

First name	
Last name	
School	

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CE AT 13+

**SCIENCE**



Foundation

Specimen Paper

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Date

Time allowed: 60 minutes

**Instructions**

Answer all the questions.

**Information**

You may use a calculator.

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1. Underline the word or phrase which best completes the following:

(a) The ripe anthers of a flower release

**nectar**

**ovules**

**pollen grains**

**scent**

(b) hydrochloric acid + sodium hydroxide sodium chloride → water

The reaction shown above is an example of

**competition**

**neutralisation**

**oxidation**

**rusting**

(c) The Moon is in the Earth's shadow during a

**full Moon phase**

**lunar eclipse**

**new Moon phase**

**solar eclipse**

(d)



Rickets is a disease which can be caused by a diet lacking in

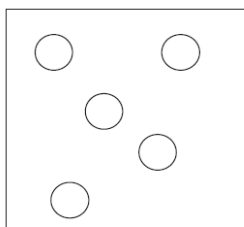
**calcium**

**iron**

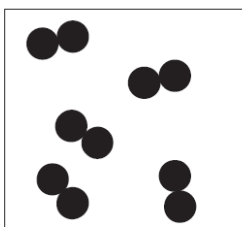
**magnesium**

**zinc**

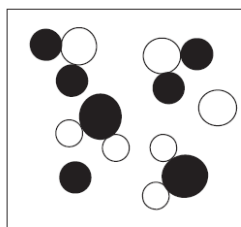
(e) The diagram which could represent particles in a mixture is



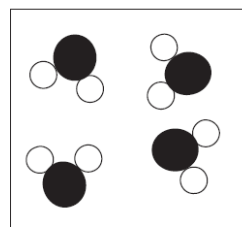
**A**



**B**



**C**



**D**

(f) The unit of measurement for weight is

**force**

**kilogram**

**metre**

**Newton**

(g) The symbol Na stands for an atom of

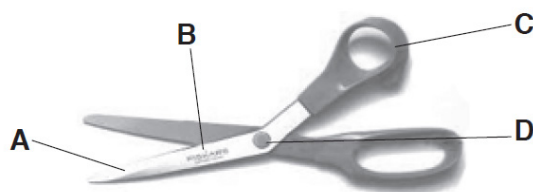
**neon**

**nitrogen**

**silicon**

**sodium**

(h) The diagram below shows a pair of scissors as an example of a lever.



The letter which shows where the force should be applied is

**A                      B                      C                      D**

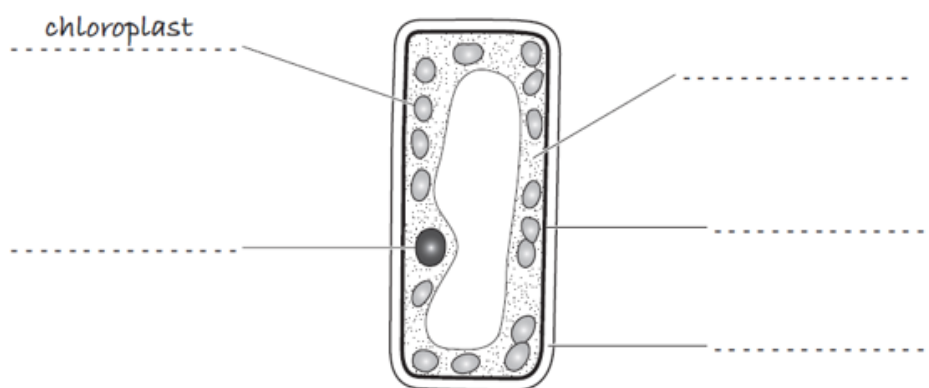
[8]

2. The diagram below shows a leaf cell.

(a) Add the names of the structures in the box below to complete the labels on the diagram.

*(One has been done for you.)*

<b>cell membrane</b>	<b>cell wall</b>	<b>chloroplast</b>	<b>cytoplasm</b>	<b>nucleus</b>
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[2]

(b) State the function of

(i) the nucleus .....

[1]

(ii) the cell wall .....

[1]

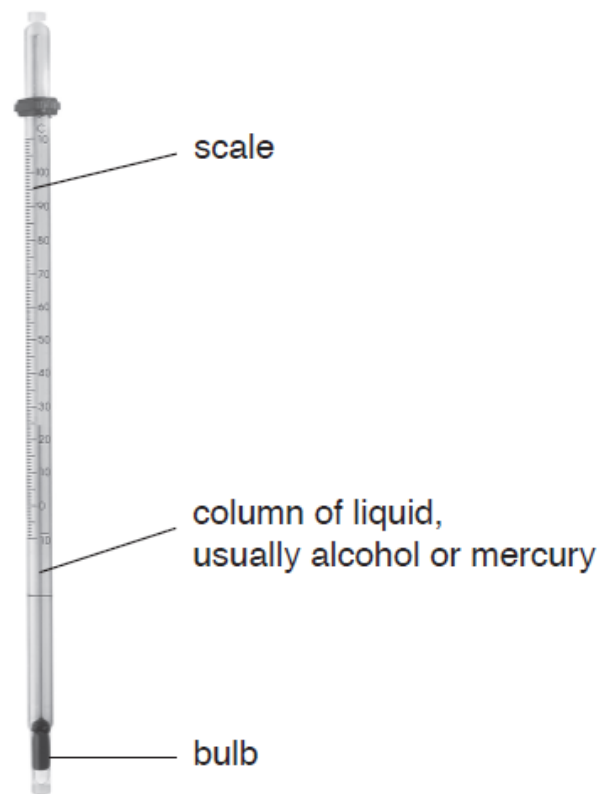
(c) Explain the function of the chloroplasts in a plant cell.

.....

.....

[2]

3. A thermometer is a device used to measure temperature.



(a) Complete the following sentences by circling the correct word or phrase in the boxes.

When the bulb is placed in a hot place, the column of liquid will 

rise up
move down

 the tube inside the thermometer.

This happens because the liquid 

expands
contracts

 on heating.

If the bulb is then put into a cold place the column of liquid will 

rise up
move down

 the

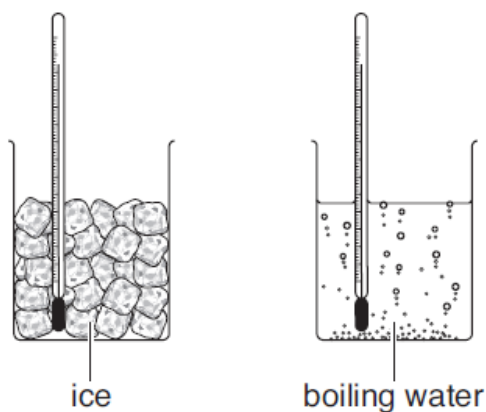
tube because the liquid 

constricts
contracts

 when it is cooled.

[4]

Some students were given a beaker full of ice and a beaker of boiling water.



They measured the temperature in each beaker with a thermometer.

(b) (i) What is the freezing point of pure water? ..... °C [1]

(ii) What is the boiling point of pure water? ..... °C [1]

The students placed a plastic bottle full of water in the freezer and left it to freeze.

(c) (i) What did the students observe when the bottle was removed from the freezer?

..... [1]

(ii) Explain your answer.

..... [1]

4. The picture below shows a Formula 1 racing car.  
The wide tyres offer good grip.  
The car is also designed to have a high top speed.



- (a) Suggest and explain how the shape of the car allows it to reach very high speeds.

.....  
..... [2]

The total area of the tyres in contact with the ground is 1400 cm<sup>2</sup>.

The force (weight) of the car is 7000 N

- (b) Calculate the pressure exerted by the car on the ground using the formula:

$$\text{pressure (N/cm}^2\text{)} = \text{force (N)} \div \text{area (cm}^2\text{)}$$

Show your working.

Answer: ..... N/cm<sup>2</sup>  
[2]

- (c) Underline either **true** or **false** after each of the following statements:

(i) The sound wave produced has a lower amplitude. **true false** [1]

(ii) Loud sounds always cause permanent damage to hearing. **true false** [1]

The car completed the lap in a time of 1 minute 20 seconds (80 seconds).

A lap is 4km (4000 metres).

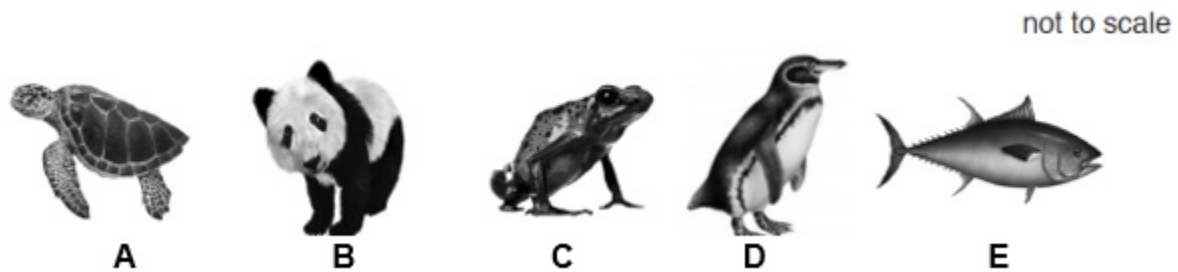
- (d) Calculate the mean speed in metres/second (m/s) for this lap using the formula:

$$\text{speed (m/s)} = \text{distance (m)} \div \text{time (s)}$$

Show your working.

Answer: ..... m/s  
[2]

5. The pictures below show five different animals.



(a) Why are all of these animals classified as vertebrates?

..... [1]

(b) Complete the following sentences about the animals shown in the pictures above.

Animal ..... is an amphibian because it .....

Animal ..... is a bird because it .....

Animal ..... is a fish because it .....

Animal ..... is a mammal because it .....

Animal ..... is a reptile because it .....

[5]

(c) Each of the animals shown above is an endangered species.

(i) What does the term *endangered* mean?

..... [1]

(ii) Choose **one** animal from those shown above and suggest two reasons why this animal might be endangered.

animal chosen .....

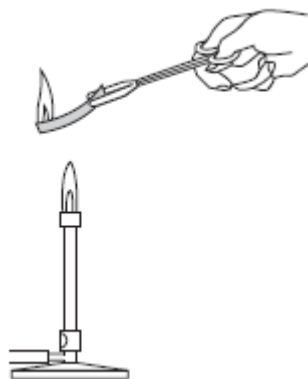
reason 1: .....

reason 2: .....

[2]

6. This question is about magnesium.

If a piece of magnesium ribbon is held in a flame it burns with a very bright light to form a white powder.



(a) (i) Suggest one safety measure which should be taken when carrying out this reaction.

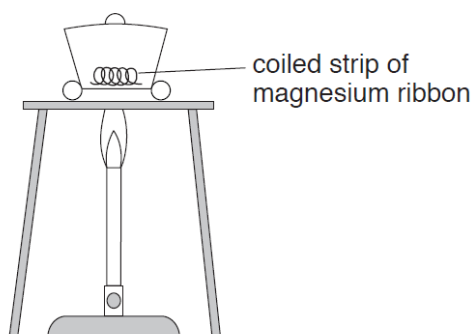
..... [1]

(ii) Complete the word equation for the reaction.

magnesium + ..... → magnesium oxide [1]

Some students weigh pieces of magnesium ribbon.

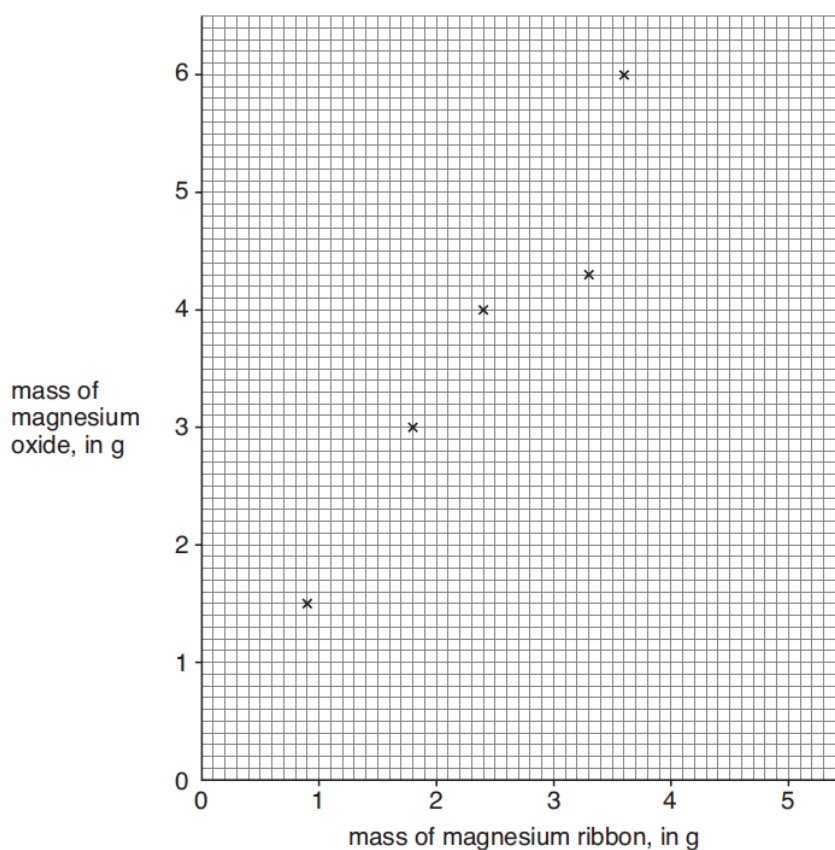
They heat them in a crucible until the reaction is complete.



They weigh the magnesium oxide which is formed.

Their results are plotted on the graph opposite.





(b) Look at the graph and complete the following:

(i) Draw a ring around the result which does not fit the pattern. [1]

(ii) Draw a straight line through the remaining points and the origin. [1]

(iii) Use your graph to find out how much magnesium oxide is formed if 3.0 g of magnesium is burnt.

*(Show your working on the graph.)*

..... g

[2]

Another student forgets to weigh his magnesium ribbon.

He finds that he has 2.5 g of magnesium oxide after heating.

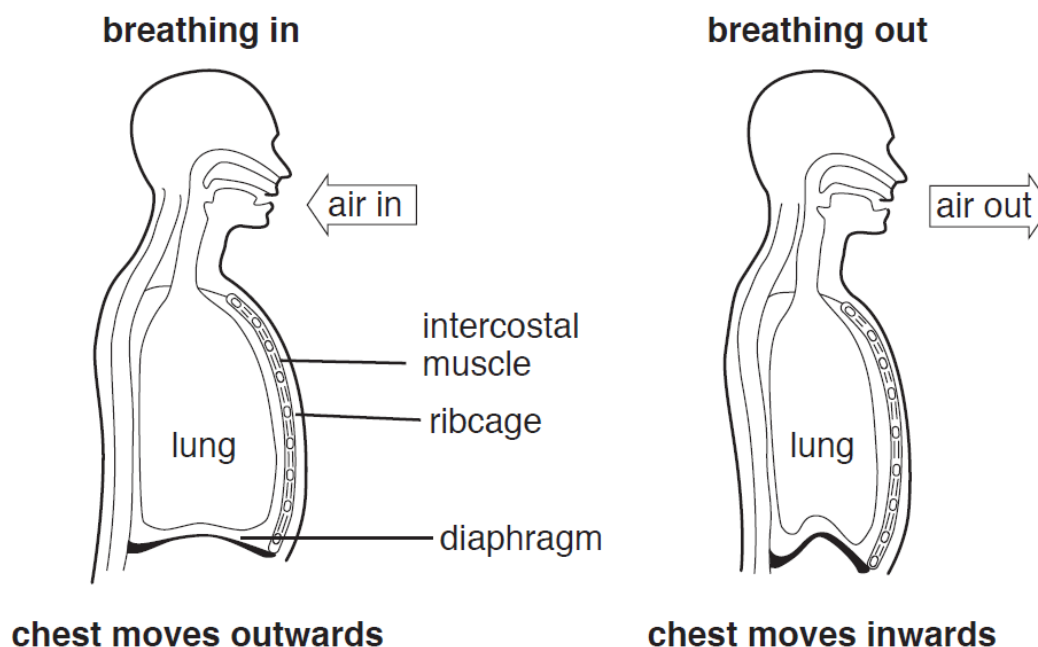
(iv) Use your graph to find out the mass of his magnesium ribbon.

*(Show your working on the graph.)*

..... g

[2]

7. The diagrams below show the movements of the chest and diaphragm during breathing in and out.



- (a) Choose the correct words from the box below to complete the following sentences which explain breathing.

Each word is used once only.

<b>contracts</b>	<b>decreases</b>	<b>downwards</b>	<b>increases</b>
<b>lungs</b>	<b>relax</b>	<b>ribs</b>	<b>upwards</b>

**When breathing in:**

The intercostal muscles between the ..... contract.

The diaphragm muscle ..... causing it to move .....

The volume within the chest ..... so air is drawn into the .....

**When breathing out:**

The intercostal muscles ..... so the ribcage moves in.

The diaphragm muscle relaxes so it moves ..... so the air is forced out from the lungs because the volume in the chest .....

[8]

Some people suffer from asthma which can cause them problems with their breathing.

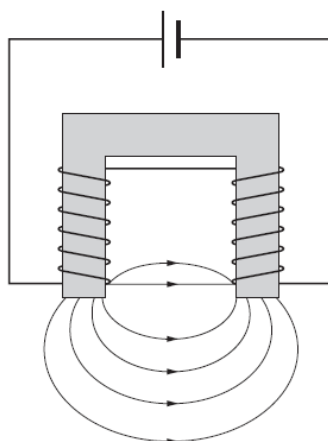
(b) How can these difficulties be overcome when they occur?

..... [1]

(c) Suggest another possible cause of problems with breathing.

..... [1]

8. The picture below shows a simple electromagnet.



(d) State two ways to increase the strength of this electromagnet.

1: .....

2: ..... [2]

(e) Suggest one use for an electromagnet.

..... [1]

(f) Suggest how you could find out which pole of the electromagnet is North-seeking and which is South-seeking.

.....

.....

..... [2]

(g) Label the iron core on the diagram.

[1]

9. Robert is studying two elements, iron and sulphur.



iron



sulphur

The table below shows the properties of these elements.

element	appearance	is the element soluble in water?	is the element magnetic?	does the element conduct electricity?
iron	grey, shiny metal	no	<b>yes</b>	<b>yes</b>
sulphur	yellow solid	no	<b>no</b>	no

(a) (i) Which of the two elements is a non-metal? ..... [1]

(ii) Explain how Robert's results show that this element is a non-metal.

.....

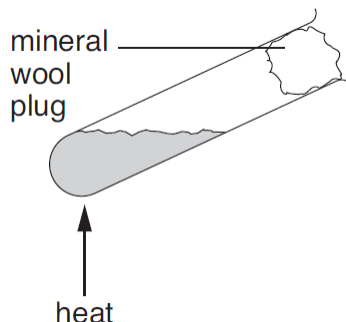
..... [2]

(b) Suggest a method of separating a mixture of iron filings and powdered sulphur.

.....

..... [2]

Robert put some of the mixture of iron filings and powdered sulphur in a small test tube.  
 He heated the mixture strongly using a Bunsen burner.  
 He saw a red glow spread through the mixture.  
 He allowed the material to cool down and then tested its properties.



He completed the table below to show the properties of the product on the heatproof mat.

	appearance of product	is the product soluble in water?	is the product magnetic?	does the product conduct electricity?
after heating	dull, grey solid	no	no	no

- (c) (i) Give two pieces of evidence which show that a chemical reaction took place when Robert heated the mixture.

..... [1]

- (ii) Complete the word equation for the reaction.

iron + sulphur → ..... [1]

- (d) State two ways in which the properties of the new product are different from the properties of the iron and sulphur mixture.

1: .....

2: ..... [2]

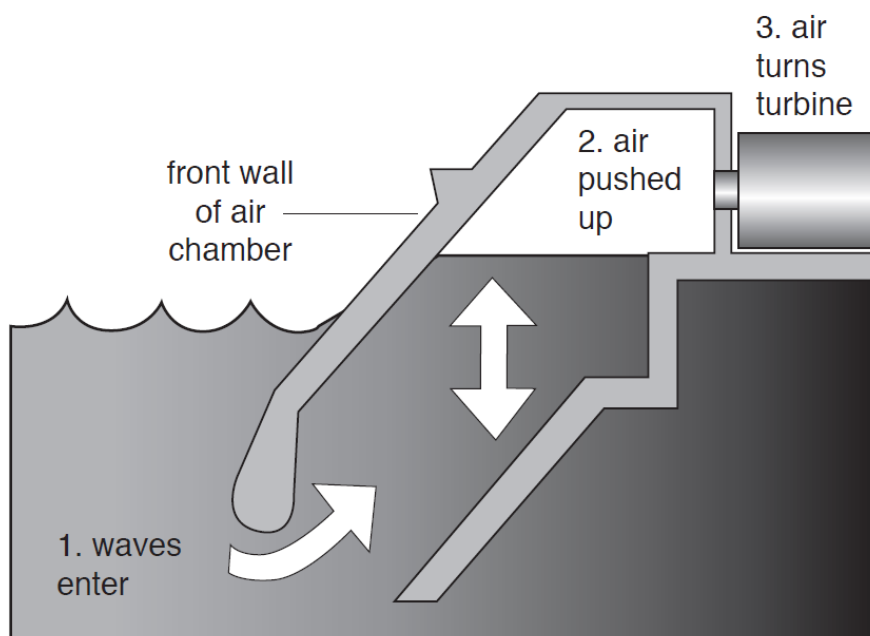
10. There are several methods of generating electricity from renewable energy sources.

A wave power station is one such method.

Wind creates waves.

(a) What is the ultimate source of the energy which causes wind?

..... [1]



Energy conversions take place when air is forced through the turbine which turns a generator.

(b) (i) Name the energy store in the air that is forced through the turbine.

..... [1]

(ii) Name the energy pathway by which energy is transmitted from the generator to nearby homes.

..... [1]

- (c) Suggest one advantage and one disadvantage of using wave power to generate electricity.

advantage: ..... [1]

disadvantage: ..... [1]

- (d) (i) Explain what is meant by a renewable energy source.

..... [1]

- (ii) Name two other sources of renewable energy.

1: ..... [1]

2: ..... [1]

(Total marks: 80)