

iLowerSecondary
SCIENCE
SAMPLE ASSESSMENT
MATERIALS

**Pearson Edexcel International Award in Lower Secondary
Science (LSC11)**

For first teaching September 2018

First examination June 2019

Issue 1



Edexcel, BTEC and LCCI qualifications

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Introduction

The Pearson Edexcel International Award in Lower Secondary Science is designed for use in international schools. It is part of a suite of *iLowerSecondary* qualifications offered by Pearson.

These sample assessment materials have been developed to support this qualification and will be used as the benchmark to develop the assessment students will take.

General marking guidance

- All candidates must receive the same treatment. Examiners must mark the last candidate in exactly the same way as they mark the first.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than be penalised for omissions.
- Examiners should mark according to the mark scheme – not according to their perception of where the grade boundaries may lie.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification/indicative content will not be exhaustive. However different examples of responses will be provided at standardisation.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, a senior examiner must be consulted before a mark is given.
- Crossed-out work should be marked **unless** the candidate has replaced it with an alternative response.

Subject specific marking guidance

Symbols, terms used in the mark scheme

- Round brackets (): words inside round brackets are to aid understanding of the marking point but are not required to award the point.
- Curly brackets { }: indicate the beginning and end of a list of alternatives (separated by obliques) where necessary to avoid confusion.
- Oblique /: words or phrases separated by an oblique are alternatives to each other and either answer should receive full credit.
- ecf: indicates error carried forward which means that a wrong answer given in an early part of a question is used correctly to a later part of a question.

You will not see 'owtte' (or words to that effect). Alternative correct wording should be credited in every answer unless the ms has specified specific.

The Additional Guidance column is used for extra guidance to clarify any points in the mark scheme. It may be used to indicate:

- what will not be accepted for that marking point in which case the phrase 'do not accept' will be alongside the relevant marking point
- it might have examples of possible acceptable answers which will be adjacent to that marking point.

Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				
Pearson Edexcel International Award in Lower Secondary					<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div>				
Sample Assessment Materials for first teaching September 2018									
Time: 1 hour 20 minutes					Paper Reference LSC11/01				
<div style="text-align: center;"> <h1>Science</h1> <h2>Achievement test</h2> </div>									
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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1/1/



SECTION A

Answer ALL questions.

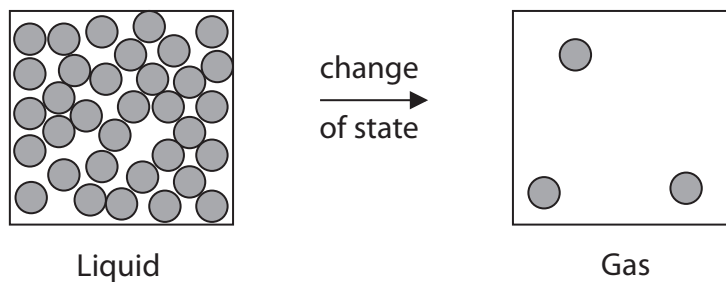
For questions 1 – 5 put a cross in one box ☐ to indicate your answer.
If you change your mind, put a line through the box ☒ and then put a cross in another box ☐.
Each question is worth one mark.

1 What is the name of the process in which plants use sunlight to produce glucose?

- ☐ A breathing
- ☐ B digestion
- ☐ C photosynthesis
- ☐ D respiration

(Total for Question 1 = 1 mark)

2 The diagram shows a change of state.



What change of state is shown in the diagram?

- ☐ A condensing
- ☐ B evaporation
- ☐ C freezing
- ☐ D melting

(Total for Question 2 = 1 mark)

3 Which of these is an example of a non-contact force?

- ☐ A air resistance
- ☐ B friction
- ☐ C magnetism
- ☐ D upthrust

(Total for Question 3 = 1 mark)

4 What keeps a satellite in orbit around the Earth?

- ☐ A air resistance
- ☐ B friction
- ☐ C gravity
- ☐ D static electricity

(Total for Question 4 = 1 mark)

5 Which of these is caused by a lack of vitamin C?

- ☐ A anaemia
- ☐ B blindness
- ☐ C rickets
- ☐ D scurvy

(Total for Question 5 = 1 mark)

6 The table shows the pH of four acidic liquids.

Acidic liquid	pH
lemonade	4.4
vinegar	3.0
ant sting	2.3
grapefruit juice	3.1

(a) Which liquid is most acidic?

(1)

(b) An acid can be neutralised with an alkali.

Complete the word equation for this type of neutralisation reaction.

(1)

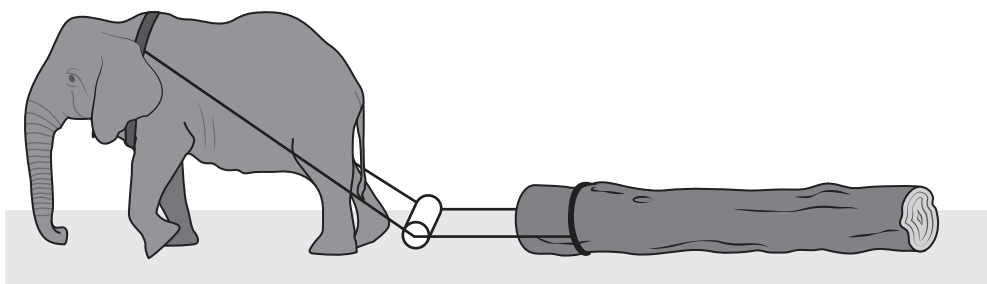
acid + alkali \longrightarrow salt +

(Total for Question 6 = 2 marks)

- 7 The diagram shows an elephant trying to pull a large log along the ground.

The elephant pulls with a force of 15 000 N.

The log does not move because of the force of friction acting on it.



- (a) Draw an arrow on the diagram to show the force of friction acting on the log.

(1)

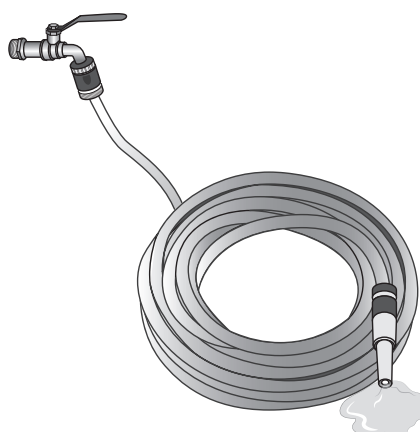
- (b) A different elephant that can pull with a force of 20 000 N is able to pull the log along the ground.

What conclusion can be made about the size of the force of friction acting on the log?

(1)

(Total for Question 7 = 2 marks)

- 8 The diagram shows a garden hosepipe.



PVC is a polymer used to make hosepipes.

Give **one** property of PVC that makes it suitable for making hosepipes.

(Total for Question 8 = 1 mark)

- 9 This is the symbol for an atom of an element in the Periodic Table.

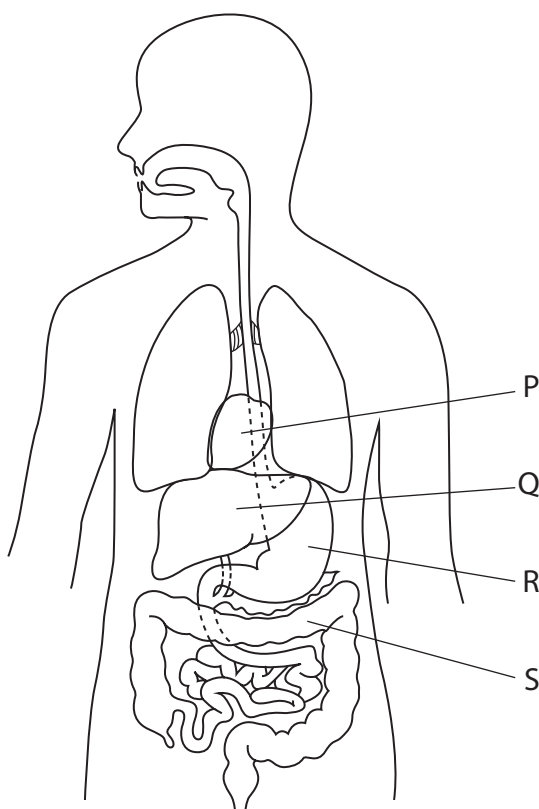


What is the mass number of this atom?

.....

(Total for Question 9 = 1 mark)

- 10 The diagram shows some organs in a human body labelled P, Q, R and S.



- (a) Give the letter that labels the stomach.

(1)

.....

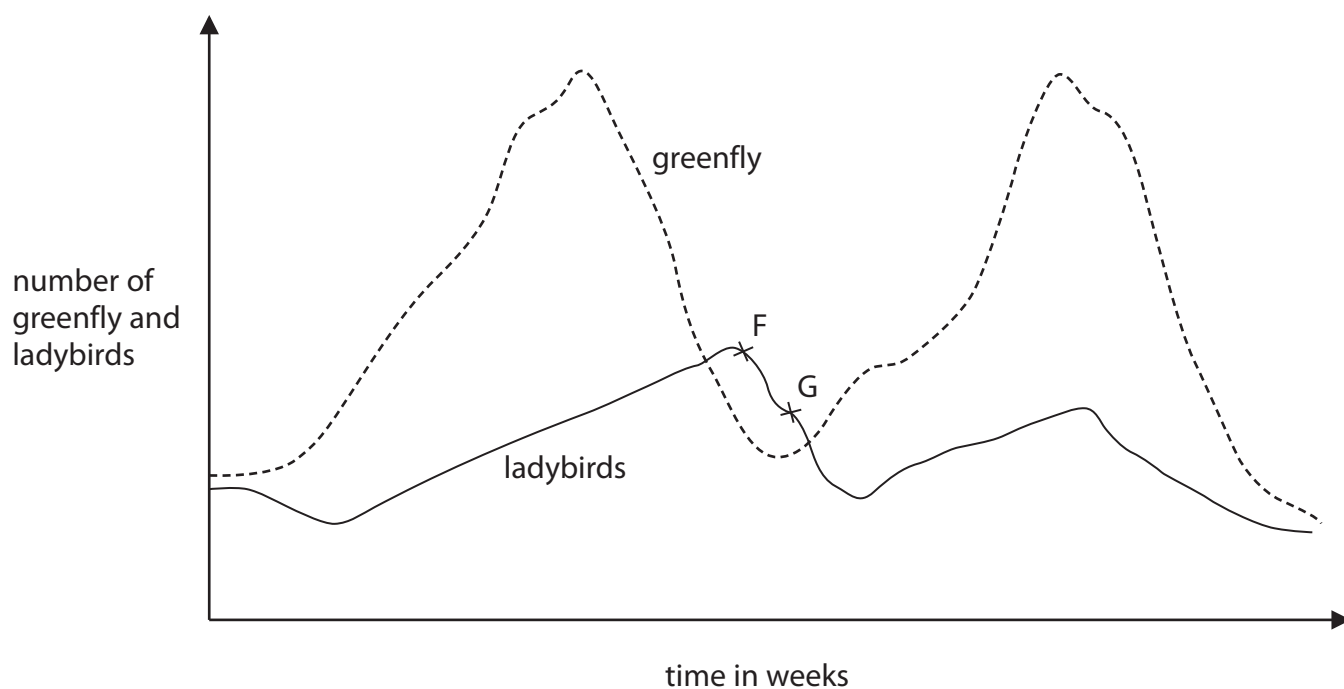
- (b) Give the main function of the stomach.

(1)

(Total for Question 10 = 2 marks)

11 Greenfly feed on rose bushes. Ladybirds feed on greenfly.

The graph shows how the number of greenfly and ladybirds on a rose bush changes over several weeks.



Explain what happens to the number of ladybirds between points F and G on the graph.

(2)

(Total for Question 11 = 2 marks)

DO NOT WRITE IN THIS AREA

- 13 Diagram 1 shows two children on a seesaw.
The seesaw is not balanced.

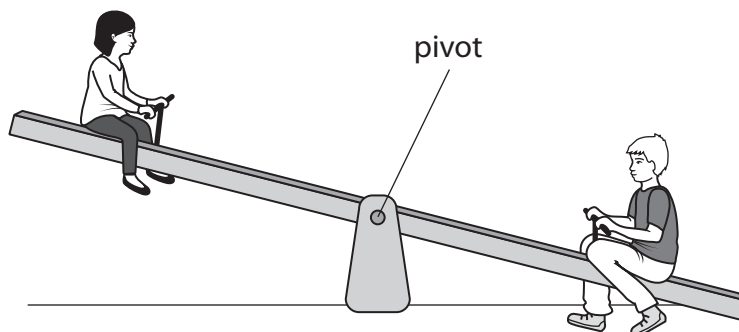


Diagram 1

Diagram 2 shows a person pushing on the end of the seesaw to make the seesaw balance.

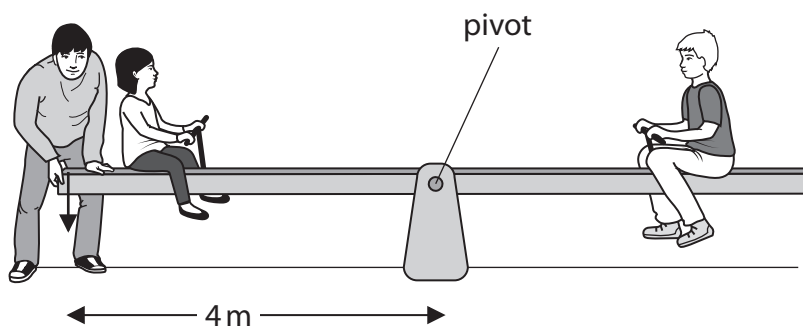


Diagram 2

A moment of 100 Nm is needed to make the seesaw balance.

Calculate the force in newtons (N), that needs to be applied by the person to balance the seesaw.

Use the equation

$$\text{moment} = \text{force} \times \text{distance from pivot}$$

(2)

force = N

(Total for Question 13 = 2 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

For questions 14 – 18 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 ☐.

14 What is the symbol for the unit of work?

- ☐ A J
- ☐ B kg/m
- ☐ C m/s
- ☐ D N

(Total for Question 14 = 1 mark)

15 Which pair is found in both animal and plant cells?

- ☐ A cell membrane and mitochondria
- ☐ B chloroplasts and permanent vacuole
- ☐ C cytoplasm and permanent vacuole
- ☐ D nucleus and cell wall

(Total for Question 15 = 1 mark)

16 This is the first part of the word equation for the reaction of copper carbonate with sulfuric acid.

copper carbonate + sulfuric acid \longrightarrow

Which row correctly completes the equation?

- | | |
|----------------------------|--|
| <input type="checkbox"/> A | copper + carbon dioxide + water |
| <input type="checkbox"/> B | copper sulfate + hydrogen |
| <input type="checkbox"/> C | copper sulfate + carbon dioxide + hydrogen |
| <input type="checkbox"/> D | copper sulfate + carbon dioxide + water |

(Total for Question 16 = 1 mark)

17 Which statement about viruses is correct?

- ☐ A they are destroyed by antibiotics
- ☐ B they are living organisms
- ☐ C they have a nucleus
- ☐ D they reproduce inside living cells

(Total for Question 17 = 1 mark)

18 Magnesium burns in oxygen to form magnesium oxide.

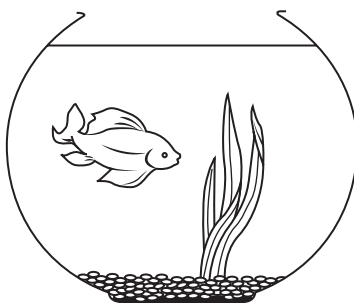
What is the correct chemical equation for this reaction?

- ☐ 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 18 = 1 mark)

19 The diagram shows a fish and some pond weed in a fish tank.

Tick **two** characteristics that both the fish and pond weed have in common.



(2)

They:

breathe

eat

grow

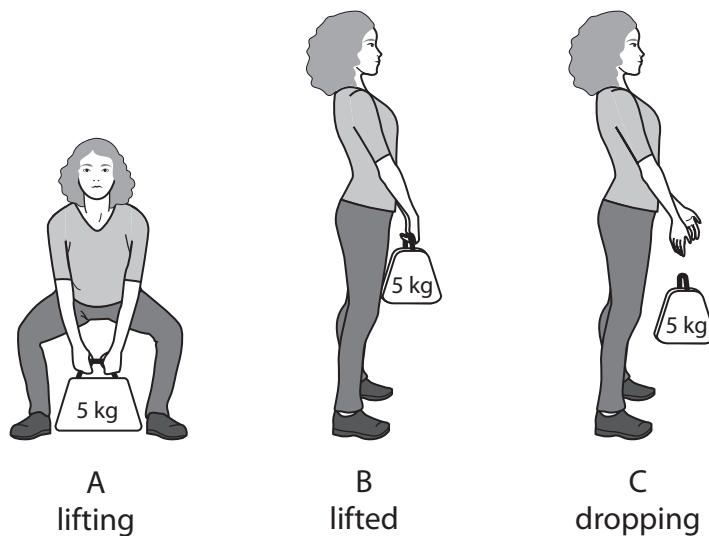
make their own food

reproduce

(Total for Question 19 = 2 marks)

DO NOT WRITE IN THIS AREA

21 Diagrams A, B and C show a student lifting and then dropping a 5 kg mass.



- (a) The box contains five different ways that energy can be stored.
Use words from the box to answer Questions (i) and (ii).

chemical	elastic potential	gravitational potential	kinetic	thermal
----------	-------------------	-------------------------	---------	---------

- (i) In diagram A, the student is using energy stored in their body to lift the mass.
Complete the sentence.

(1)

The energy stored in the student's body is

..... energy.

- (ii) In diagram C, an energy transfer is taking place as the mass is dropping.
Complete the sentence to show this energy transfer.

(1)

..... energy is

transferred to energy.

(Total for Question 21 = 2 marks)

22 State **one** difference between a single circulatory system and a double circulatory system.

(Total for Question 22 = 1 mark)

23 Four metals, D, L, M and P, are placed in solutions of their sulfates.
The table shows if a displacement reaction occurs.

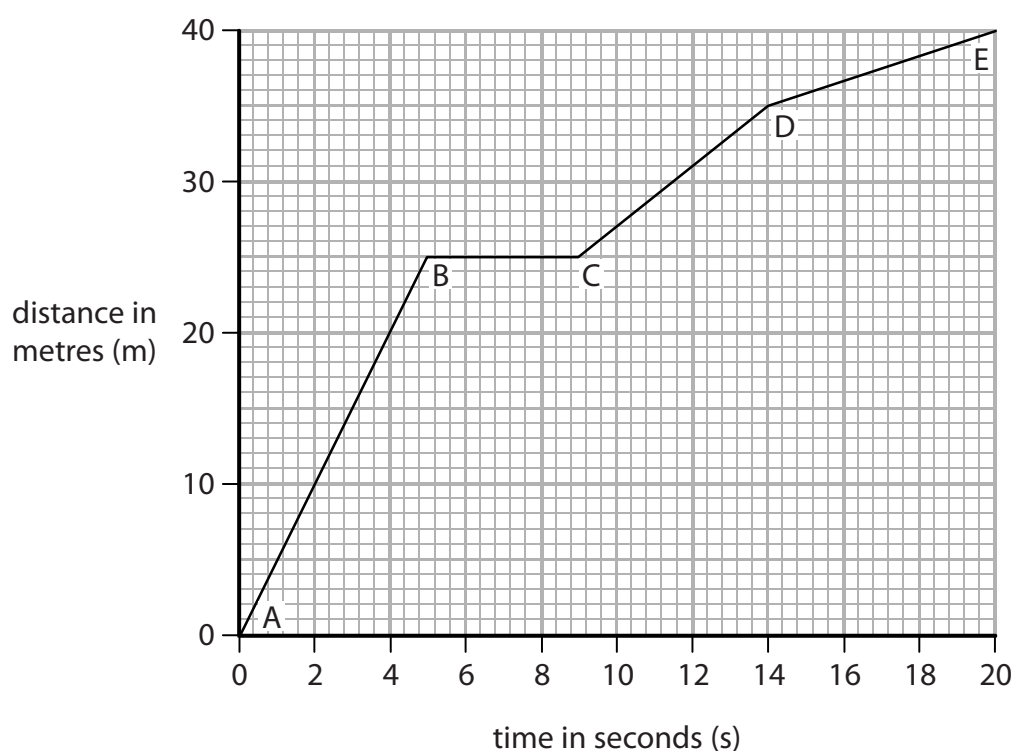
Metal	Solution of			
	D sulfate	L sulfate	M sulfate	P sulfate
D	no reaction	reaction	no reaction	no reaction
L	no reaction	no reaction	no reaction	no reaction
M	reaction	reaction	no reaction	reaction
P	reaction	reaction	no reaction	no reaction

Write the letters of the four metals in order from most reactive to least reactive.

<div><div></div><div>.....</div></div>	<div><div></div><div>.....</div></div>	<div><div></div><div>.....</div></div>	<div><div></div><div>.....</div></div>
most reactive			least reactive

(Total for Question 23 = 1 mark)

24 The graph shows how far a cyclist travelled in 20 seconds.



(a) How far does the cyclist travel in the first 4 seconds?

(1)

.....m

(b) In which part of the journey was the cyclist travelling fastest?

Tick the correct box.

(1)

A to B

☐

B to C

☐

C to D

☐

D to E

☐

(c) Calculate the cyclist's average speed for the whole journey.

(2)

.....m/s

(Total for Question 24 = 4 marks)

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

- 25** The photograph shows a statue that is made of limestone. Limestone contains calcium carbonate.



© Bildagentur Zoonar GmbH/Shutterstock

The damage to the statue is the result of sulfur dioxide entering the atmosphere.

Sulfur dioxide is a gas that is produced when fuels containing sulfur are burnt.
Sulfur dioxide gas can escape into the atmosphere.

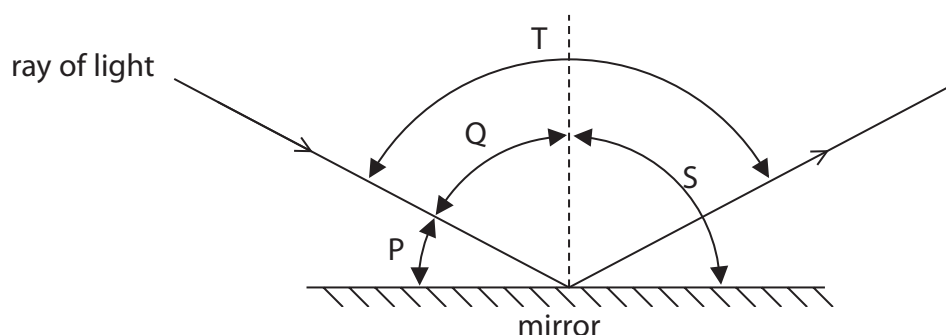
Explain how sulfur dioxide in the atmosphere leads to the damage shown in the photograph.

(3)

(Total for Question 25 = 3 marks)

For questions 26 – 30 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 ☐.

26 The diagram shows a ray of light shining on to a plane mirror.



Which angle is the **angle of incidence**?

- ☐ A P
- ☐ B Q
- ☐ C S
- ☐ D T

(Total for Question 26 = 1 mark)

27 Which sub-atomic particles are found in the nucleus of an atom?

- ☐ A electrons and neutrons
- ☐ B electrons, neutrons and protons
- ☐ C electrons and protons
- ☐ D neutrons and protons

(Total for Question 27 = 1 mark)

28 Which statement describes a habitat?

- ☐ A a community of animals and plants together with where they live
- ☐ B all the different organisms that live together in one place
- ☐ C all the organisms of the same species living together
- ☐ D the place where an organism lives

(Total for Question 28 = 1 mark)

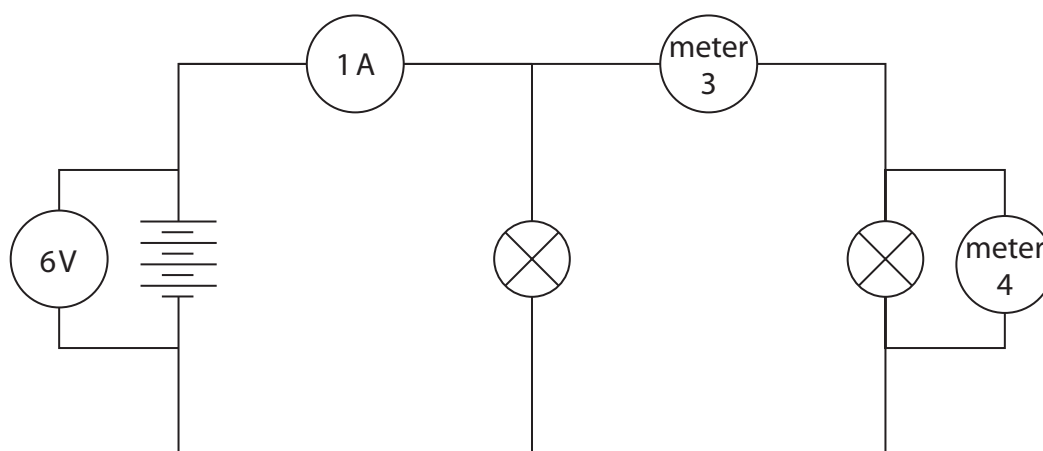
29 When magnesium is burned in oxygen the reaction produces heat, light and a white ash.

What type of reaction is this?

- ☐ **A** displacement
- ☐ **B** exothermic
- ☐ **C** reduction
- ☐ **D** thermal decomposition

(Total for Question 29 = 1 mark)

30 The diagram shows a circuit containing two identical bulbs and four meters.



Which row of the table shows the correct readings for meter 3 and meter 4?

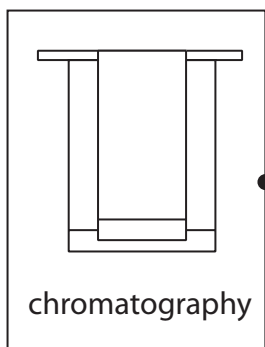
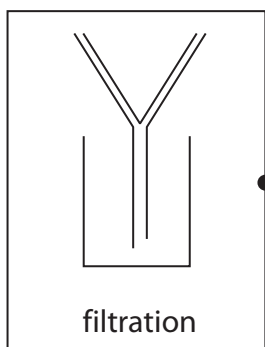
	meter 3	meter 4
<input type="checkbox"/> A	0.5A	3V
<input type="checkbox"/> B	1.0A	3V
<input type="checkbox"/> C	0.5A	6V
<input type="checkbox"/> D	1.0A	6V

(Total for Question 30 = 1 mark)

31 The diagram shows two methods of separating mixtures.

Draw **one** straight line from each method to the mixture it will separate.

Method



Mixture

• two soluble food colourings

• sugar and salt

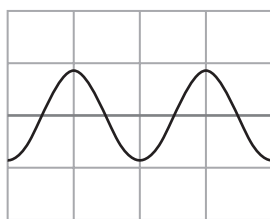
• an insoluble solid and a liquid

• a solvent and a solution

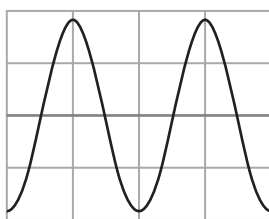
• sugar dissolved in water

(Total for Question 31 = 2 marks)

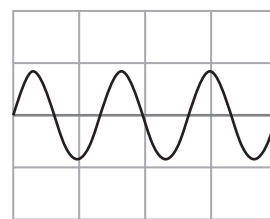
32 The diagram shows the wave traces of three different sounds A, B and C.



A



B



C

(a) Which **two** sounds have the same amplitude?

(1)

(b) Which **two** sounds have the same pitch?

(1)

(Total for Question 32 = 2 marks)

33 Pyramids of numbers represent the number of organisms at each stage in a food chain.

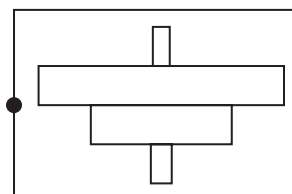
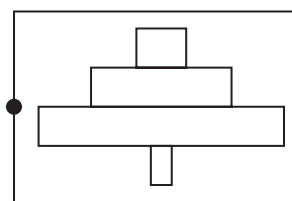
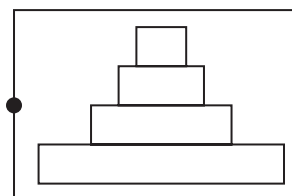
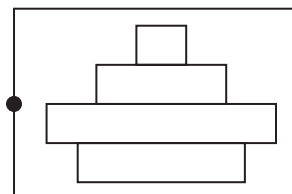
Draw **one** straight line from each description of a food chain to the pyramid of numbers that best represents the food chain.

Description of food chain

caterpillars feed on oak trees
small birds eat caterpillars
sparrowhawks eat small birds

grasshoppers eat grass
shrews eat grasshoppers
owls eat shrews

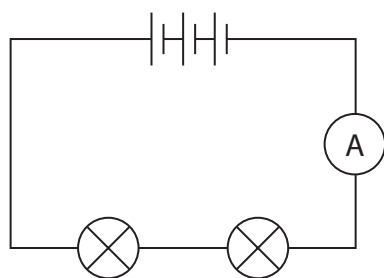
Pyramid of numbers



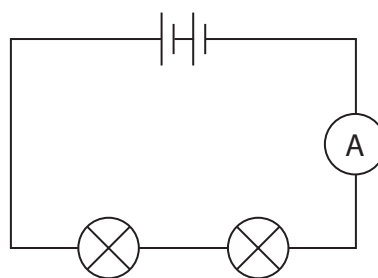
(Total for Question 33 = 2 marks)

34 The diagram shows two circuits in which all the cells, bulbs and meters are identical.

A student investigates the size of the current in each circuit.



circuit A



circuit B

(a) What does the student use to measure the current in each circuit?

(1)

(b) The student discovers that there is a smaller current in circuit B.

Explain, in terms of resistance and potential difference, why the current is smaller in circuit B.

(2)

(Total for Question 34 = 3 marks)

35 When a small piece of sodium is dropped into water it reacts quickly.
The products of the reaction are sodium hydroxide solution and hydrogen gas.

- (a) Complete the equation for this reaction by adding the missing number and the missing state symbol.

(2)



- (b) Give the name of another metal that reacts with water in a similar way to sodium.

(1)

(Total for Question 35 = 3 marks)

36 Selective breeding is used to develop varieties of wheat with short, strong stems.

- (a) The selective breeding of wheat involves the following four stages.
These are not in the correct order.

1. breed the plants together to produce seeds
2. select the plants with the shortest, strongest stems
3. repeat this for many generations
4. grow the seeds into new plants

Complete the flow chart by putting these stages in the correct order.
The first one has been done for you.

(1)



- (b) Explain **one** advantage of growing wheat with short, strong stems.

(2)

(Total for Question 36 = 3 marks)

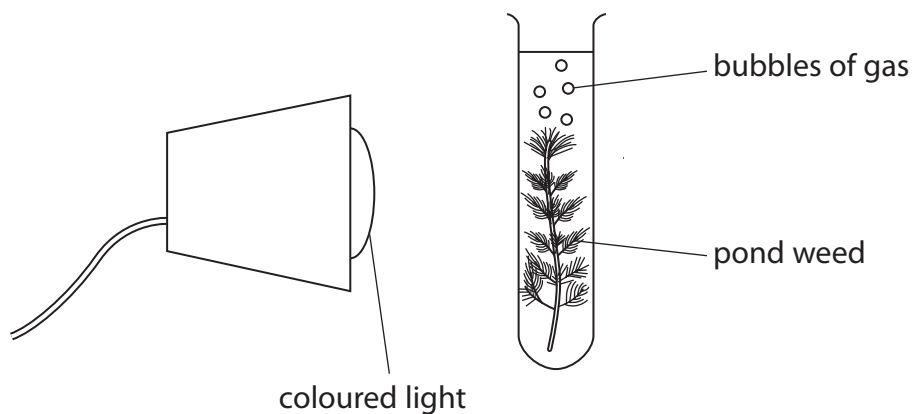
TOTAL FOR SECTION A = 60 MARKS

SECTION B

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

37 A student investigates the effect of different coloured light on the rate of photosynthesis.

The diagram shows the apparatus the student uses.



During photosynthesis, bubbles of gas are given off by the pond weed.

The student measures the rate of photosynthesis by counting the number of bubbles of gas given off in two minutes.

The student uses four different coloured lights and tests each colour three times.

The student makes this prediction:

The rate of photosynthesis will be fastest in green light.

(a) Name the gas given off by the pond weed during photosynthesis.

(1)

(b) The table shows the student's results.

Colour of light	Number of bubbles of gas in two minutes		
	Test 1	Test 2	Test 3
blue	40	43	41
red	35	37	35
yellow	13	19	14
green	9	11	10

(i) What has the student done to ensure their results are reliable?

(1)

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

Draw a circle around the anomalous result in the table.

(1)

(iii) Explain why the results **do not** support the student's prediction.

(2)

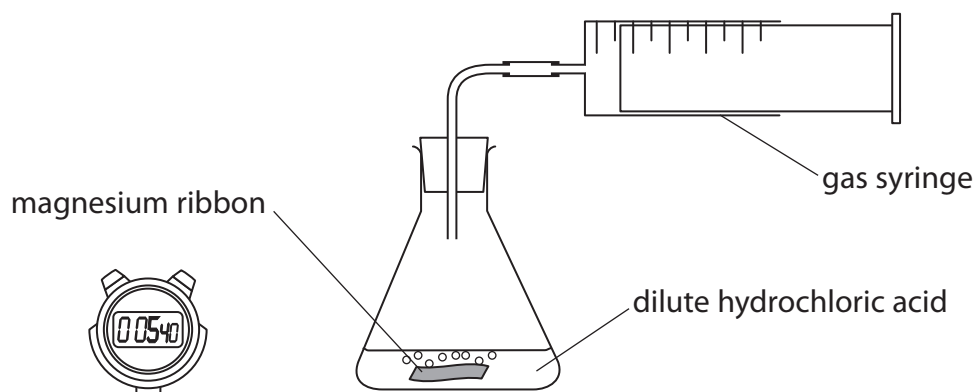
(Total for Question 37 = 5 marks)

38 A student investigates the rate at which hydrogen gas is given off when magnesium ribbon reacts with dilute hydrochloric acid.

The student's method is:

- measure 25 cm^3 of dilute hydrochloric acid and pour it into a conical flask
- drop a 2.5 cm length of magnesium ribbon into the acid and immediately connect the conical flask to a gas syringe
- record the total volume of gas collected in the gas syringe at five-second intervals.

The diagram shows the apparatus the student uses.



(a) Explain **one** safety precaution that should be taken when using acid.

(2)

Safety precaution

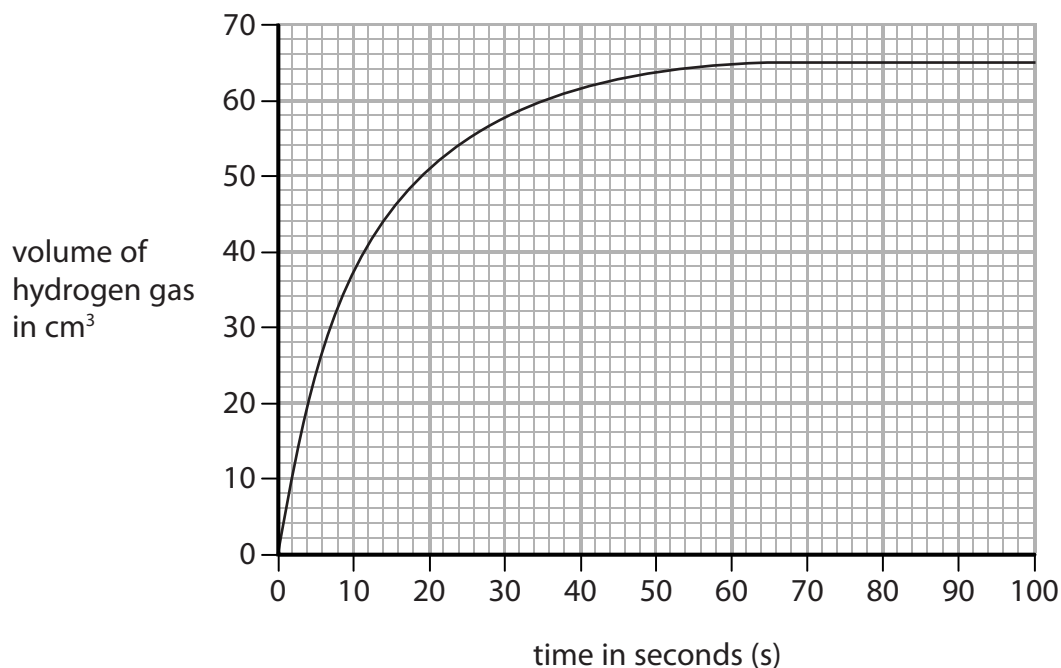
Reason

(b) Name the piece of equipment the student should use for measuring the 25 cm^3 of acid.

(1)

.....

(c) The student uses their results to produce this graph.



The reaction stopped at 70 seconds.

- (i) State the total volume of hydrogen gas produced when the reaction stopped at 70 seconds.

(1)

.....cm³

- (ii) Explain how the graph shows that the reaction stopped at 70 seconds.

(2)

.....

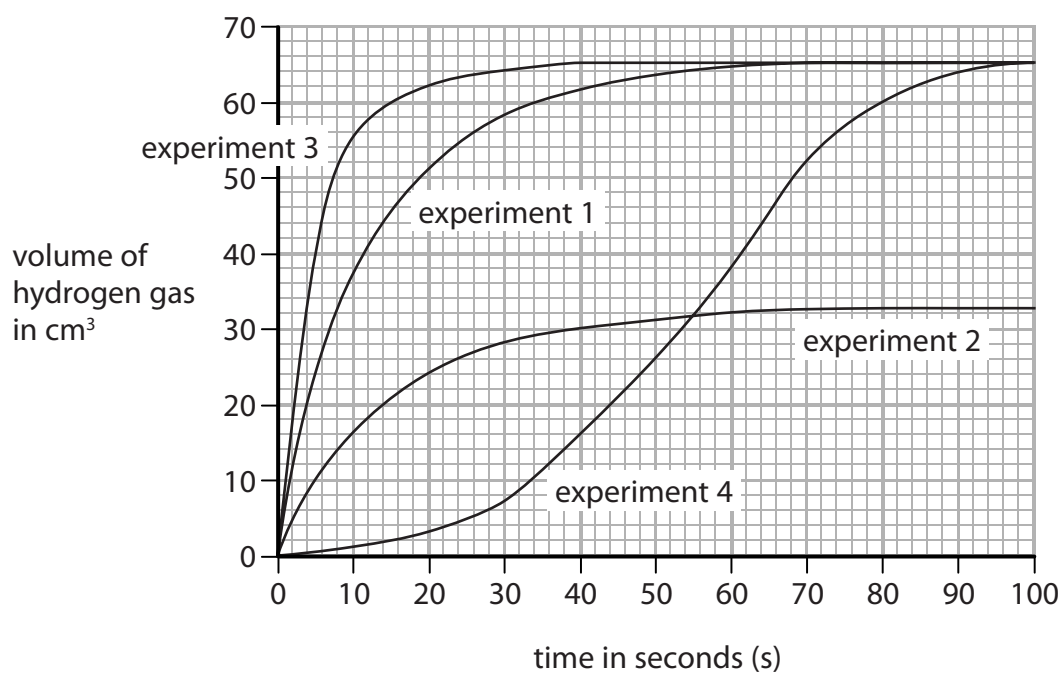
.....

.....

.....

- (d) The student repeats the experiment three more times using the same acid but at different temperatures.

These are the student's results.



In which experiment was the acid at the highest temperature?

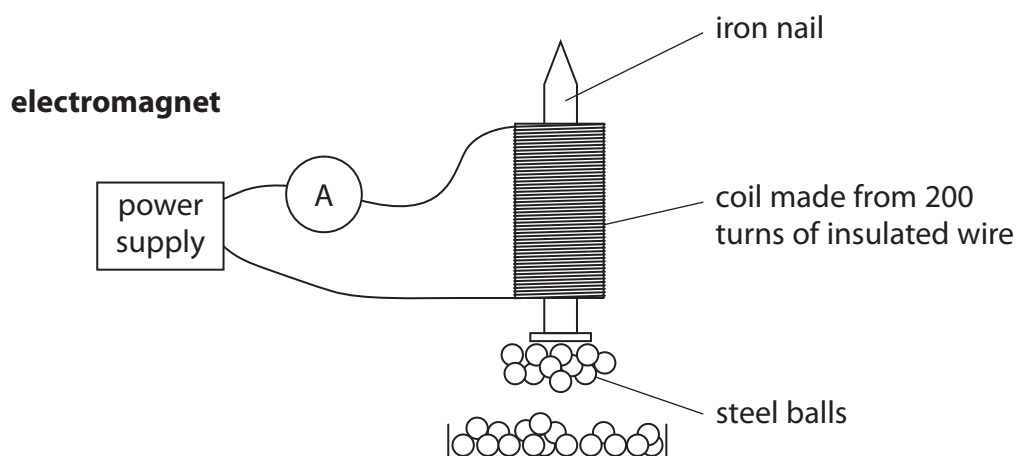
(1)

Experiment number

(Total for Question 38 = 7 marks)

39 A student investigates how the size of the current through an electromagnet affects the strength of the electromagnet.

The diagram shows the apparatus the student uses.



The student's method is:

- wind 200 turns of insulated wire around an iron nail to make a coil
- connect the coil to a power supply
- place the electromagnet above some steel balls
- switch on the power supply
- count the number of steel balls picked up by the electromagnet
- repeat the experiment with different currents.

(a) (i) State the **dependent** variable in this investigation.

(1)

(ii) State the **independent** variable in this investigation.

(1)

(b) State **one** other variable that the student needs to control in this investigation.

(1)

(c) The table shows the student's results.

Current in amperes (A)	Number of steel balls picked up
0	0
1	2
2	6
3	14
4	26
5	44

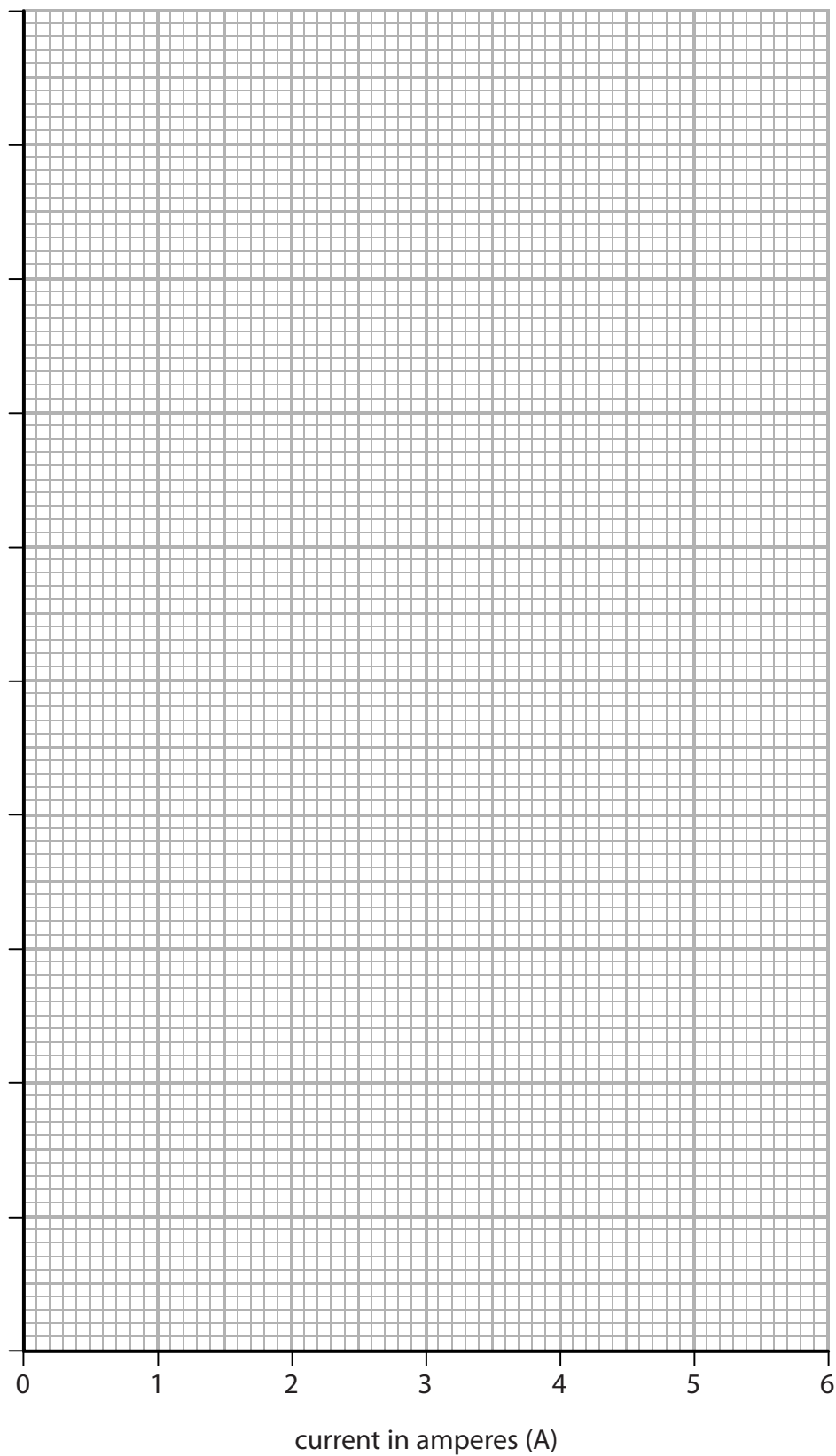
(i) Plot the results given in the table on the grid below.

Use a suitable scale for the vertical axis.

Join the points with a curve of best fit.

(3)

number of steel
balls picked up



(ii) What conclusion can the student make about the effect of electric current on the strength of the electromagnet?

(2)

(Total for Question 39 = 8 marks)

TOTAL FOR SECTION B = 20 MARKS

TOTAL FOR PAPER = 80 MARKS

DO NOT WRITE IN THIS AREA

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Mark scheme

Question number	Answer	Mark
1	C photosynthesis	(1)

Question number	Answer	Mark
2	B evaporation	(1)

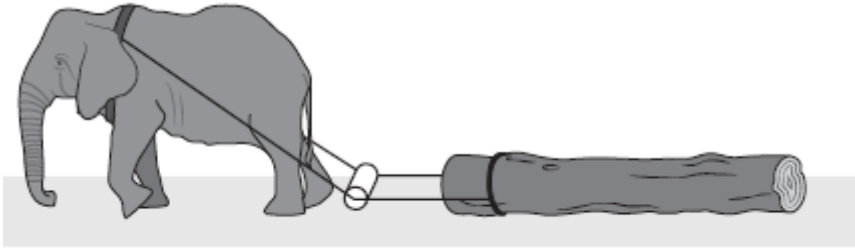
Question number	Answer	Mark
3	C magnetism	(1)

Question number	Answer	Mark
4	C gravity	(1)

Question number	Answer	Mark
5	D scurvy	(1)

Question number	Answer	Mark
6(a)	ant sting	(1)

Question number	Answer	Mark
6(b)	acid + alkali \longrightarrow salt + water	(1)

Question number	Answer	Mark
7(a)		(1)

Question number	Answer	Additional guidance	Mark
7(b)	(force of friction acting on the log is) between 15 000 and 20 000 N	Accept any value quoted greater than 15 000 N but less than or equal to 20 000 N.	(1)

Question number	Answer	Mark
8	<p>Award one mark for any one of the following:</p> <ul style="list-style-type: none"> • (PVC is) flexible • (PVC is) waterproof • (PVC) does not rot/rust • (PVC is) easily shaped (into tubes/pipes). <p>Accept any other appropriate response.</p>	(1)

Question number	Answer	Mark
9	9	(1)

Question number	Answer	Mark
10(a)	R	(1)

Question number	Answer	Additional guidance	Mark
10(b)	digests food	Accept an accurate description of the digestion process.	(1)

Question number	Answer	Mark
11	<p>Award one mark for identification of what happens to the number of ladybirds between F and G on the graph and one mark for linked expansion.</p> <p>identification: number of ladybirds decreases/drops (1)</p> <p>expansion: because of insufficient/less greenfly to feed on (1)</p> <p>Accept any other appropriate response.</p>	(2)

Question number	Answer	Mark
12(a)	Award one mark for identification of why arteries have thick muscular walls and one mark for linked expansion. identification: they need to be strong (1) expansion: because blood in the arteries is under high pressure (1) Accept any other appropriate response.	(2)

Question number	Answer	Mark
12(b)	capillary	(1)

Question number	Answer	Additional guidance	Mark
13	Rearrangement (1) force = moment ÷ distance from pivot Substitution (1) force = 100 ÷ 4 (= 25(N))	Award 2 marks for correct answer with no working.	(2)

Question number	Answer	Mark
14	A J	(1)

Question number	Answer	Mark
15	A cell membrane and mitochondria	(1)

Question number	Answer	Mark
16	D copper sulfate + carbon dioxide + water	(1)

Question number	Answer	Mark
17	D they reproduce inside living cells	(1)

Question number	Answer	Mark
18	D $2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$	(1)

Question number	Answer	Additional guidance	Mark										
19	<p>They:</p> <table><tr><td>breathe</td><td><input type="checkbox"/></td></tr><tr><td>eat</td><td><input type="checkbox"/></td></tr><tr><td>grow</td><td><input checked="" type="checkbox"/></td></tr><tr><td>make their own food</td><td><input type="checkbox"/></td></tr><tr><td>reproduce</td><td><input checked="" type="checkbox"/></td></tr></table>	breathe	<input type="checkbox"/>	eat	<input type="checkbox"/>	grow	<input checked="" type="checkbox"/>	make their own food	<input type="checkbox"/>	reproduce	<input checked="" type="checkbox"/>	For each incorrect answer subtract one mark – no negative scores.	(2)
breathe	<input type="checkbox"/>												
eat	<input type="checkbox"/>												
grow	<input checked="" type="checkbox"/>												
make their own food	<input type="checkbox"/>												
reproduce	<input checked="" type="checkbox"/>												

Question number	Answer	Mark
20(a)	A/D	(1)

Question number	Answer	Mark
20(b)	B and C	(1)

Question number	Answer	Mark
21(a)(i)	chemical	(1)

Question number	Answer	Mark
21(a)(ii)	<p>gravitational potential energy is transferred to kinetic energy.</p> <p>Both answers must be in the correct order.</p>	(1)

Question number	Answer	Mark
22	<p>Award one mark for any one of the following:</p> <ul style="list-style-type: none"> in a single circulatory system, blood passes through the heart once, in one complete circuit in a double circulatory system, blood passes through the heart twice, in one complete circuit single circulatory systems have two chambers in the heart and a double circulatory system has four. <p>Accept any other appropriate response.</p>	(1)

Question number	Answer	Mark
23	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; padding: 5px; margin: 0 10px;">M</div> <div style="border: 1px solid black; padding: 5px; margin: 0 10px;">P</div> <div style="border: 1px solid black; padding: 5px; margin: 0 10px;">D</div> <div style="border: 1px solid black; padding: 5px; margin: 0 10px;">L</div> </div> <p style="text-align: center; margin-top: 5px;"> most reactive → least reactive </p> <p>Correct order only.</p>	(1)

Question number	Answer	Mark
24(a)	20±1 (metres)	(1)

Question number	Answer	Additional guidance	Mark
24(b)	<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div>A to B <input checked="" type="checkbox"/></div> <div>B to C <input type="checkbox"/></div> <div>C to D <input type="checkbox"/></div> <div>D to E <input type="checkbox"/></div> </div>	For each incorrect answer subtract one mark – no negative scores.	(1)

Question number	Answer	Additional guidance	Mark
24(c)	<p>Substitution (1)</p> <p>40/20</p> <p>Evaluation (1)</p> <p>2 (m/s)</p>	Award two marks for correct answer with no working.	(2)

Question number	Answer	Mark
25	<p>Award one mark for identification of how sulfur dioxide has caused the damage to limestone and two marks for linked expansion, up to a maximum of 3 marks.</p> <p>identification: sulfur dioxide dissolves in moisture/rain (in the atmosphere/air) (1)</p> <p>expansion: therefore producing acid rain (1), acid (rain) reacts with (calcium) carbonate/limestone (1)</p> <p>Accept any other appropriate response.</p>	(3)

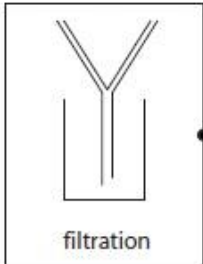
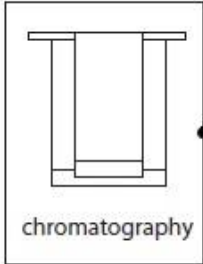
Question number	Answer	Mark
26	B Q	(1)

Question number	Answer	Mark
27	D neutrons and protons	(1)

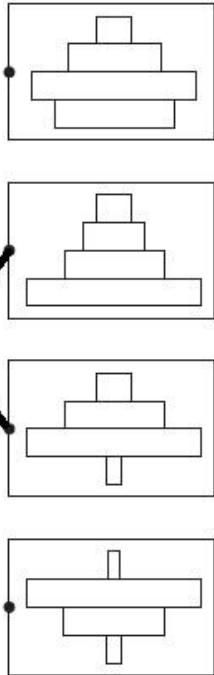
Question number	Answer	Mark
28	D the place where an organism lives	(1)

Question number	Answer	Mark
29	B exothermic	(1)

Question number	Answer	Mark			
30	<table border="1"> <tr> <td>C</td> <td>0.5A</td> <td>6V</td> </tr> </table>	C	0.5A	6V	(1)
C	0.5A	6V			

Question number	Answer	Mark
31	<p>Award one mark for each correct line, up to a maximum of two marks.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Method</p>  <p>filtration</p>  <p>chromatography</p> </div> <div style="text-align: center;"> <p>Mixture</p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">two soluble food colourings</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">• sugar and salt</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">• an insoluble solid and a liquid</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">• a solvent and a solution</div> <div style="border: 1px solid black; padding: 5px;">• sugar dissolved in water</div> </div> </div> <p>Do not award answers with more than one line to and from any of the boxes.</p>	(2)

Question number	Answer	Mark
32(a)	A and C	(1)
Question number	Answer	Mark
32(b)	A and B	(1)

Question number	Answer	Mark
33	<p>Award one mark for each correct line, up to a maximum of two marks.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Description of food chain</p> <div style="border: 1px solid black; padding: 5px; margin: 10px;"> caterpillars feed on oak trees small birds eat caterpillars sparrowhawks eat small birds </div> <div style="border: 1px solid black; padding: 5px; margin: 10px;"> grasshoppers eat grass shrews eat grasshoppers owls eat shrews </div> </div> <div style="text-align: center;"> <p>Pyramid of numbers</p>  </div> </div> <p>Do not award answers with more than one line to and from any of the boxes.</p>	(2)

Question number	Answer	Mark
34(a)	ammeter	(1)

Question number	Answer	Mark
34(b)	<p>Award one mark for identification of why the current is smaller in circuit B and one mark for linked expansion.</p> <p>identification: the (total) resistance (of the bulbs to the current) in both circuits is the same (1)</p> <p>expansion: and the number of cells/potential difference (which produce the flow of electrons/current) is less in circuit B</p> <p>Accept any other appropriate response.</p>	(2)

Question number	Answer	Mark
35(a)	... 2 (1) $\text{H}_2\text{O (l)} + 2\text{Na (s)} \longrightarrow 2\text{NaOH (...aq (1).....)} + \text{H}_2 \text{ (g)}$	(2)

Question number	Answer	Additional guidance	Mark
35(b)	lithium/potassium	Accept any other Group 1 metal.	(1)

Question number	Answer	Mark
36(a)	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; padding: 2px 10px; margin: 0 5px;">2</div> → <div style="border: 1px solid black; padding: 2px 10px; margin: 0 5px;">1</div> → <div style="border: 1px solid black; padding: 2px 10px; margin: 0 5px;">4</div> → <div style="border: 1px solid black; padding: 2px 10px; margin: 0 5px;">3</div> </div> <p>Correct order only</p>	(1)

Question number	Answer	Mark
36(b)	<p>Award one mark for identification of an advantage of growing wheat with short, strong stems and one mark for linked expansion.</p> <p>identification: crop less susceptible to damage by wind/rain (1)</p> <p>expansion: therefore increased crop yield (1)</p> <p>Accept any other appropriate response.</p>	(2)

Question number	Answer	Mark
37(a)	oxygen	(1)

Question number	Answer	Mark
37(b)(i)	<p>repeated (each) experiment three times</p> <p>Accept any other appropriate response.</p>	(1)

Question number	Answer	Mark																							
37(b)(ii)	<table><tr><th rowspan="2">Colour of light</th><th colspan="3">Number of bubbles of gas in two minutes</th></tr><tr><th>Test 1</th><th>Test 2</th><th>Test 3</th></tr><tr><td>blue</td><td>40</td><td>43</td><td>41</td></tr><tr><td>red</td><td>35</td><td>37</td><td>35</td></tr><tr><td>yellow</td><td>13</td><td>19</td><td>14</td></tr><tr><td>green</td><td>9</td><td>11</td><td>10</td></tr></table>	Colour of light	Number of bubbles of gas in two minutes			Test 1	Test 2	Test 3	blue	40	43	41	red	35	37	35	yellow	13	19	14	green	9	11	10	(1)
Colour of light	Number of bubbles of gas in two minutes																								
	Test 1	Test 2	Test 3																						
blue	40	43	41																						
red	35	37	35																						
yellow	13	19	14																						
green	9	11	10																						

Question number	Answer	Additional guidance	Mark
37(b)(iii)	<p>Award one mark for identification of why the results do not support the student's prediction and one mark for linked expansion.</p> <p>identification: the green light has the slowest rate of photosynthesis (1)</p> <p>expansion: because it produces the least bubbles of gas/oxygen in one minute (1)</p> <p>Accept any other appropriate response.</p>	Accept the reverse argument that blue/red/yellow have a faster rate of photosynthesis because they produce more bubbles.	(2)

Question number	Answer	Mark
38(a)	<p>Award one mark for identification of safety precaution and one mark for linked expansion, up to a maximum of two marks.</p> <ul style="list-style-type: none"> identification: wear safety spectacles (1) expansion: because acid will harm/burn/damage the eyes (1) <p>OR</p> <ul style="list-style-type: none"> identification: wear gloves (1) expansion: because acid can harm/burn/damage the skin (1) <p>OR</p> <ul style="list-style-type: none"> identification: wipe up spills (1) expansion: because (spilt) acid can harm other students/students' belongings (1) <p>Accept any other appropriate response.</p>	(2)

Question number	Answer	Mark
38(b)	measuring cylinder	(1)

Question number	Answer	Mark
38(c)(i)	$65 \pm 1 \text{ (cm}^3\text{)}$	(1)

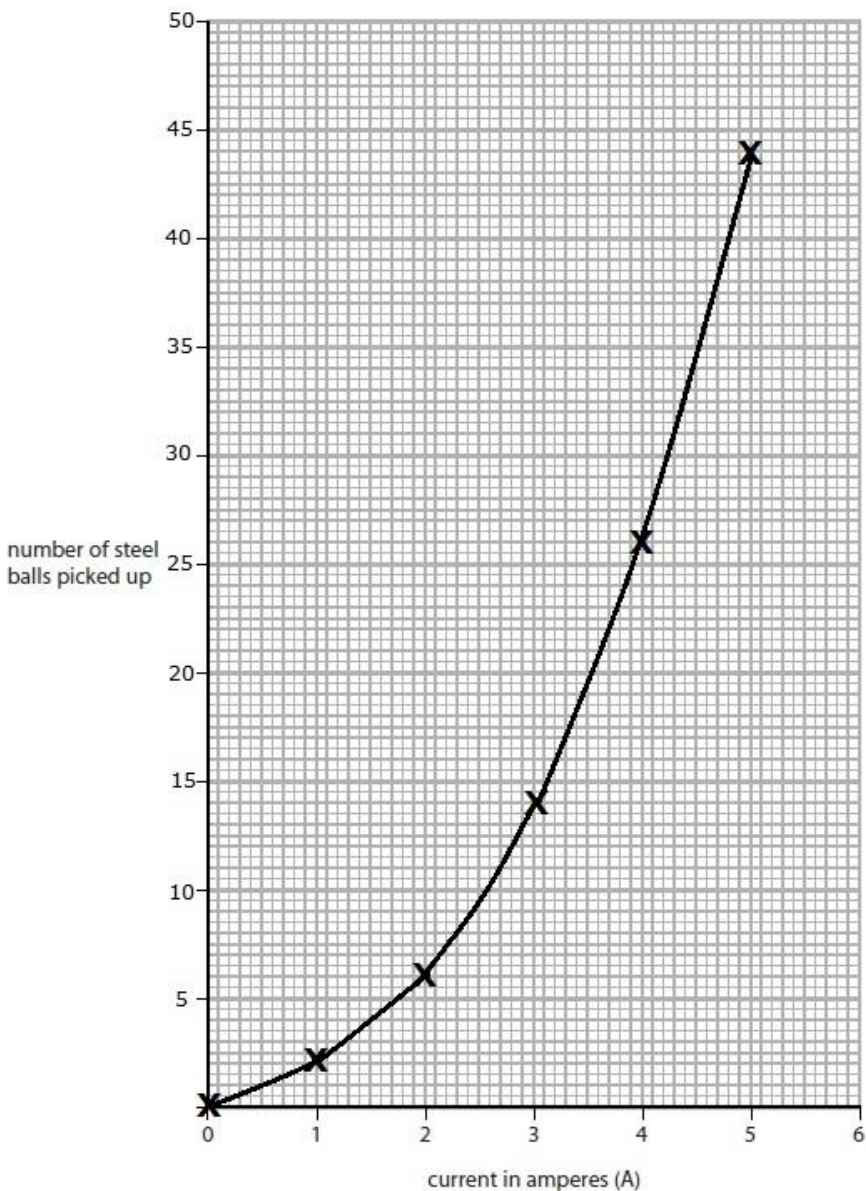
Question number	Answer	Mark
38(c)(ii)	Award one mark for identification of how the graph shows that the reaction stopped at 70 seconds and one mark for linked expansion. identification: {the graph/line is no longer rising}/{the graph/line is level/flat} (1) expansion: because no more gas is being given off (1) Accept any other appropriate response.	(2)

Question number	Answer	Mark
38(d)	(Experiment number) 3	(1)

Question number	Answer	Mark
39(a)(i)	number of steel balls picked up Accept any other appropriate response.	(1)

Question number	Answer	Mark
39(a)(ii)	the current	(1)

Question number	Answer	Mark
39(b)	Award one mark for any one of the following: <ul style="list-style-type: none"> size of steel balls mass of steel balls distance of electromagnet/nail from steel balls. Accept any other appropriate response.	(1)

Question number	Answer	Mark
39(c)(i)	<p>Suitable vertical scale: 1 large square = 5 steel balls (1)</p> <p>All points plotted to ± 1 steel ball (1)</p> <p>All points including the origin joined with a smooth continuous curve (1)</p>  <p>number of steel balls picked up</p> <p>current in amperes (A)</p>	(3)

Question number	Answer	Additional guidance	Mark
39(c)(ii)	<p>Award one mark for each of the following.</p> <p>as the current increases, (1) the (magnetic) strength of the electromagnet increases (1)</p> <p>Accept any other appropriate response.</p>	Accept the reverse (as the current decreases, the strength of the electromagnet decreases).	(2)

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