

Write your name here

Surname

Other names

Centre Number

Candidate Number

**Pearson Edexcel International
Lower Secondary Curriculum**

Science

Year 9

Achievement Test

Friday 2 June 2017 – Afternoon

Time: 1 hour 20 minutes

Paper Reference

LSC01/01

You may need:

Calculator

Ruler

Total Marks

Instructions

- Use **black** ink or **black** ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Candidates may use a calculator.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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SECTION A

Answer ALL questions.

For questions 1 – 10 put a cross in one box to indicate your answer.
If you change your mind, put a line through the box and then put a cross in another box .
Each question is worth one mark.

1 Which of the following is a mixture?

- A air
- B copper
- C oxygen
- D steam

(Total for Question 1 = 1 mark)

2 Copper sulfate is a blue solid. When it is added to water, the solid disappears and a blue liquid is seen.

Which of these statements about copper sulfate is correct?

- A It evaporates in water.
- B It forms a solution in water.
- C It is insoluble in water.
- D It melts in water.

(Total for Question 2 = 1 mark)

3 Which is the best description of the term **prey**?

It is an animal that

- A is always a carnivore.
- B is hunted and killed by other animals.
- C kills and eats other animals.
- D makes its own food.

(Total for Question 3 = 1 mark)

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4 Which of these properties of gold shows that it does **not** react with oxygen in the air?

- A It conducts electricity.
- B It conducts heat.
- C It has a high melting point.
- D It stays shiny.

(Total for Question 4 = 1 mark)

5 A gardener notices that her plants are showing poor growth.

A probable cause is a shortage of which of the following ions?

- A calcium
- B carbonate
- C chloride
- D nitrate

(Total for Question 5 = 1 mark)

6 Which of the following is a force?

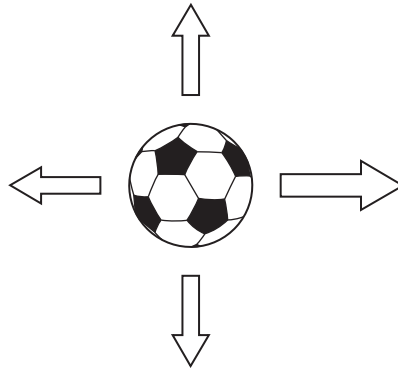
- A electricity
- B light
- C mass
- D weight

(Total for Question 6 = 1 mark)



7 The diagram shows the forces acting on a football.





What happens to the football?



- A It does not move.
- B It moves to the left.
- C It moves to the right.
- D It moves up.

(Total for Question 7 = 1 mark)

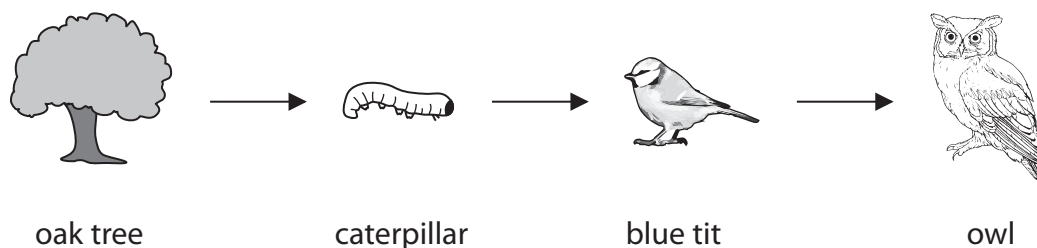
8 In an electrical circuit, what is the symbol for a buzzer?

- A 
- B 
- C 
- D 

(Total for Question 8 = 1 mark)



9 This is a woodland food chain.



Which organism is the producer?

- A blue tit
- B caterpillar
- C oak tree
- D owl

(Total for Question 9 = 1 mark)

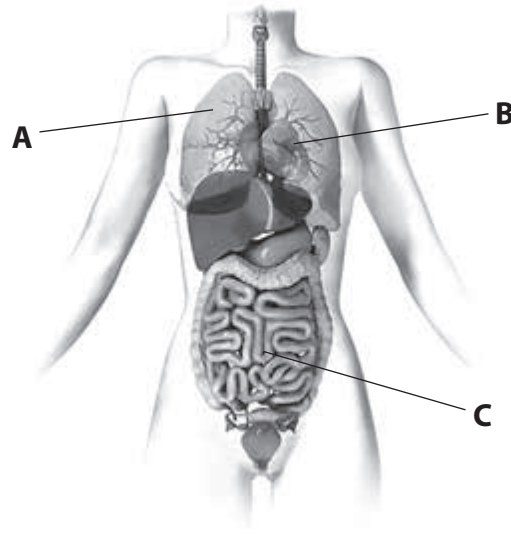
10 Which of the following is the most likely pH value of a very strong acid?

- A 1
- B 7
- C 8
- D 14

(Total for Question 10 = 1 mark)



11 The diagram shows some of the organs in the human body.



The table gives the names and functions of the organs labelled in the diagram. Complete the table.

Letter	Name of organ	Function of organ
A		takes in oxygen and removes carbon dioxide
B	heart	
C		breaks down food into simpler substances and absorbs these into the blood

(Total for Question 11 = 3 marks)





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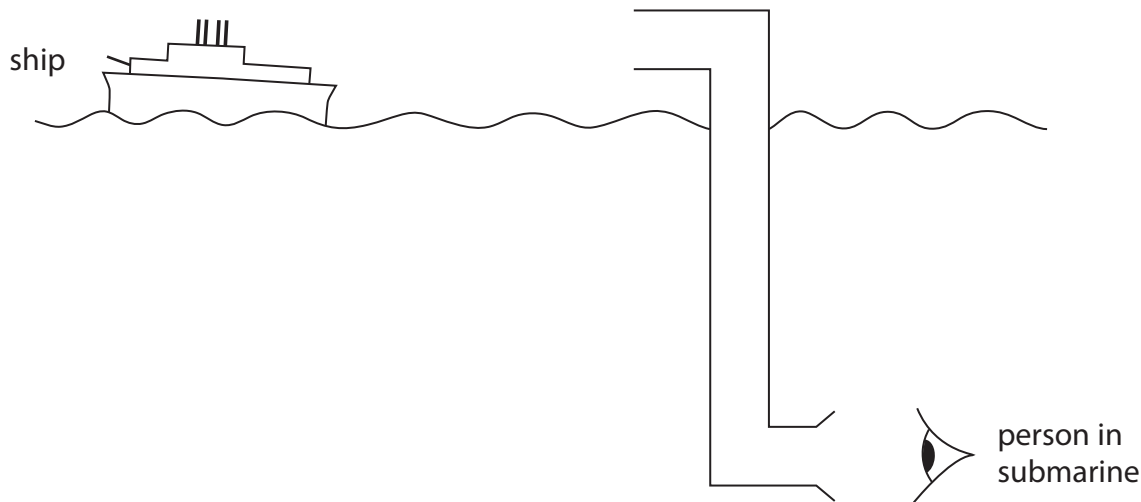
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12 A periscope contains two mirrors. The diagram shows a submarine periscope.

Complete the diagram by adding the two mirrors and a ray of light to show how a person in the submarine can see the ship from under the water.

You should represent the mirrors as  and represent the ray of light by 



(Total for Question 12 = 2 marks)

13 Copper oxide reacts with an acid to form copper sulfate and water.

(a) Name the acid needed to form the copper sulfate. (1)

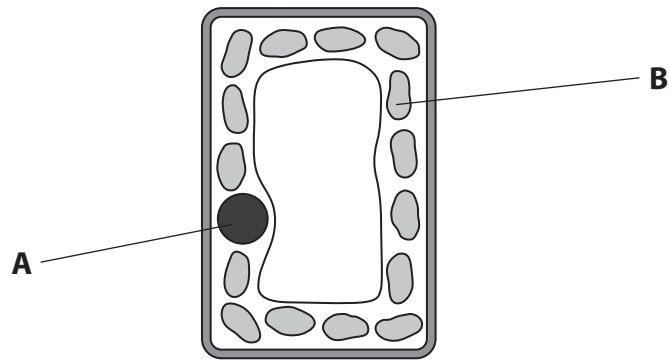
(b) Explain why the reaction is an example of a neutralisation reaction. (1)

(Total for Question 13 = 2 marks)



14 The diagram shows a plant cell.

Name parts **A** and **B**.



A

B

(Total for Question 14 = 2 marks)

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For questions 15 – 24 put a cross in one box to indicate your answer.
If you change your mind, put a line through the box and then put a cross in another box .
Each question is worth one mark.

15 Rocks can be classified as igneous, metamorphic or sedimentary.

In which row of the table are the rocks classified correctly?

	Igneous	Metamorphic	Sedimentary
<input type="checkbox"/> A	limestone	marble	slate
<input type="checkbox"/> B	granite	slate	limestone
<input type="checkbox"/> C	slate	granite	marble
<input type="checkbox"/> D	marble	granite	slate

(Total for Question 15 = 1 mark)

16 Some substances are described as being addictive.

An **addictive** substance is one that

- A improves a person's health.
- B is added to food.
- C is added to a medicine to improve its taste.
- D a person may become dependent on.

(Total for Question 16 = 1 mark)

17 What is the chemical formula of calcium carbonate?

- A CaCO_2
- B CaCO_3
- C Ca_2CO_3
- D Ca_3CO_2

(Total for Question 17 = 1 mark)



18 Jack wants to measure the voltage that a cell produces in an electrical circuit.

To do this he should connect

- A a voltmeter in series with the cell.
- B an ammeter in series with the cell.
- C an ammeter in parallel with the cell.
- D a voltmeter in parallel with the cell.

(Total for Question 18 = 1 mark)

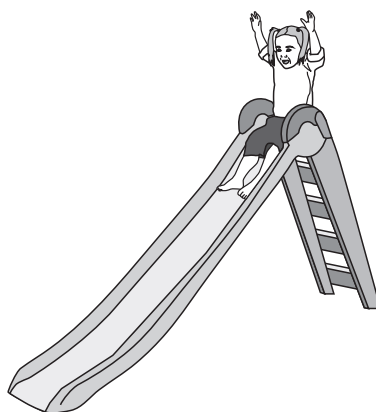
19 Metals can be bent into different shapes.

This is because they are

- A conductors.
- B insulators.
- C malleable.
- D shiny.

(Total for Question 19 = 1 mark)

20 A child goes from the top of a slide to the bottom.



Which of the following correctly shows the energy transfers that take place?

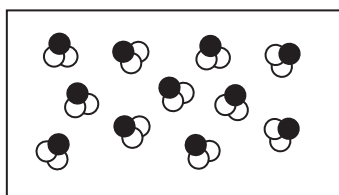
- A kinetic energy \rightarrow gravitational potential energy + thermal (heat) energy
- B gravitational potential energy \rightarrow thermal (heat) energy \rightarrow kinetic energy
- C kinetic energy \rightarrow gravitational potential energy
- D gravitational potential energy \rightarrow thermal (heat) energy + kinetic energy

(Total for Question 20 = 1 mark)

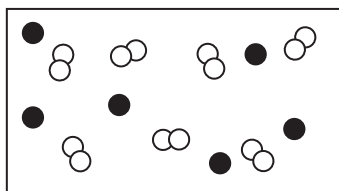


21 Which of the following represents a mixture of an element and a compound?

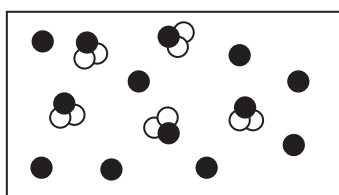
A



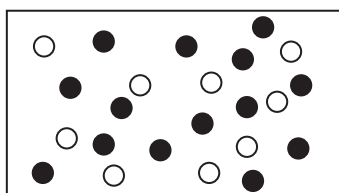
B



C



D



(Total for Question 21 = 1 mark)

22 In which of the following places would the gravitational force be greatest?

- A at the top of Mount Everest
- B in Death Valley, California, which is 86 m below sea level
- C in the International Space Station
- D on a beach on an island in the Pacific Ocean

(Total for Question 22 = 1 mark)

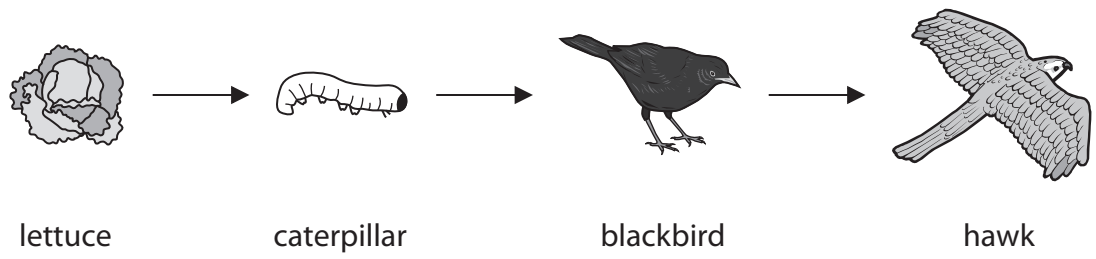
23 Which of the following is an example of discontinuous variation?

- A blood group
- B height
- C hair colour
- D weight

(Total for Question 23 = 1 mark)



24 The diagram shows a food chain.



Poison kills some of the hawks.

Which of the following are most likely to **increase** in number?

- A only the blackbirds
- B the blackbirds and the caterpillars
- C the blackbirds and the lettuces
- D only the caterpillars

(Total for Question 24 = 1 mark)

25 (a) State **one** reason why a farmer may wish to grow genetically modified (GM) wheat. (1)

.....

.....

(b) Suggest **one** reason why people may be concerned about the farmer growing genetically modified (GM) wheat. (1)

.....

.....

(Total for Question 25 = 2 marks)



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26 Over many decades the stonework of important buildings, such as York Minster in England and the Taj Mahal in India, has been damaged by chemical weathering.



York Minster



Taj Mahal

(a) Name the environmental problem that causes this chemical weathering.

(1)

.....

(b) Name the gas that is the major cause of the environmental problem in (a) and explain where this gas comes from.

(3)

Name of gas

Explanation

.....

.....

.....

.....

(Total for Question 26 = 4 marks)



P 4 8 4 3 9 A 0 1 3 3 2

27 A boy is wearing trainers.



The total area of the soles of the two trainers is 0.02 m^2 .
The boy exerts a force of 500 N on the ground.

(a) Calculate the total pressure exerted by the two trainers on the ground.

State the units of your answer.

(3)

Pressure Units

(b) If the boy stands on one leg, how would this affect the answer to (a)?

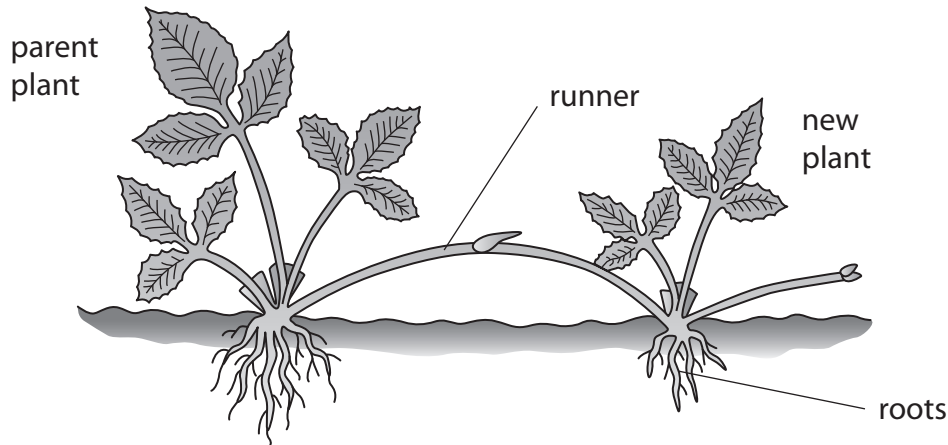
(1)

(Total for Question 27 = 4 marks)



For questions 28 – 37 put a cross in one box to indicate your answer.
If you change your mind, put a line through the box and then put a cross in another box .
Each question is worth one mark.

28 Some plants, such as strawberry plants, produce new plants from runners.



Which of these statements concerning this way of producing new plants is **not** true?

- A Only one parent strawberry plant is required.
- B The new plants are clones of the parent plant.
- C The new plants are produced by sexual reproduction.
- D The new plants contain the same genes as the parent plant.

(Total for Question 28 = 1 mark)

29 Human characteristics can be inherited, affected by the environment or both.

Which of the following is **both** inherited **and** affected by the environment?

- A blood group
- B eye colour
- C gender
- D height

(Total for Question 29 = 1 mark)



30 Turkey farmers have gradually increased the average size of turkeys.



To do this they choose the heaviest female and male turkeys to breed from.

This is an example of

- A asexual reproduction.
- B cloning.
- C genetic modification.
- D selective breeding.

(Total for Question 30 = 1 mark)

31 In Ptolemy's model of the Solar System, which of the following was thought to be at the centre of the universe?

- A the Earth
- B the Milky Way
- C the Moon
- D the Sun

(Total for Question 31 = 1 mark)



- 32** On Earth the force of gravity on a mass of 1 kg is 10N.
On Mars the force of gravity is only one third as great.

An object has a mass of 9 kg.

What would be the weight of this object on Mars?

- A** 90N
- B** 270N
- C** 30N
- D** 27N

(Total for Question 32 = 1 mark)

- 33** Complete the general word equation for the reaction between an acid and a metal carbonate.

acid + metal carbonate →

- A** carbon dioxide + water + a salt
- B** a salt + water
- C** a salt + carbon dioxide
- D** carbon dioxide + water

(Total for Question 33 = 1 mark)

- 34** An object at the bottom of a swimming pool looks closer to the surface than it really is.

This is because of

- A** attraction.
- B** deflection.
- C** reflection.
- D** refraction.

(Total for Question 34 = 1 mark)

- 35** Which of the following ions is needed by plants to make chlorophyll?

- A** calcium
- B** lithium
- C** magnesium
- D** sodium

(Total for Question 35 = 1 mark)



36 Magnesium reacts with oxygen to form magnesium oxide.

The correct balanced symbol equation for the reaction is

- A** $\text{Mg} + \text{O}_2 \rightarrow \text{MgO}_2$
- B** $2\text{Mg} + \text{O}_2 \rightarrow \text{MgO}$
- C** $2\text{Mg} + 2\text{O}_2 \rightarrow \text{MgO}_2$
- D** $2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$

(Total for Question 36 = 1 mark)

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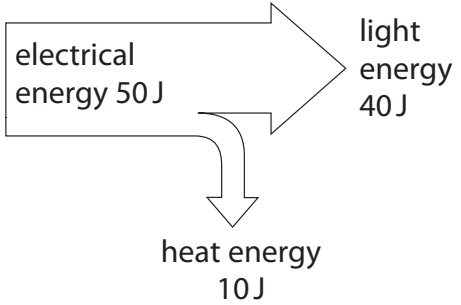
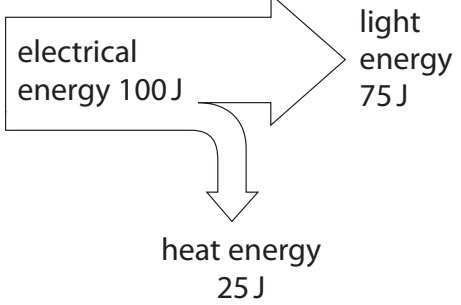
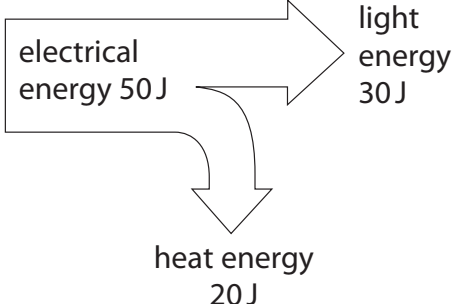
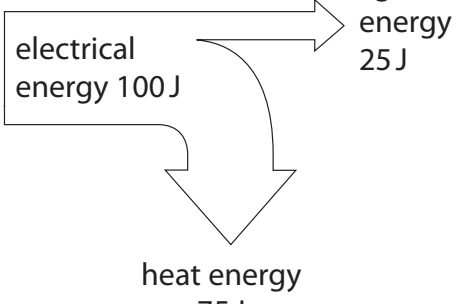


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37 Which of the following Sankey diagrams shows the most efficient electric light bulb?

<input type="checkbox"/> A	 <p>electrical energy 50 J</p> <p>light energy 40 J</p> <p>heat energy 10 J</p>
<input type="checkbox"/> B	 <p>electrical energy 100 J</p> <p>light energy 75 J</p> <p>heat energy 25 J</p>
<input type="checkbox"/> C	 <p>electrical energy 50 J</p> <p>light energy 30 J</p> <p>heat energy 20 J</p>
<input type="checkbox"/> D	 <p>electrical energy 100 J</p> <p>light energy 25 J</p> <p>heat energy 75 J</p>

(Total for Question 37 = 1 mark)



38 When a small piece of the metal calcium (Ca) is added to water, it reacts and produces hydrogen gas (H₂).

When a small piece of the metal potassium (K) is added to water, it also reacts and produces hydrogen gas (H₂).

The general word equation for both reactions is



(a) State **one** observation that will be the **same** for the reaction of both metals with water. (1)

(b) State **one** observation that will be **different** for the reaction of the two metals with water. (1)

(c) If the formula of potassium hydroxide is KOH, write a balanced symbol equation for the reaction between potassium and water. (2)

(Total for Question 38 = 4 marks)

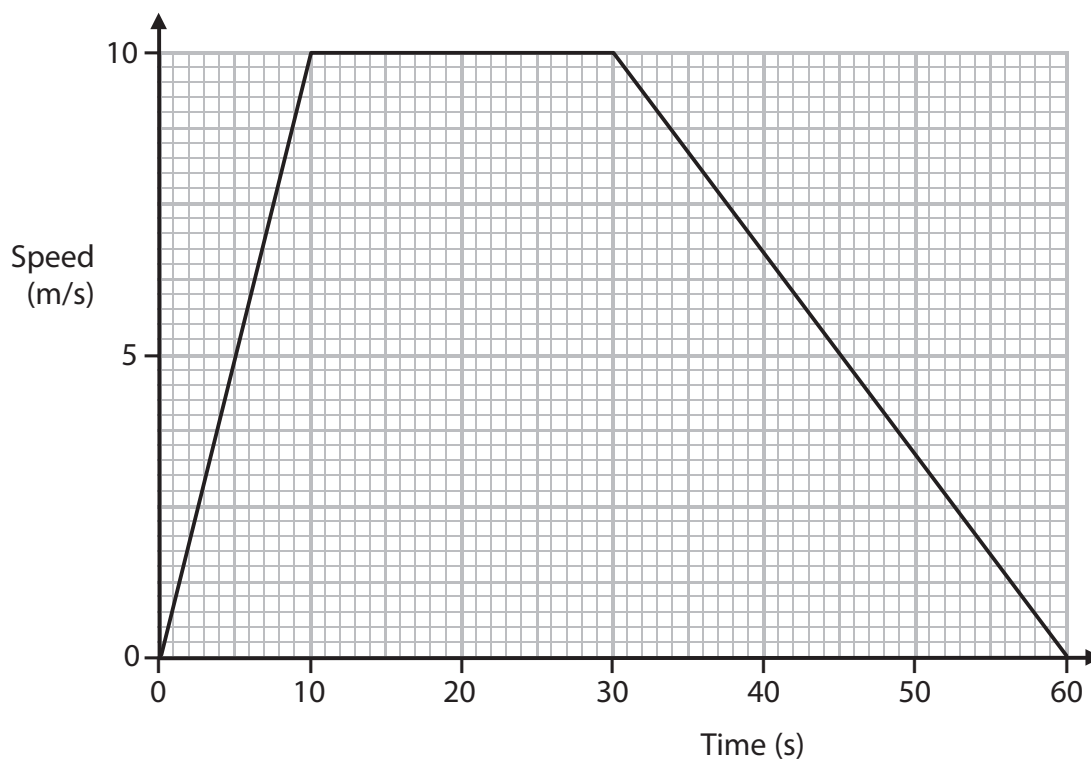


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39 The speed-time graph shows the first part of a car journey.



(a) Describe the relationship between speed and time during the first 10 seconds. (1)

.....

.....

(b) (i) What speed does the car travel at between 10 seconds and 30 seconds into the journey? (1)

.....

(ii) Use your answer to (b)(i) to calculate the distance travelled between 10 seconds and 30 seconds into the journey. Show your working. (2)

.....

.....

.....

.....

(Total for Question 39 = 4 marks)



P 4 8 4 3 9 A 0 2 1 3 2

- 40 Doctors have identified a disease that damages certain nerve cells in the brain. The disease is an inherited condition caused by a **dominant** allele, written as H.

The Punnett square shows the inheritance of the disease from a father and a mother.

In this case, the mother carries one copy of the dominant allele, H, and so she has the disease. The father does not carry this dominant allele, so he does not have the disease.

		Father	
		h	h
Mother	H	Hh	Hh
	h	hh	

- (a) (i) Complete the Punnett square by filling in the empty box. (1)
- (ii) What term is given to the pairs of alleles, such as Hh and hh, in the Punnett square? (1)

- (b) The Punnett square for a different father and mother is shown below.

		Father	
		H	H
Mother	H	HH	HH
	h	hH	hH

What is the chance of a child of these parents inheriting the disease?
Give your answer as a percentage.

(1)

.....%

(Total for Question 40 = 3 marks)

TOTAL FOR SECTION A = 60 MARKS



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Turn over for Section B



P 4 8 4 3 9 A 0 2 3 3 2

SECTION B

Answer ALL questions.

- 41** Vitamins are a vital component of a balanced diet. Vegetables such as cabbage are a good source of vitamin C.



Cabbage

Cooking cabbage in boiling water affects the amount of vitamin C present in the cabbage.

A food scientist carries out an investigation to see how the length of time that cabbage is cooked in boiling water affects the vitamin C content.

The table shows the results.

Time cooked in boiling water (min)	Vitamin C present in cabbage (%)
0	100
0.5	80
2	60
4	49
7	40
10	37

- (a) What is the dependent and the independent variable in this investigation? (2)

Dependent variable

Independent variable

- (b) How could the results be made more reliable? (1)



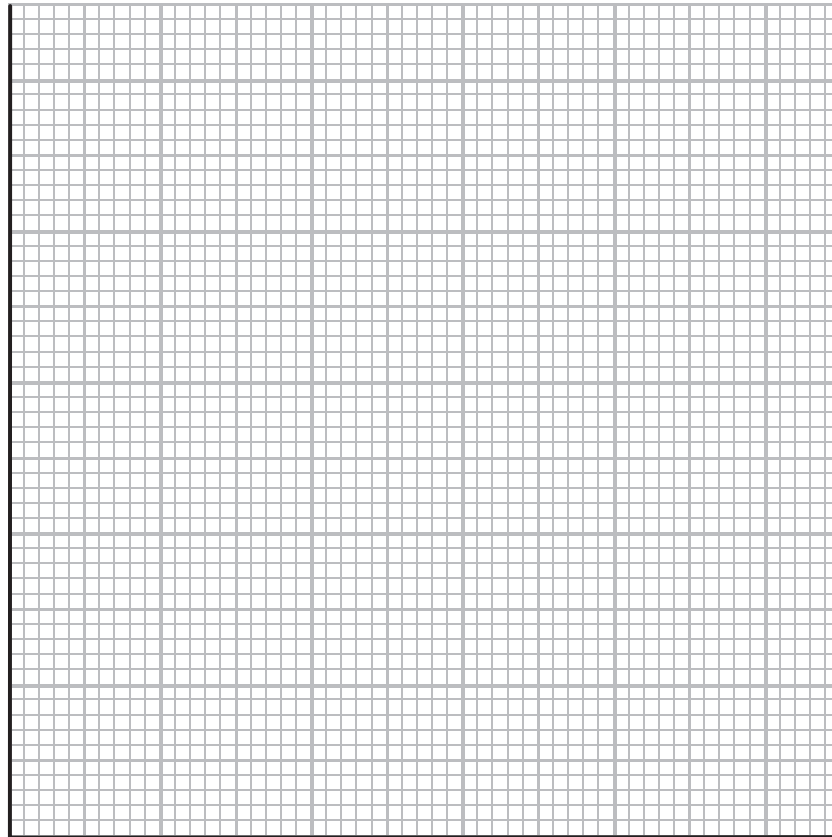
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(c) Plot the food scientist's results on the grid and use them to draw a **curve** of best fit. (3)

Vitamin C present in cabbage (%)



Time cooked in boiling water (min)

(d) Use your graph to estimate the vitamin C content of cabbage cooked in boiling water for 5 minutes.

Indicate on the graph how you estimated your answer.

(2)

(Total for Question 41 = 8 marks)



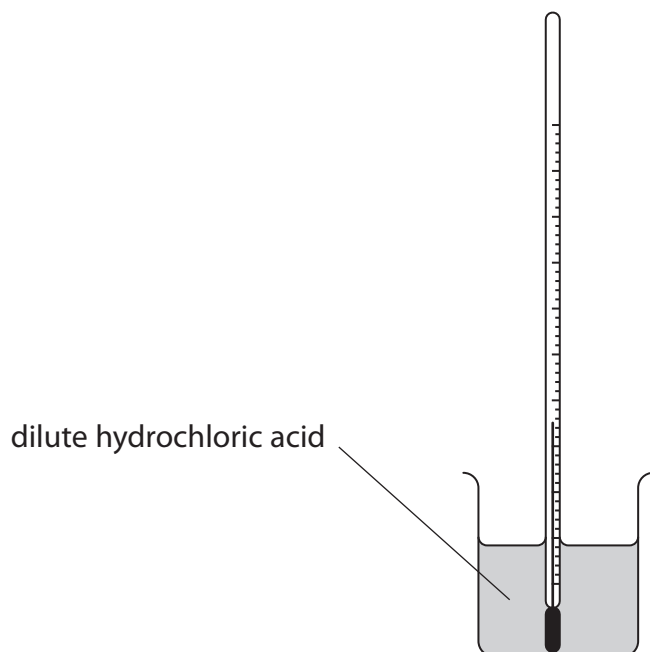
P 4 8 4 3 9 A 0 2 5 3 2

42 Caitlin knows that when a metal reacts with dilute hydrochloric acid there is an increase in temperature.

Caitlin is provided with samples of four metals, **W**, **X**, **Y** and **Z**. She investigates their reactivity by measuring the rise in temperature when each of the metals reacts with dilute hydrochloric acid.

She makes a prediction about the link between the reactivity of the metal and the rise in temperature and then plans her investigation.

The diagram shows the apparatus Caitlin used.



She uses this method for each of the four metals:

- pour 20 cm³ of dilute hydrochloric acid into the beaker
- record the starting temperature of the acid
- add the metal to the acid
- stir with a thermometer
- record the highest temperature reached in the beaker.

(a) Use your knowledge of the reactivity series to make a correct prediction about the link between the reactivity of a metal and the rise in temperature.

(1)

I think that the more reactive the metal is, the

.....



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(b) Suggest **one** safety precaution Caitlin should take because she is using an acid.
Explain your answer.

(2)

Safety precaution

Explanation

(c) State **two** variables that she needs to control in her investigation.

(2)

1

2

(d) Suggest the apparatus she should use for measuring the 20 cm³ acid.

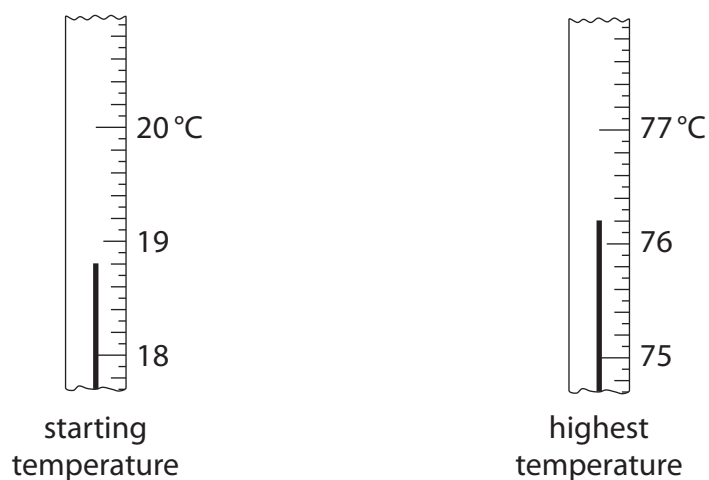
(1)

.....



P 4 8 4 3 9 A 0 2 7 3 2

(e) The diagrams show the thermometer readings when metal **W** was used.



Use the diagrams to complete the table below.

Metal used	Starting temperature (°C)	Highest temperature (°C)	Rise in temperature (°C)
W
X	19.2	19.2	0.0
Y	19.0	29.3	10.3
Z	19.1	25.0	5.9

(2)

(f) Data can be quantitative or qualitative.

Explain why the data in the table above is described as quantitative.

(1)

(g) (i) What does the zero temperature rise for metal **X** suggest about this metal?

(1)



(ii) Use the values for the rise in temperature to suggest the order of reactivity of the four metals **W, X, Y** and **Z**.

Write the letter of each metal in order of reactivity, from most to least.

(1)

most reactive

.....

.....

least reactive

(h) Caitlin's teacher said that she could improve her method by using a polystyrene cup with a lid instead of the glass beaker.

Suggest **one** reason why this would improve Caitlin's method.

(1)

.....
.....

(Total for Question 42 = 12 marks)

TOTAL FOR SECTION B = 20 MARKS
TOTAL FOR PAPER = 80 MARKS

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