Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International Award in Lower Secondary

Centre Number	Candidate Number

Friday 29 May 2020

Afternoon (Time: 1 hour 20 minutes) | Paper Reference **LSC11/01**

Science

Achievement test

You must have:
Ruler

Total Marks

Instructions

- Use **black** ink or 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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P 6 5 7 5 3 A 0 1 3 6

Pearson

SECTION A

Answer ALL questions.

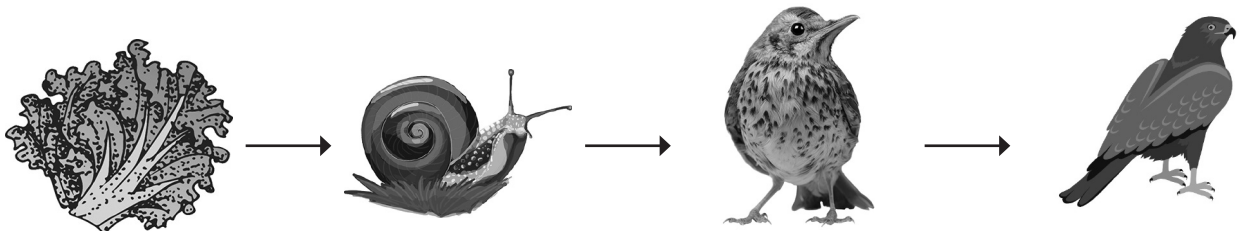
For Questions 1–5 put a cross in one box ☒ to indicate your answer.
If you change your mind, put a line through the box ☒ and then put a cross in another box ☒.
Each question is worth one mark.

1 Which is a contact force?

- ☒ **A** air resistance
- ☒ **B** gravity
- ☒ **C** magnetism
- ☒ **D** static electricity

(Total for Question 1 = 1 mark)

2 This is a food chain.



lettuce → snail → thrush → hawk

(Source: © Pearson Asset Library)

What is the tertiary consumer in this food chain?

- ☒ **A** hawk
- ☒ **B** lettuce
- ☒ **C** snail
- ☒ **D** thrush

(Total for Question 2 = 1 mark)

3 Which is a composite material?

- ☒ **A** magnesium oxide
- ☒ **B** porcelain
- ☒ **C** MDF (medium density fibreboard)
- ☒ **D** poly(chloroethene) PVC

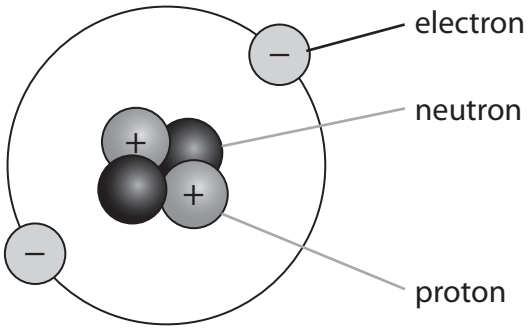
(Total for Question 3 = 1 mark)

4 Which particles move through a wire when an electric current flows?

- ☒ **A** atoms
- ☒ **B** electrons
- ☒ **C** protons
- ☒ **D** neutrons

(Total for Question 4 = 1 mark)

5 The diagram shows the structure of a helium atom.



Which is the correct chemical symbol for this atom of helium?

- ☒ **A** $^{2}_{2}H$
- ☒ **B** $^{4}_{2}H$
- ☒ **C** $^{2}_{2}He$
- ☒ **D** $^{4}_{2}He$

(Total for Question 5 = 1 mark)

6 Different methods are used to separate mixtures.

Draw **one** straight line from each method to its possible use.

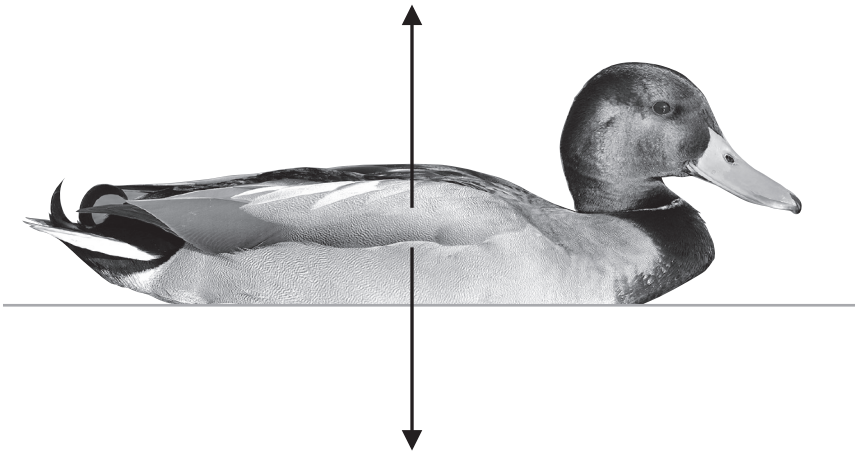
(2)

Method	Use
paper chromatography	to separate a solvent from a solution
	to separate an insoluble solid from a liquid
filtration	to separate coloured dyes in food colourings
	to separate two insoluble solids

(Total for Question 6 = 2 marks)

7 The diagram shows a duck floating on water in a pond.

The duck is not moving.



(Source: © Pearson Asset Library)

(a) The arrows show two of the forces acting on the duck.

The names of different forces are listed in the box.

air resistance	drag	friction	upthrust	weight

Choose forces from the box to complete these sentences.

(1)

The upwards force is called ..... .

The downwards force is called ..... .

(b) Explain, in terms of forces, why the duck is floating on the water.

(2)

.....

.....

.....

.....

(Total for Question 7 = 3 marks)

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8 The human circulatory system is a double circulatory system.

Some animals such as fish have a single circulatory system.

In both systems blood is transported in arteries and veins.

(a) State the main function of arteries.

(1)

.....

(b) Describe how a single circulatory system is different to a double circulatory system.

(2)

.....

.....

.....

.....

(Total for Question 8 = 3 marks)

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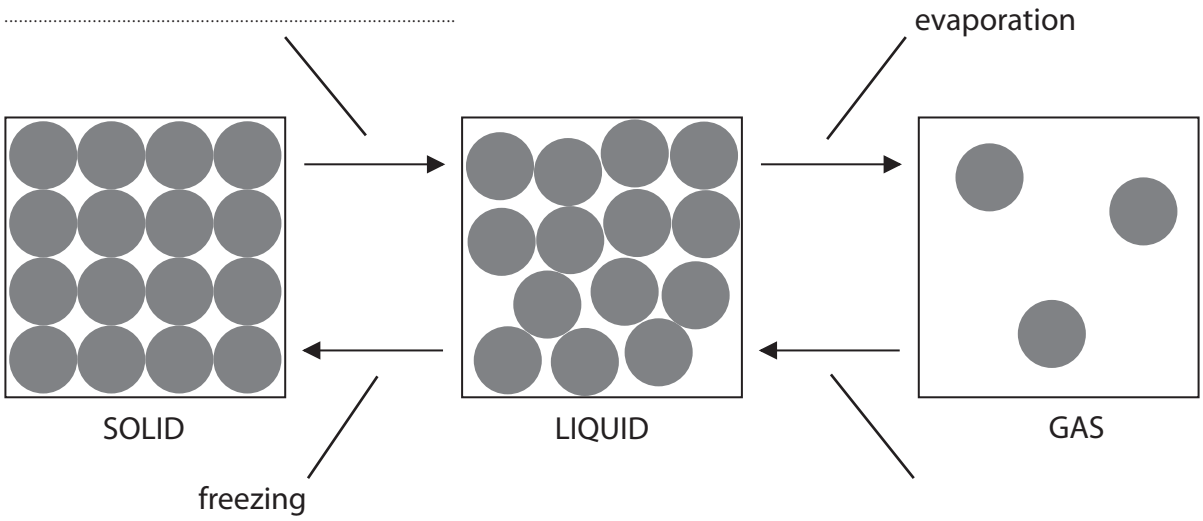
9 The diagram shows the arrangement of particles in a solid, a liquid and a gas.



(a) The arrows show the changes of state.

Two of the changes of state have been labelled.

Use words from the box to complete the other two labels.

(2)

boiling	condensing	dissolving	melting	reacting

(b) Some gas is put in a balloon. Explain, in terms of particles, how the gas exerts a pressure on the inside of the balloon.

(2)

(Total for Question 9 = 4 marks)

10 Smoking cigarettes is a lifestyle choice that may lead to cardiovascular disease.

Some people who have never smoked cigarettes still have cardiovascular disease.

Give **two** other factors that may contribute to the occurrence of cardiovascular disease.

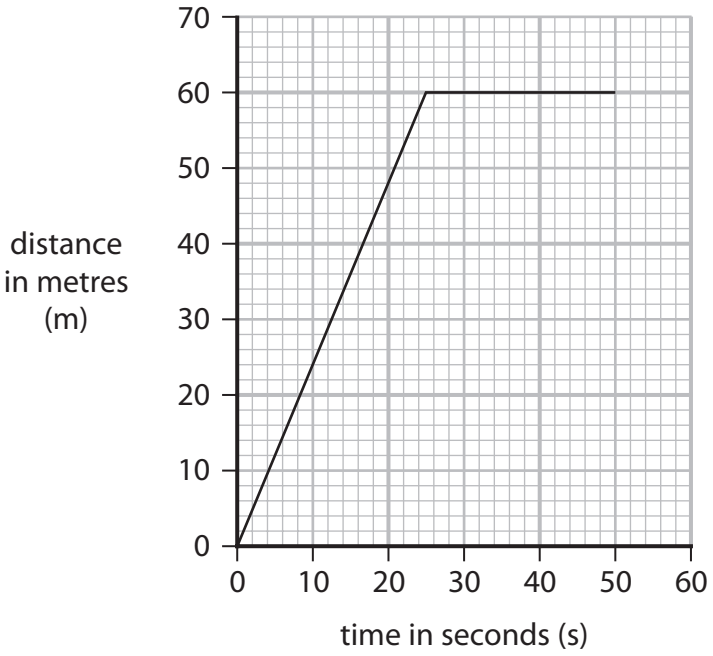
(2)

1 .....

2 .....

(Total for Question 10 = 2 marks)

11 The diagram shows a distance-time graph for the first 50 seconds of a journey.



Some statements about the journey are given. Each statement is either true or false.

Put a tick (✓) in a box to show if each statement is true or false.

$$\text{average speed} = \frac{\text{distance travelled}}{\text{time taken}}$$

(1)

	True	False
The average speed during the first 25 seconds is 1.2 m/s	☐	☐
The average speed during the first 25 seconds is 2.4 m/s	☐	☐
The average speed during the 50 second journey is 2.4 m/s	☐	☐

(Total for Question 11 = 1 mark)

For Questions 12–16 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 ☒.

12 Magnesium metal burns very brightly to produce heat and a white solid.

What type of chemical reaction is taking place?

☒ **A** endothermic

☒ **B** exothermic

☒ **C** reduction

☒ **D** thermal decomposition

(Total for Question 12 = 1 mark)

13 Which part of the digestive system is mainly responsible for absorbing water?

☒ **A** the large intestine

☒ **B** the pancreas

☒ **C** the small intestine

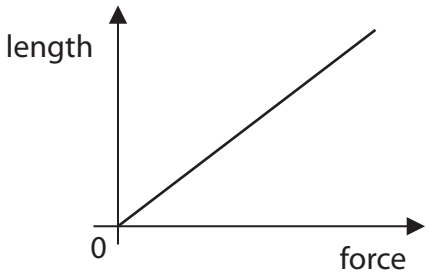
☒ **D** the stomach

(Total for Question 13 = 1 mark)

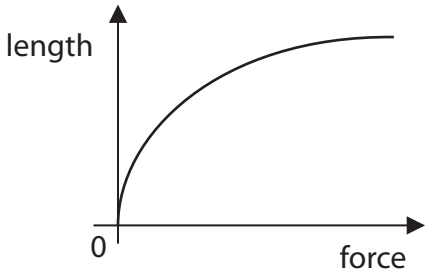
14 The graphs show the effect of force on a metal spring.

Which graph shows the spring obeying Hooke's Law?

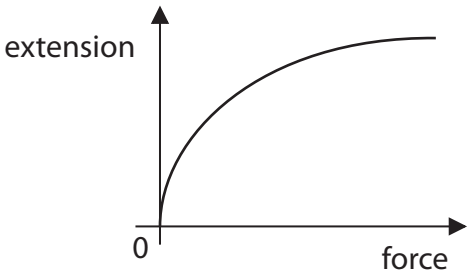
☒ **A**



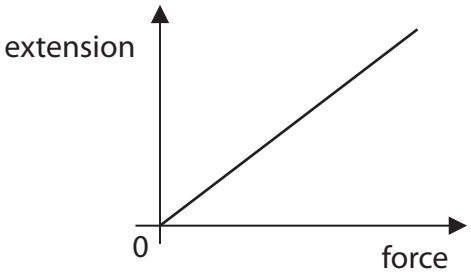
☒ **B**



☒ **C**



☒ **D**



(Total for Question 14 = 1 mark)

15 Which part of a living cell is responsible for producing energy?

- ☒ **A** the cell wall
- ☒ **B** the cytoplasm
- ☒ **C** the mitochondria
- ☒ **D** the nucleus

(Total for Question 15 = 1 mark)

16 When a bulb is connected to a 12 V cell a current of 0.05 A flows through the bulb.

What is the resistance of the bulb?

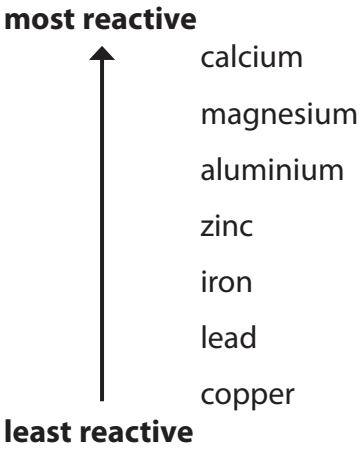
Use the equation

$$\text{resistance (R)} = \frac{\text{voltage (V)}}{\text{current (I)}}$$

- ☒ **A** 0.6 Ω
- ☒ **B** 6 Ω
- ☒ **C** 24 Ω
- ☒ **D** 240 Ω

(Total for Question 16 = 1 mark)

17 The diagram shows a reactivity series for some metals.



(a) A student plans to make zinc nitrate using a displacement reaction.

Tick (✓) **one** box to show the metal and **one** box to show the salt solution the student should mix together to produce zinc nitrate.

(2)

Metal		**Salt solution**	
copper	☐	aluminium nitrate	☐
iron	☐	calcium nitrate	☐
magnesium	☐	copper nitrate	☐
zinc	☐	magnesium nitrate	☐

(b) Name the gas produced when zinc metal reacts with dilute hydrochloric acid.

(1)

.....

(Total for Question 17 = 3 marks)

18 A student constructs four electric circuits.

Each circuit includes two bulbs and an ammeter.

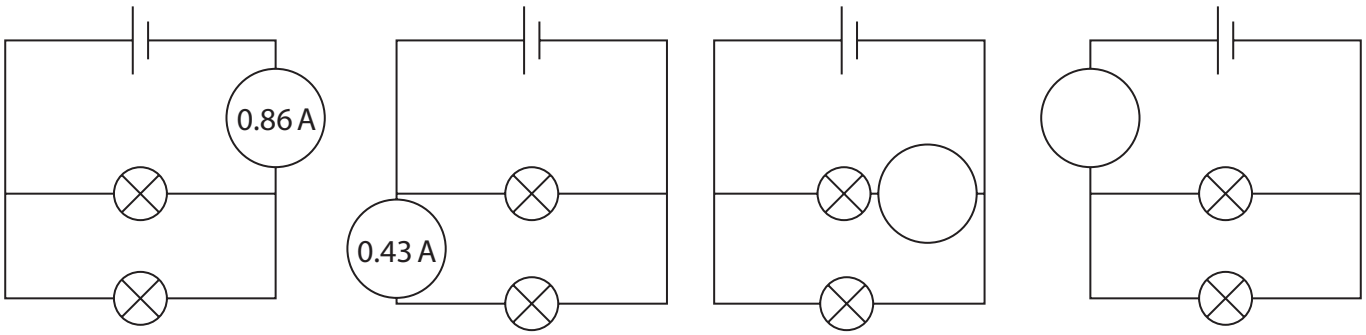
All the bulbs, all the cells and all the ammeters are identical.

The ammeter readings for the first two circuits are shown.

Use values from the box to complete the ammeter readings for the other two circuits.

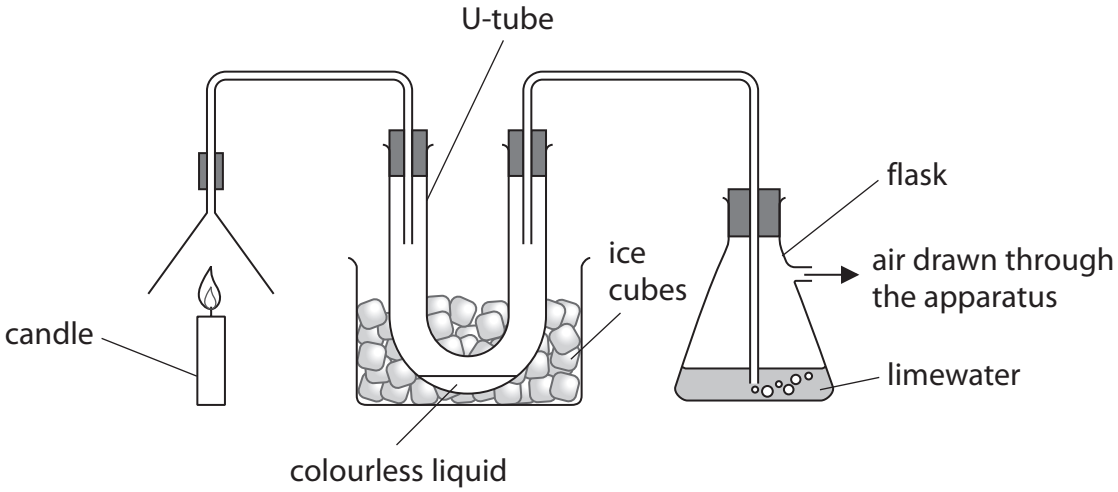
(2)

0.43 A	0.86 A	1.29 A	1.72 A



(Total for Question 18 = 2 marks)

19 The diagram shows the apparatus used to identify the products formed when a candle burns.



(a) A student suggests that the colourless liquid collected in the U-tube is water.

Describe how to test the colourless liquid to show it contains water.

(2)

.....

.....

.....

(b) Name the gas that the limewater in the flask is testing for.

(1)

.....

(Total for Question 19 = 3 marks)

20 Use words from the box to complete the sentences.

fungi	pathogen	poison	vaccine	virus

(a) A bacteria that can cause a disease is an example of a ..... .

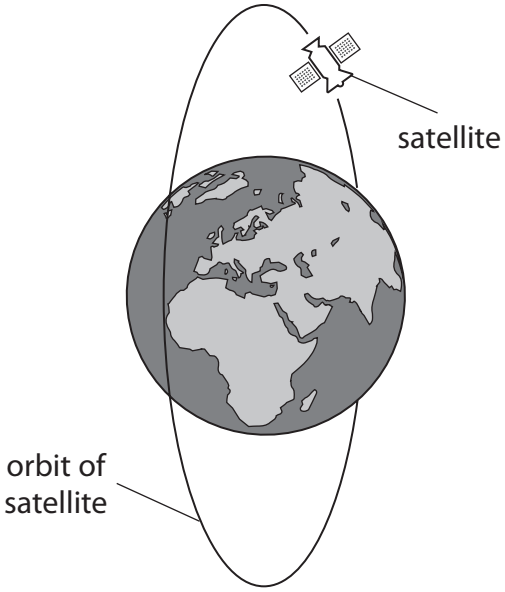
(1)

(b) An obligate parasite that must inhabit a host cell to reproduce is a ..... .

(1)

(Total for Question 20 = 2 marks)

21 The diagram shows an artificial satellite in polar orbit around the Earth.



(a) Draw an arrow on the diagram to show the force acting on the satellite that keeps it in orbit.

(1)

(b) State **one** use of polar orbit satellites.

(1)

.....

.....

(Total for Question 21 = 2 marks)

22 It can be argued that a petrol fuelled car shares many of the characteristics of living organisms. For example, a car and a living organism both release energy from fuel, both move and both produce waste materials.

Give two reasons why a car **cannot** be considered to be a living organism.

(2)

1 .....

.....

2 .....

.....

(Total for Question 22 = 2 marks)

23 The surface area to volume ratio is important in controlling body temperature in some animals.

The ratio can be calculated using a formula.

Here is some data about an Asian elephant.

surface area = 18 m^2

volume = 6 m^3

Draw **one** straight line from the correct formula for calculating the ratio to the correct value of the surface area to volume ratio for an Asian elephant.

(1)

Formula for calculating the surface area to volume ratio	**Surface area to volume ratio for an Asian elephant**
$\text{ratio} = \frac{\text{surface area}}{\text{volume}}$	108 : 1
ratio = surface area × volume	24 : 1
$\text{ratio} = \frac{\text{volume}}{\text{surface area}}$	3 : 1
	0.33 : 1

(Total for Question 23 = 1 mark)

For Questions 24–28 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 ☒.

24 Reduction is a type of chemical reaction.

What happens during reduction?

☒ **A** a substance gains oxygen

☒ **B** a substance loses oxygen

☒ **C** a substance gains mass

☒ **D** a substance loses energy

(Total for Question 24 = 1 mark)

25 A farmer wants to improve the yield of tomatoes from his plants.

The farmer chooses the plants that produce the best yield of tomatoes to produce the next generation of tomato plants.

This is repeated for several generations.

What is the name of this process?

☒ **A** adaptation

☒ **B** fertilisation

☒ **C** population growth

☒ **D** selective breeding

(Total for Question 25 = 1 mark)

26 Which is the correct word equation for **anaerobic** respiration?

☒ **A** carbon dioxide + water → glucose + oxygen

☒ **B** carbon dioxide + glucose → oxygen + water

☒ **C** glucose → lactic acid

☒ **D** glucose + oxygen → carbon dioxide + water

(Total for Question 26 = 1 mark)

27 A cyclist travels at a speed of 21.6 km/h.

What is this speed in m/s?

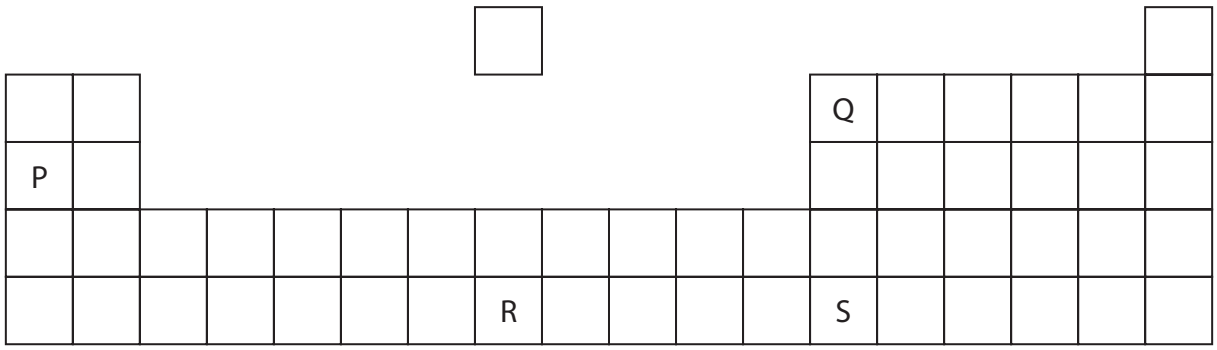
- ☒ **A** 0.021 m/s
- ☒ **B** 0.36 m/s
- ☒ **C** 6.0 m/s
- ☒ **D** 21.6 m/s

(Total for Question 27 = 1 mark)

28 The diagram shows an outline of part of the Periodic Table.

P, Q, R and S show the position of four elements.

The letters are **not** the symbols of the elements.



Which two elements are in the same group?

- ☒ **A** P and Q
- ☒ **B** Q and R
- ☒ **C** Q and S
- ☒ **D** R and S

(Total for Question 28 = 1 mark)

29 Each part of a living cell has a different function.

Draw **one** straight line from each part of a cell to the function of that part.

(2)

Part	Function
cell membrane	enables photosynthesis to occur
chloroplast	enables respiration and the production of ATP
nucleus	controls the activities of the cell
	controls the movement of substances into and out of the cell

(Total for Question 29 = 2 marks)

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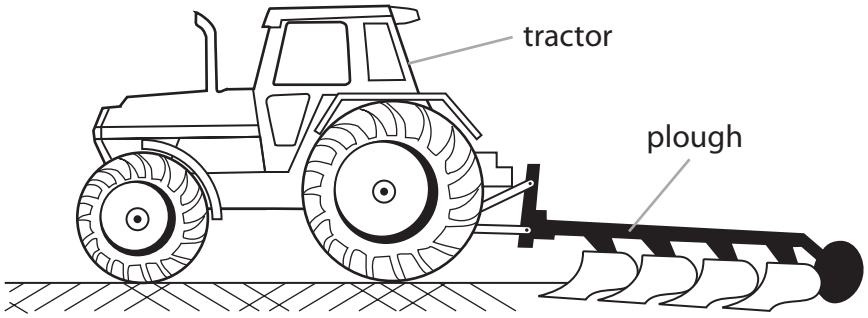
30 A tractor pulls a plough across a field.

The field is 75 m wide.



The tractor pulls the plough with a force of 4200 N.

Calculate the work done by the tractor each time it crosses the field.

You should include the unit in your answer.

Use the equation

work done = force × distance moved

(2)

work done = ... unit .....

(Total for Question 30 = 2 marks)

31 Living organisms often have to compete for resources.

(a) Give **one** resource that living organisms may compete for.

(1)

.....

(b) Describe the difference between intra-specific and inter-specific competition.

(2)

.....

.....

.....

(Total for Question 31 = 3 marks)

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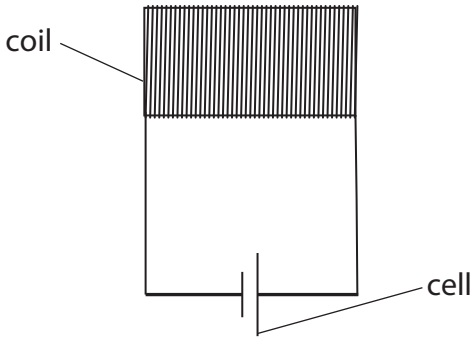
32 When an electric current flows through a coil, a magnetic field is created around the coil.



Which two of the following would increase the strength of the magnetic field?

Tick (✓) the **two** statements that are correct.

(1)

decrease the thickness of the wires	
add more turns to the coil	
decrease the voltage of the cell	
put an iron core in the coil	
reverse the direction of the current	

(Total for Question 32 = 1 mark)

33 A student investigates the reaction between marble chips (calcium carbonate) and dilute hydrochloric acid.

(a) State **one** way in which the rate of this reaction could be increased.

(1)

.....

(b) The word equation for the reaction is

calcium carbonate + hydrochloric acid → calcium chloride + water + carbon dioxide

Complete the chemical equation for this reaction.

(2)

..... + ...HCl → $CaCl_2 + H_2O + CO_2$

(Total for Question 33 = 3 marks)

34 Sound travels at different speeds in different materials.

Draw **one** straight line from each material to the most likely speed of sound in that material.

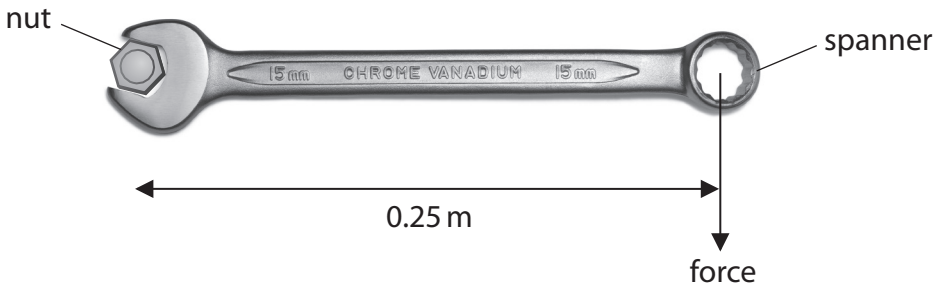
(2)

Material	Speed of sound in the material
air	5130 m/s
iron	1500 m/s
water	330 m/s

(Total for Question 34 = 2 marks)

35 The spanner is being used to tighten a nut.

A moment of 25 Nm is needed to tighten the nut.



(Source: © Pearson Asset Library)

Calculate the size of the force that needs to be applied to the spanner to tighten the nut.

Use the equation

moment = force × distance from pivot

(2)

force = ... N

(Total for Question 35 = 2 marks)

TOTAL FOR SECTION A = 60 MARKS

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SECTION B

Answer ALL the questions. Write your answers in the spaces provided.

36 A cell is labelled 3 V.

(a) A student investigates to see if the voltage across the cell is affected by the number of bulbs added in parallel with the cell.

(i) State the independent variable in this investigation.

(1)

.....

(ii) State the dependent variable in this investigation.

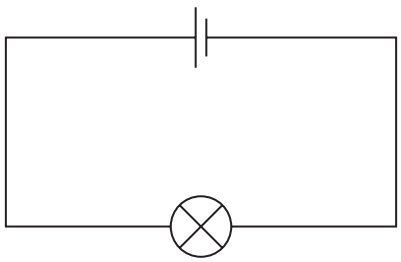
(1)

.....

(b) The student starts the investigation by connecting one bulb to the cell and measuring the voltage across the cell using a voltmeter.

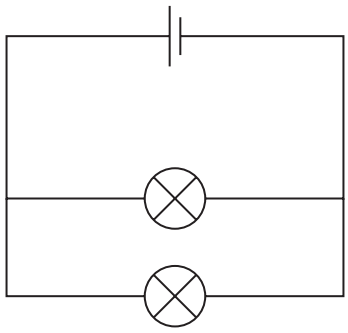
Complete the diagram of the circuit by adding the symbol for the voltmeter.

(2)



(c) The student adds a second bulb in parallel with the first bulb and measures the voltage across the cell.

The diagram shows the circuit with two bulbs in parallel.



The student continues adding bulbs in parallel until six bulbs are in the circuit.

Each time a bulb is added, the student measures the voltage across the cell.

The table shows the student's results.

Number of bulbs	Voltage across cell in volts (V)			
	Measurement 1	Measurement 2	Measurement 3	Average
1	2.96	2.95	2.95	2.95
2	2.73	2.72	2.72	2.72
3	2.50	2.49	2.48	2.49
4	2.27	2.25	2.26	2.26
5	2.80	2.03	2.03	2.03
6	1.80	1.78	1.82	1.80

(i) State what the student has done to ensure the results are reliable.

(1)

.....

.....

(ii) One of the results in the table is anomalous.

Draw a circle around the anomalous result.

(1)

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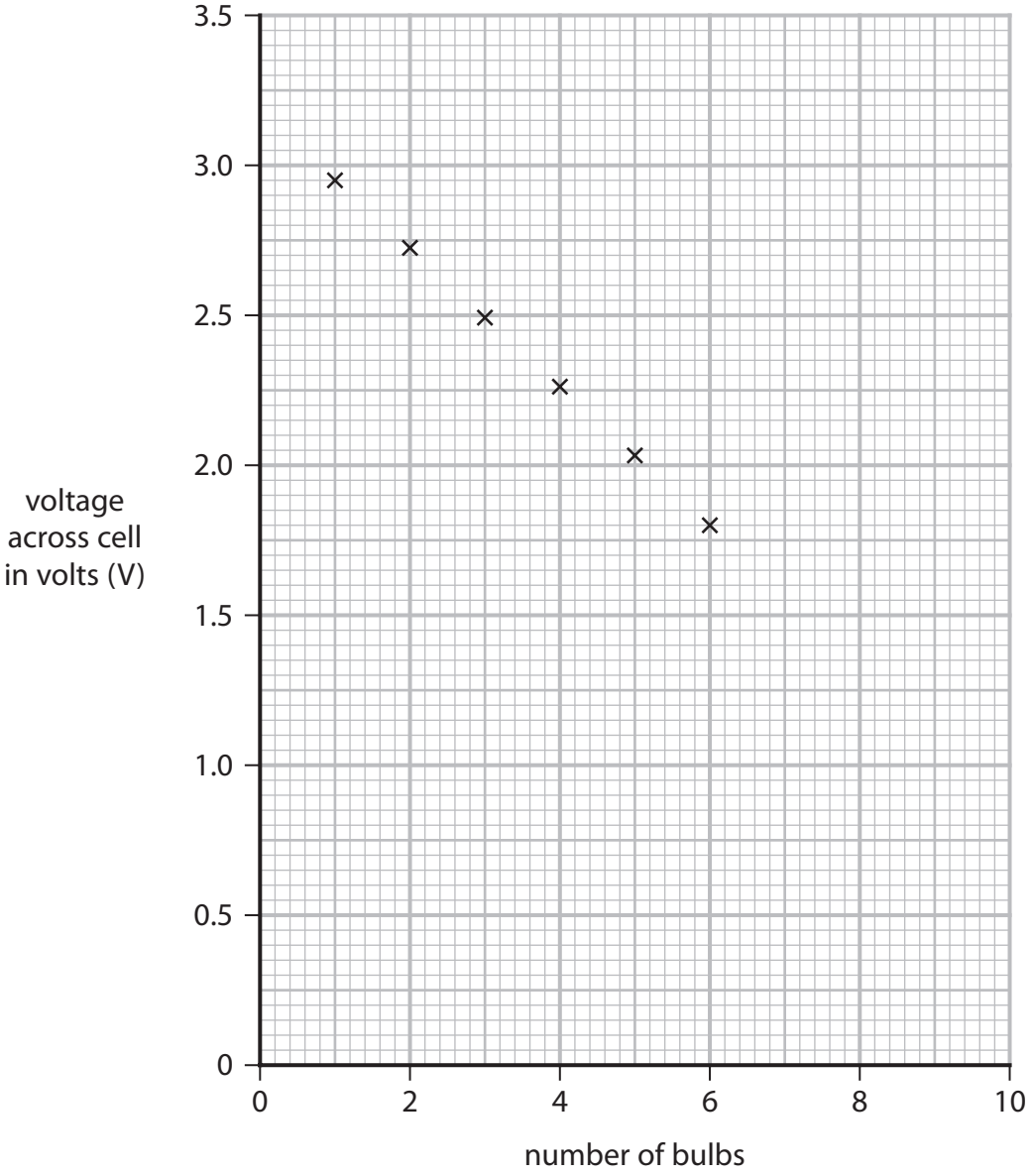
(d) The student plots his results on a graph.



(i) Complete the graph by drawing a line of best fit.

(1)

(ii) The student predicts that with 8 lamps in parallel the voltage across the cell would be 1.7 V.

Explain why this prediction is incorrect.

(2)

.....

.....

.....

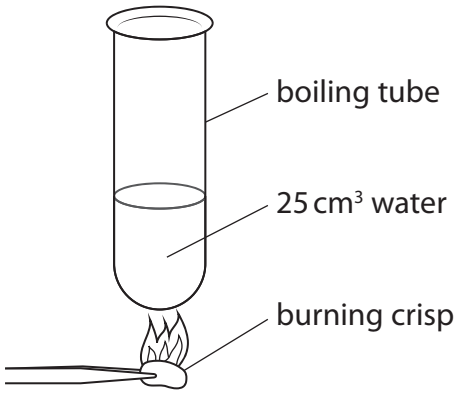
.....

(Total for Question 36 = 9 marks)

37 Some students investigate the energy per gram produced by five different varieties of potato crisps.

They do this by burning a crisp under a boiling tube containing 25 cm^3 of water and measuring the temperature rise.

The diagram shows the apparatus the students use.



The investigation involves the following steps. The steps are not in the correct order.

Step A: set fire to the crisp

Step B: measure the final temperature of the water

Step C: measure 25 cm^3 of water and pour it into the boiling tube

Step D: measure the mass of the crisp

Step E: hold the burning crisp under the boiling tube until the crisp stops burning

Step F: measure the starting temperature of the water

(a) Complete the flow chart by putting the steps in the correct order for the investigation. The first two steps have been done for you.

(2)

D	→	**C**	→		→		→		→	

(b) Name the piece of equipment the students should use to measure the 25 cm^3 of water.

(1)

.....

(c) State why the students need to measure the mass of the crisp.

(1)

.....

(d) Give one safety precaution the students should take when doing the investigation.

(1)

.....

(Total for Question 37 = 5 marks)

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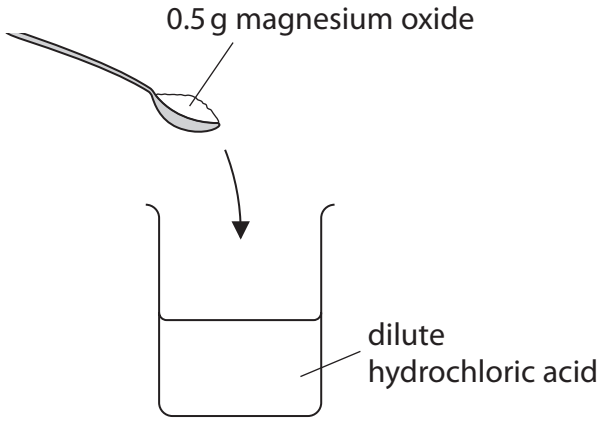
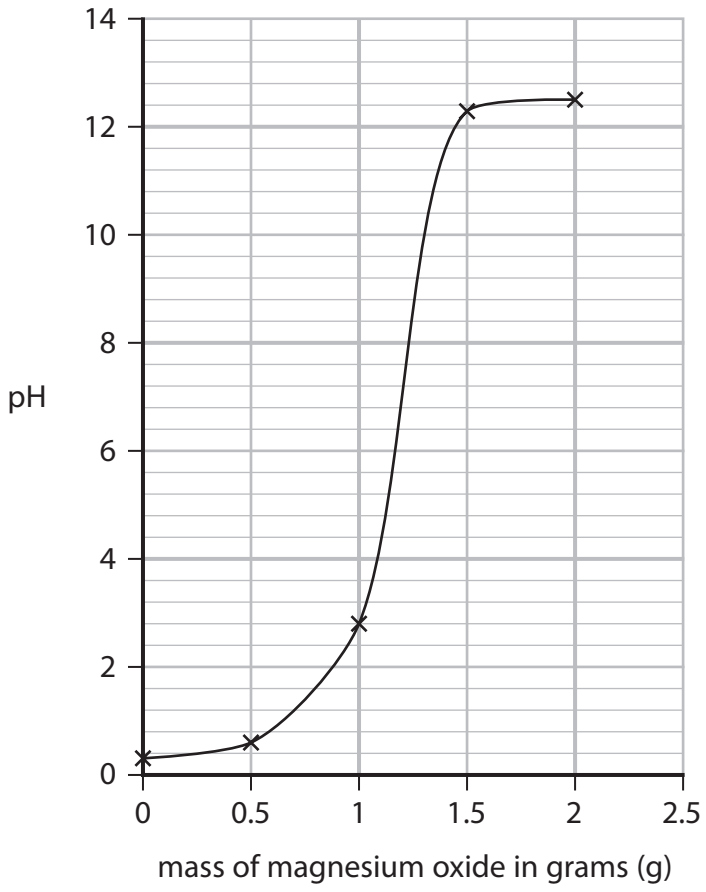
38 A student does an investigation to find out how much magnesium oxide must be added to 75 cm^3 of dilute hydrochloric acid to produce a neutral solution.



This is the student's method:

- add 0.5 g of magnesium oxide to the dilute hydrochloric acid and stir
- measure the pH of the solution
- continue adding magnesium oxide, 0.5 g at a time, and measure the pH of the solution after each addition

The student plots the results on a graph.



(a) Describe how the pH changes as the mass of magnesium oxide added increases.

(2)

(b) Use the graph to predict the mass of magnesium oxide needed to give a neutral solution.

You should show on the graph how you obtained your answer.

(2)

(c) Give one possible source of error that may affect the results.

(1)

(d) State what a student would need to do to show if the same mass of other metal oxides would neutralise 75 cm^3 of the dilute hydrochloric acid.

(1)

(Total for Question 38 = 6 marks)

TOTAL FOR SECTION B = 20 MARKS

TOTAL FOR PAPER = 80 MARKS

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