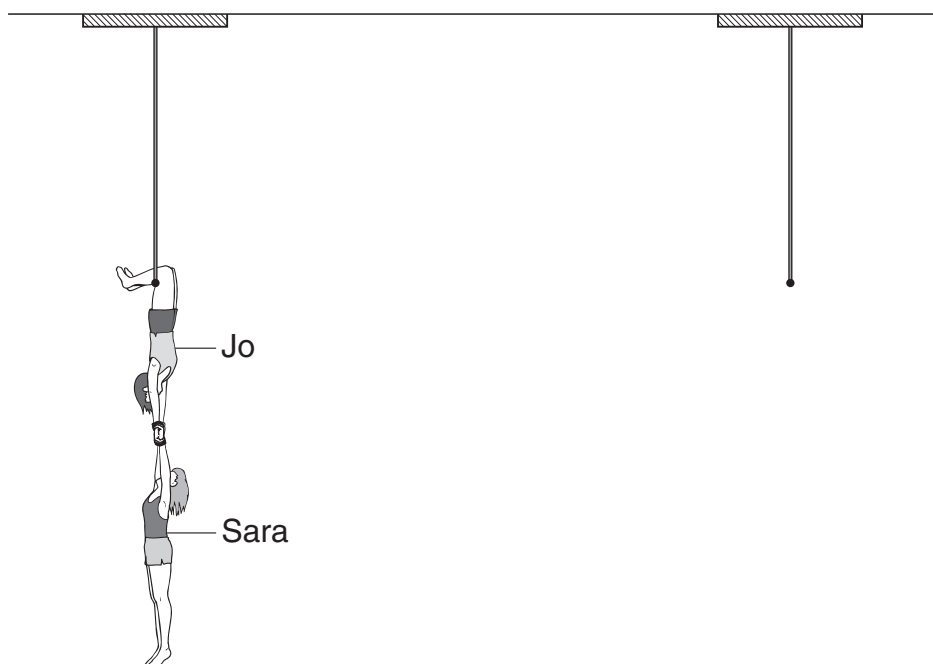
- (b) Sara swings towards Jo.



6ai
1 mark

6aii
1 mark

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

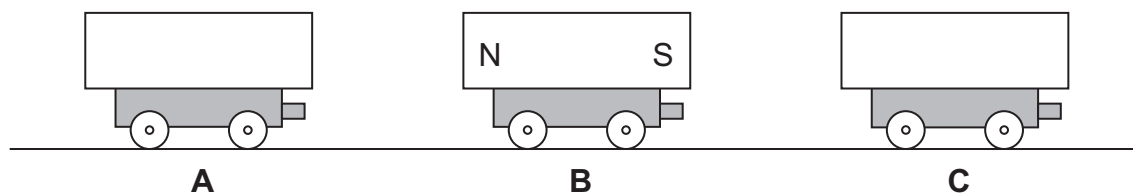
1 mark

maximum 5 marks

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

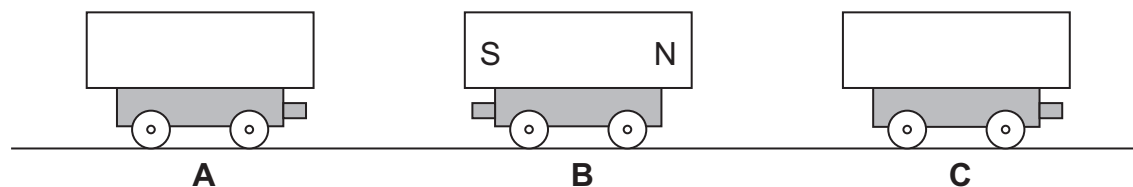
(a) He pushed trolleys A, B and C together.

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



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.

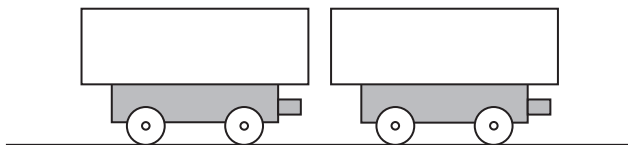


What would happen now when Peter pushed them all together?
Use either **attract** or **repel** to complete each sentence below.

Magnet B would _____ magnet A.

Magnet B would _____ magnet C.

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



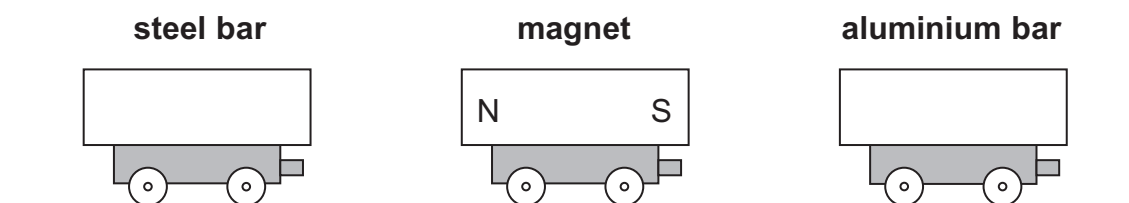
The magnets repelled each other.

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

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?

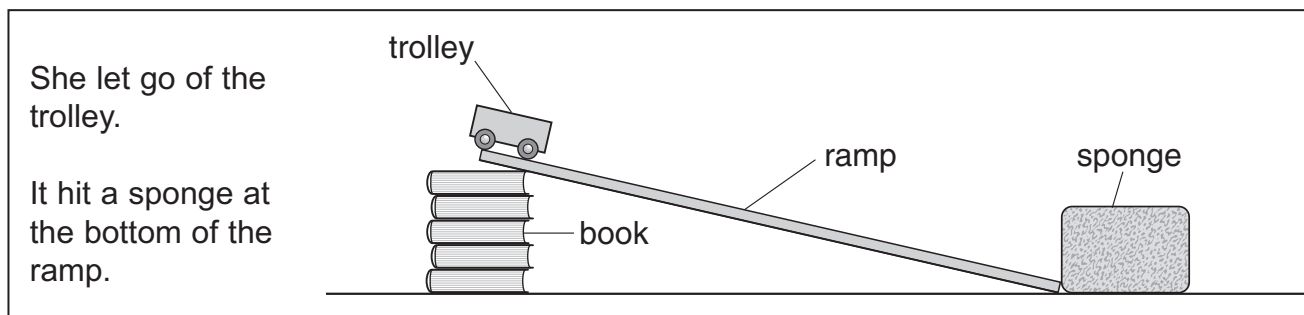
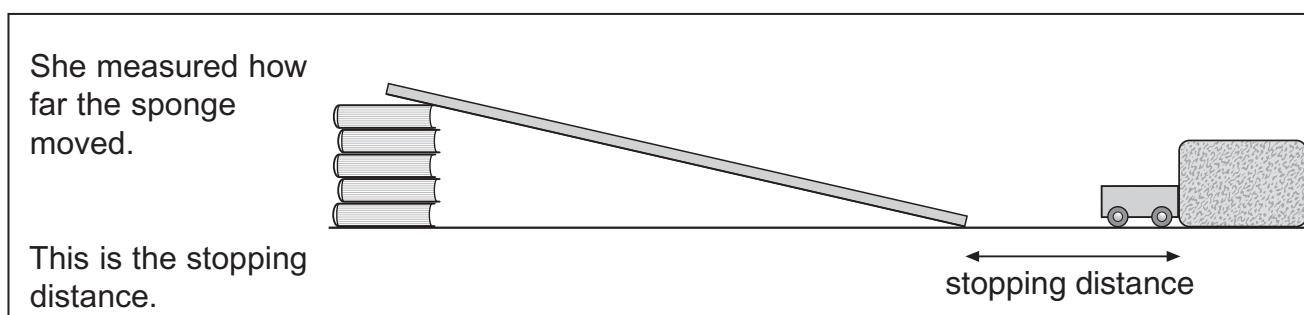
1 mark

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

1 mark

maximum 6 marks

8. Yasmin investigated the stopping distance of a trolley.



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

(i) How could she make this ramp steeper?

(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.



8ai

1 mark



8aii

1 mark

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

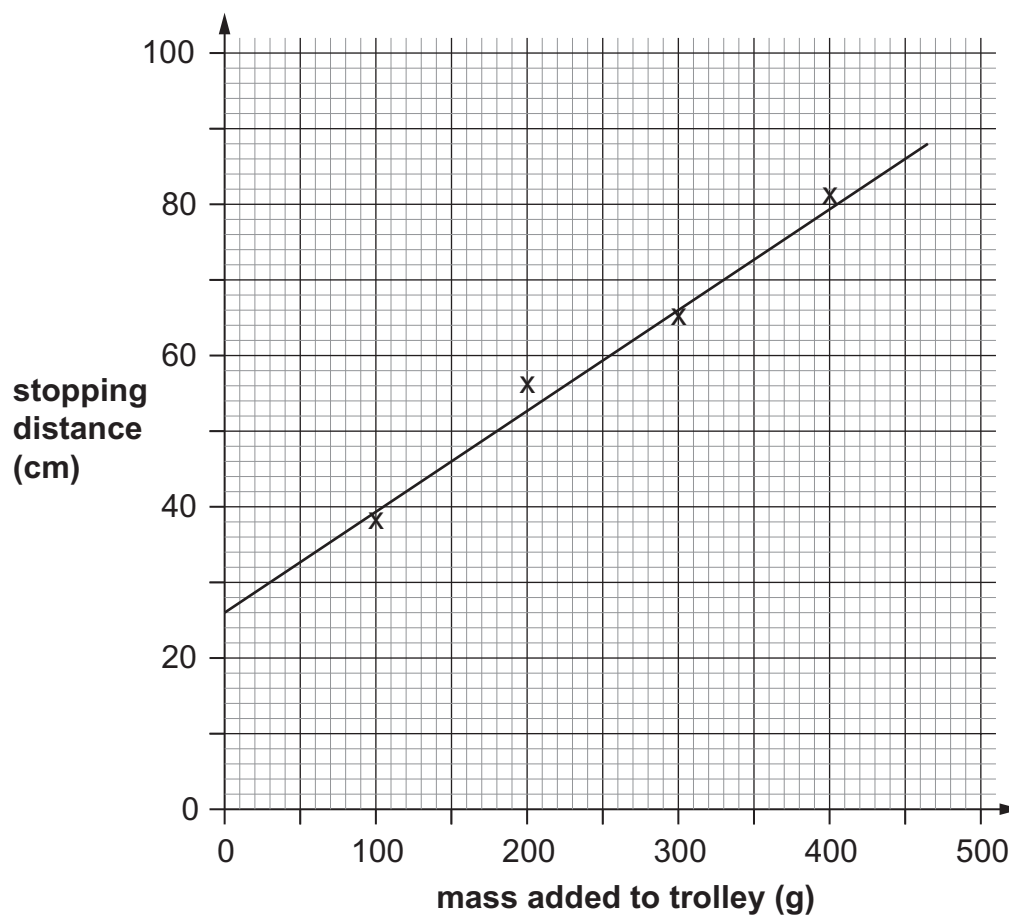
Suggest why she decided to repeat her investigation.

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

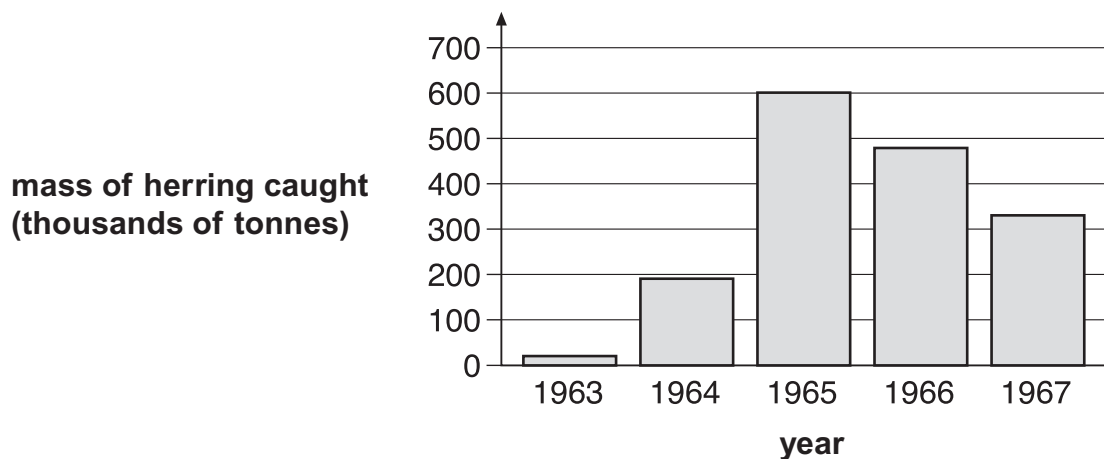
maximum 5 marks

Total

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?

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

9ai
1 mark

9aai
1 mark

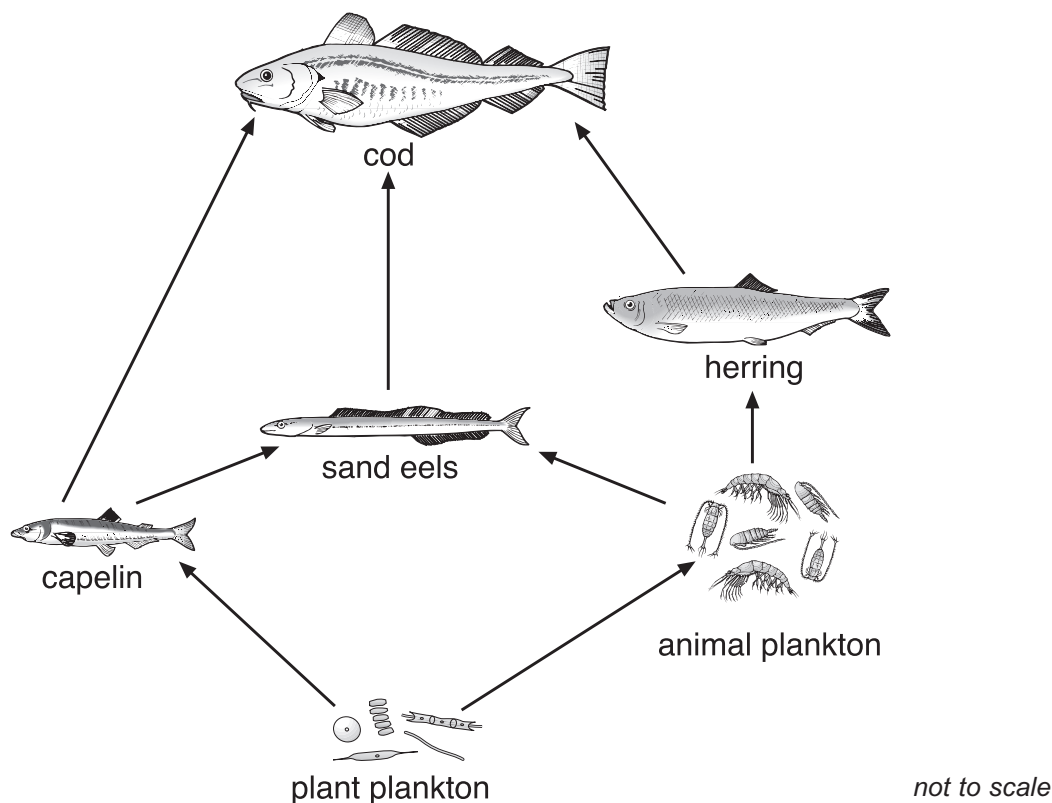
- (iii) Herring **cannot** breed until they are four years old.
Fishing for herring was banned in the Norwegian Sea from 1972 to 1976.
Suggest **one** reason why fishing for herring was banned **for this period**.



9a(iii)

1 mark

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



- (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

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

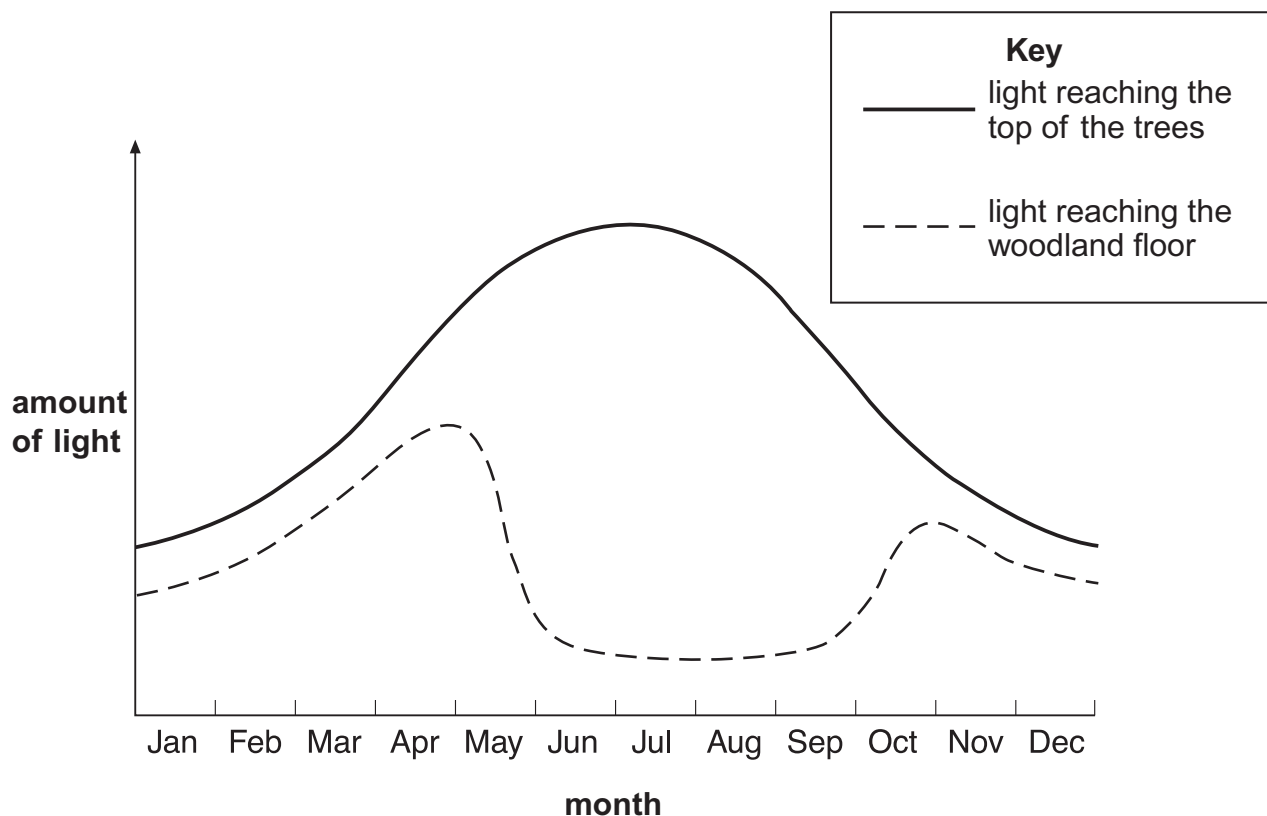


beginning of May



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 + _____ $\longrightarrow$ carbon dioxide + _____

☐

10c

1 mark

☐

10c

1 mark

maximum 5 marks



11a

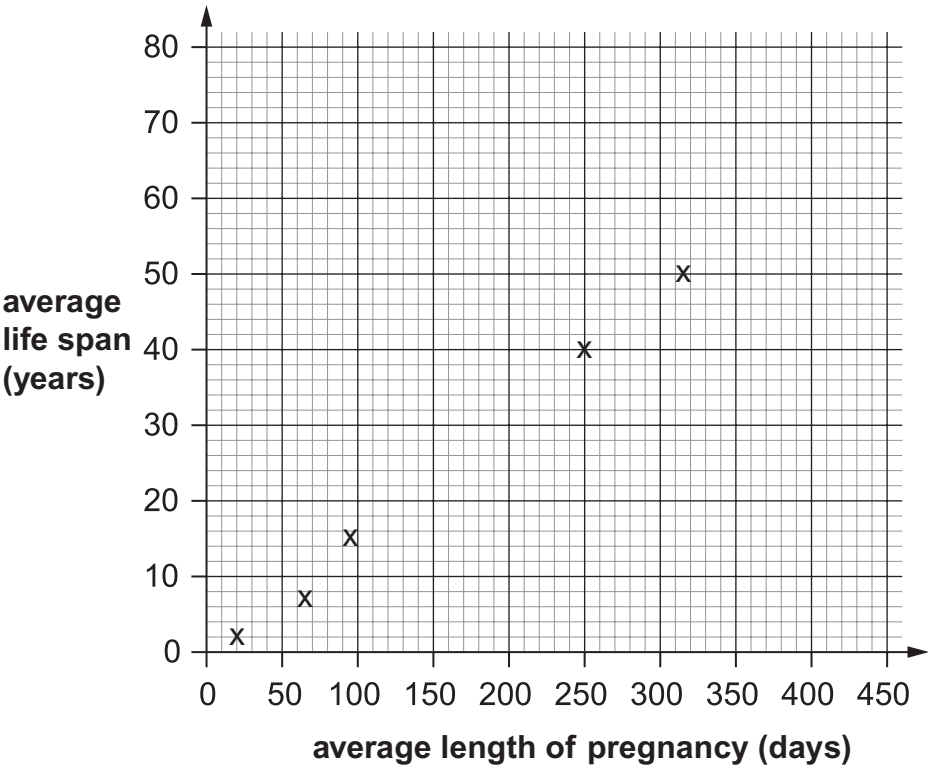
1 mark

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. _____

(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

☐ 11ci
1 mark

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

☐ 11cii
1 mark

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

yes ☐ no ☐

Use the graph to give a reason for your answer.

☐ 11cii
1 mark

maximum 6 marks

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?

12aia
1 mark

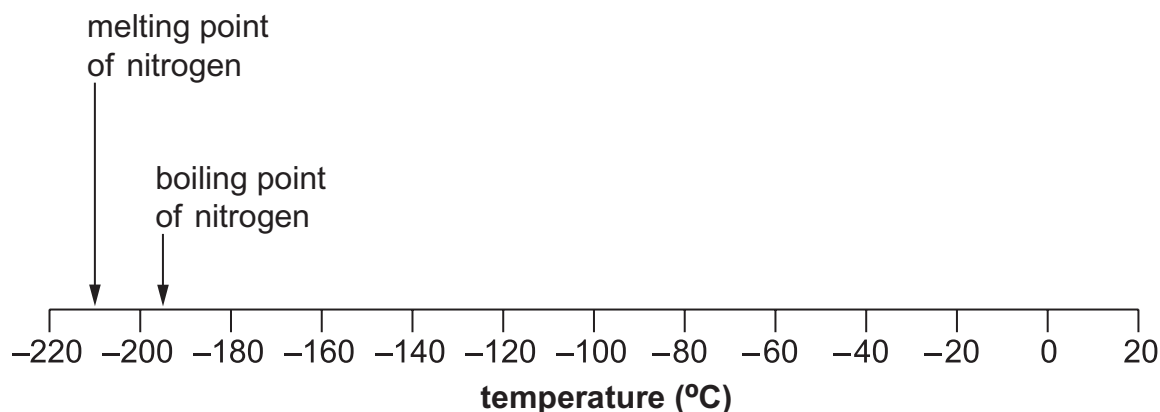
- (iii) a gas at 500°C?

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

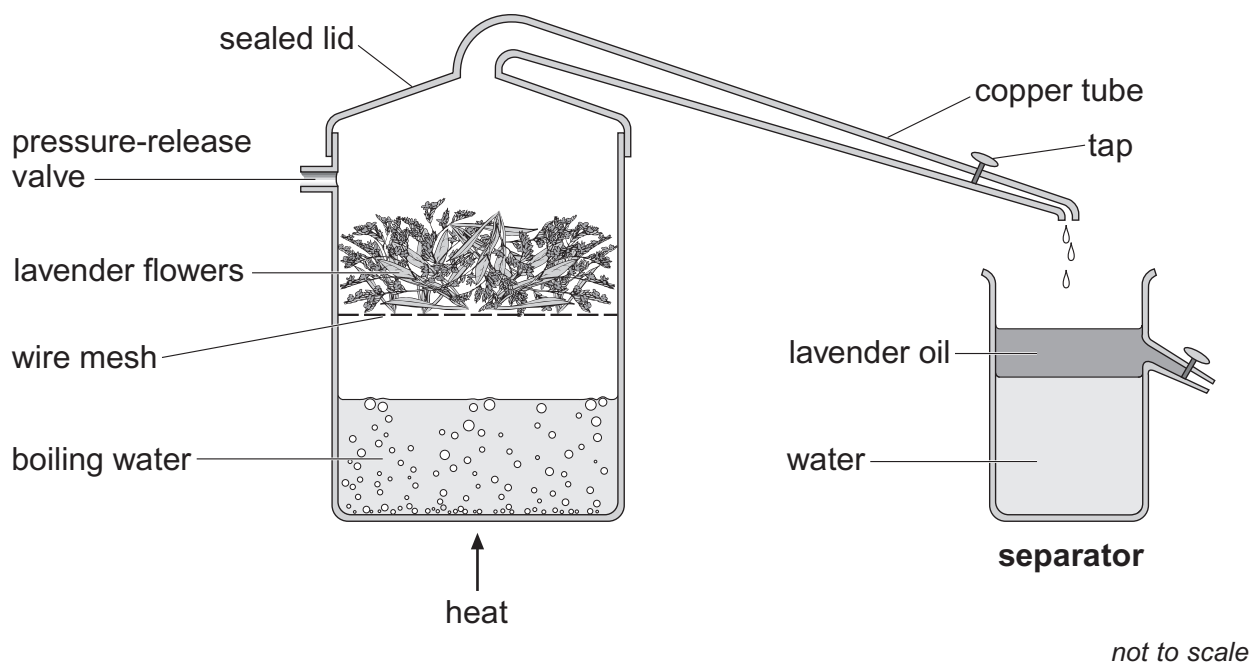
☐
☐

12biii

1 mark

maximum 7 marks

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



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?

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



13ai

1 mark



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.

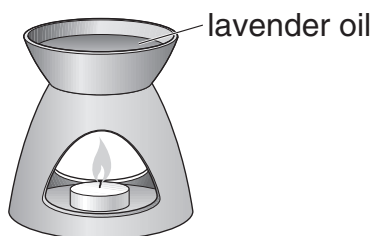
- (i) What is the change in the physical state of both lavender oil vapour and water vapour as they cool?

from _____ to _____

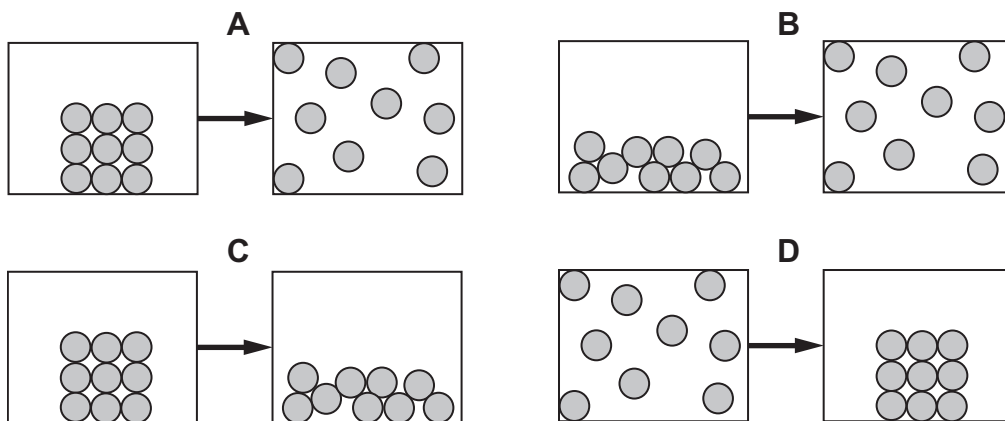
- (ii) Look at the separator.

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

- (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.

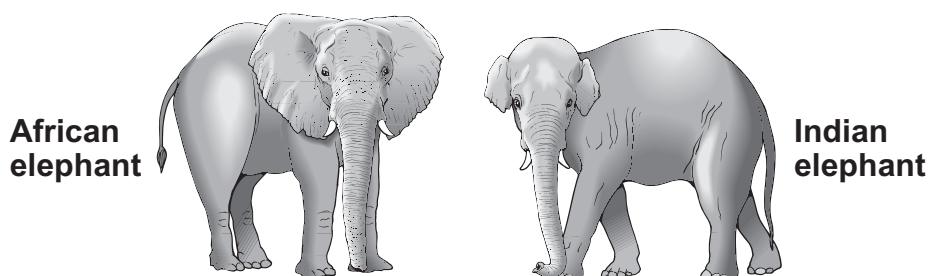
13bi
1 mark

13bii
1 mark

13c
1 mark

maximum 5 marks

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



Predict which elephant can lose more heat from its ears.

_____ elephant

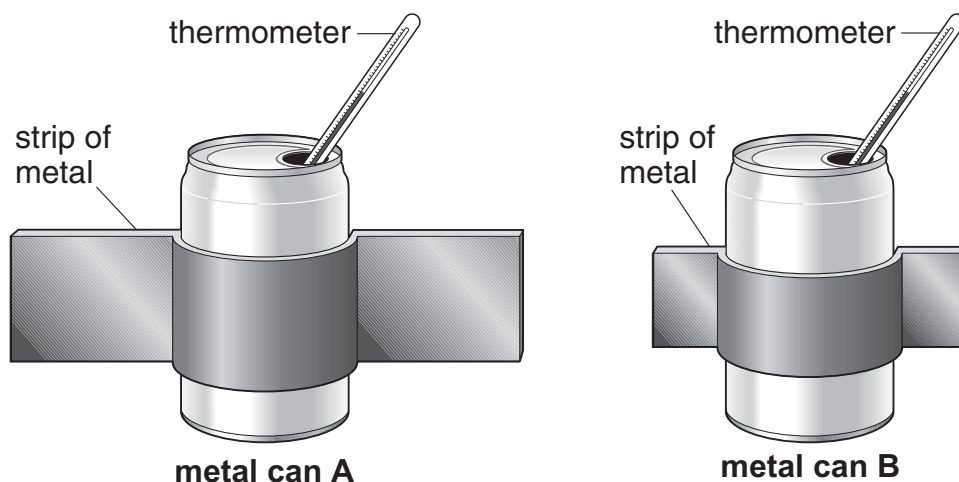
Give the reason for your answer.



14a

1 mark

- (b) Ben filled two identical cans with 250 cm³ of hot water. He wrapped strips of metal around them to model the elephants' ears.



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

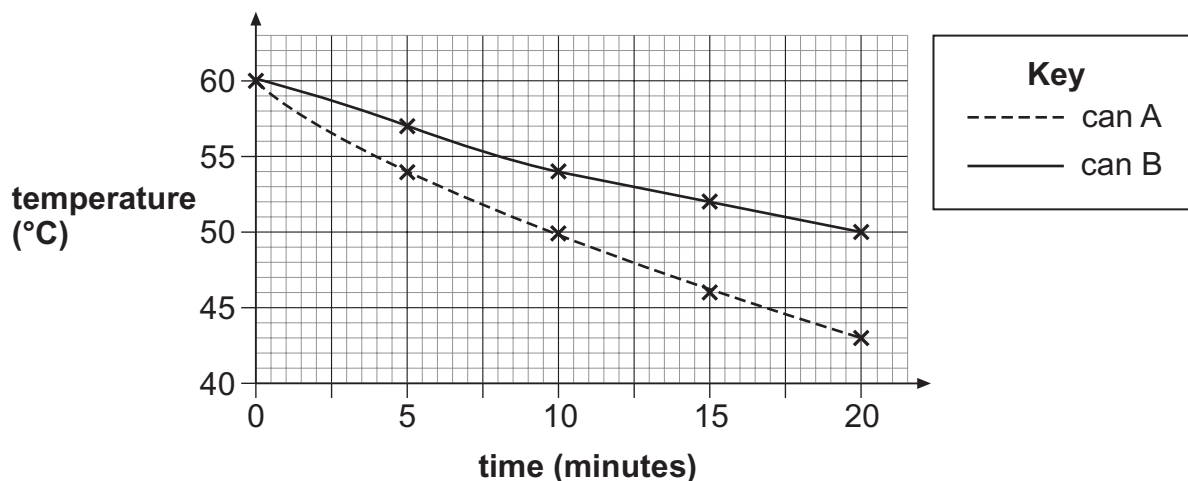
time (minutes)	temperature (°C)	
	can A	can B
0	60	60
5	54	57
10	50	54
15	46	52
20	43	50

- (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.

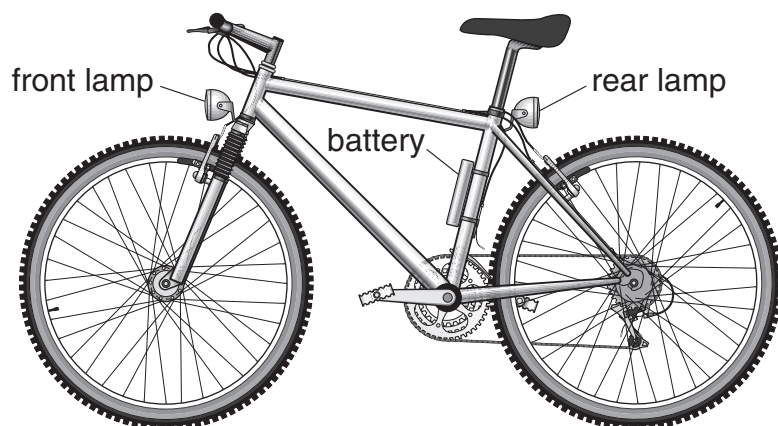
14c

1 mark

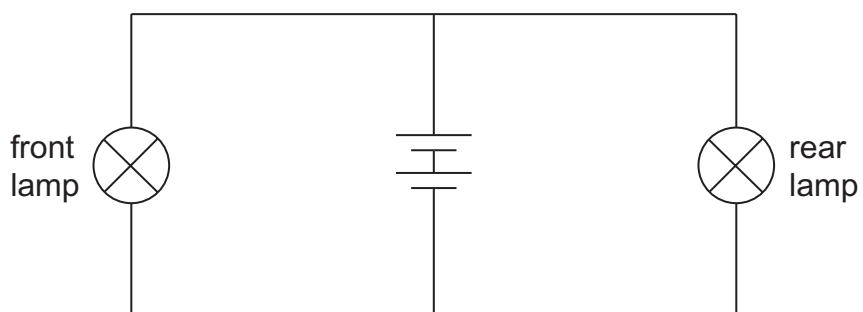
maximum 5 marks

Total

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.

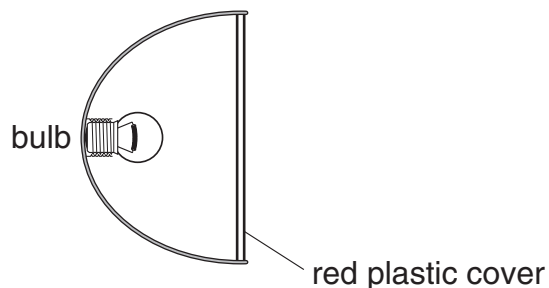


- (i) **On the circuit diagram above**, place a letter **A** to show the position of a switch to turn **only** the front lamp on and off.
- (ii) **On the circuit diagram above**, place a letter **B** to show the position of a switch to turn **both** lamps on and off at the same time.

15ai
1 mark

15aia
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?

- (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.

When the generator turns, kinetic energy is changed to useful
_____ energy in the wires. This energy in the wires is
changed to useful _____ energy in the bulb.

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

maximum 7 marks



15b

1 mark



15c

1 mark



15c

1 mark



15c

1 mark



15c

1 mark

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

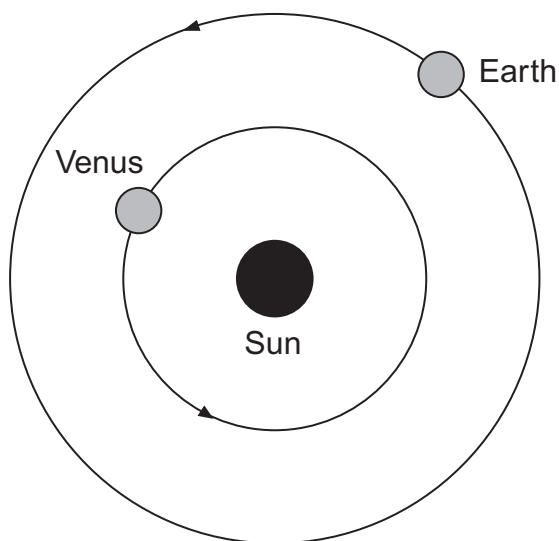
- (a) Give **one** reason why Venus takes less time than Earth to orbit the Sun.



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

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

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



16b

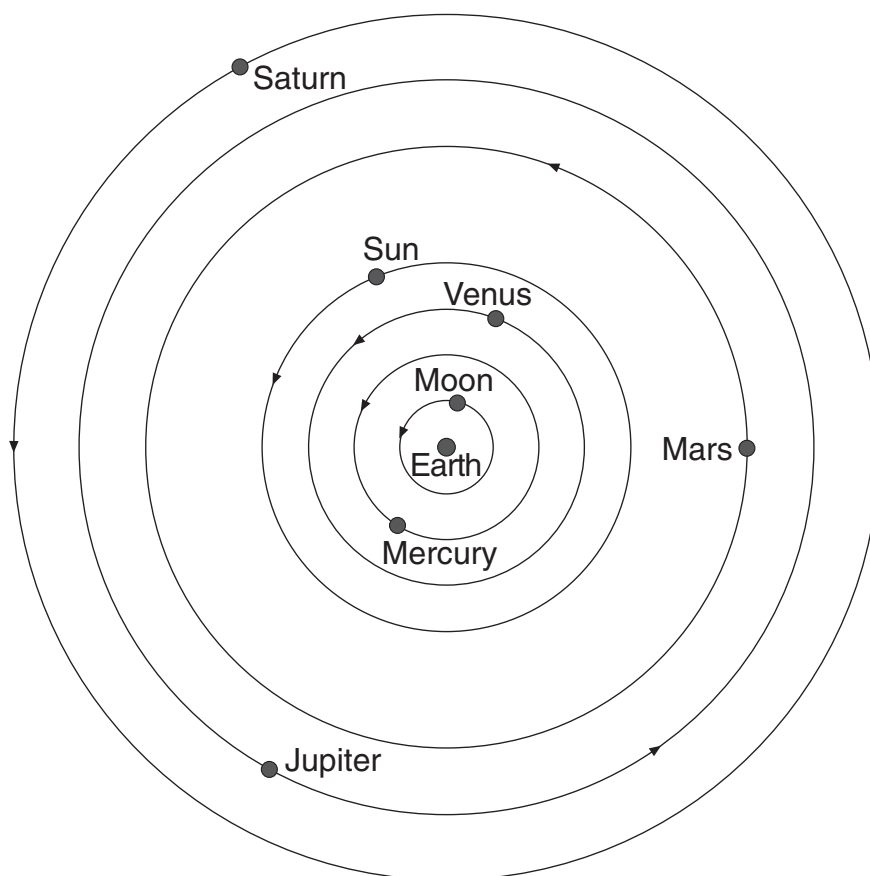
1 mark



16b

1 mark

- (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.

- (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 _____

16ci
1 mark

16cii
1 mark

maximum 5 marks

END OF TEST

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