Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

General Certificate of Secondary Education
Foundation Tier
June 2013

Science B

SCB1FP

Unit 1 My World

F

Written Paper

Wednesday 5 June 2013 1.30 pm to 2.30 pm

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 7(b) should be answered in continuous prose.
  In this question you will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.

Advice
- In all calculations, show clearly how you work out your answer.

Answer **all** questions in the spaces provided.

1 Materials are made of chemical elements.

Scientists often use chemical symbols when writing about elements.

1 (a) Draw **one** line from each element to the correct chemical symbol.

Element	Chemical symbol
Carbon	N
Nitrogen	Na
Sodium	S
	C

(3 marks)

1 (b) Draw a ring round the correct answer to complete each sentence.

1 (b) (i) Carbon is an element because it contains only one type of

atom. / compound. / molecule.

(1 mark)

1 (b) (ii) Oxygen (O_2) is

an atom. / an ion. / a molecule.

(1 mark)

1 (b) (iii) Water (H_2O) is

- a compound.
- an element.
- a mixture.

(1 mark)

1 (c) Rock salt is a mixture. Pure salt can be separated from rock salt.

Sentences **A**, **B**, **C**, **D** and **E** describe how pure salt can be obtained from rock salt. The sentences are not in the correct order.

A Evaporate the water by heating

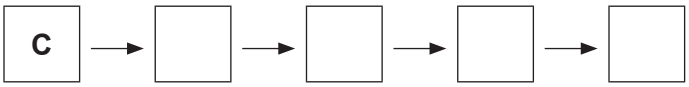
B Mix the rock salt with water

C Crush the rock salt

D Stir to dissolve the salt

E Filter the mixture

Put the sentences **A**, **B**, **C**, **D** and **E** in the correct order. The first one has been done for you.

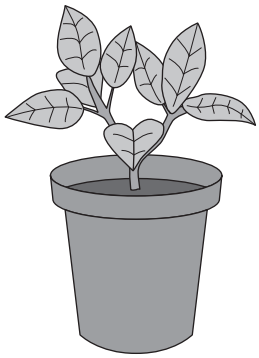


(3 marks)

9

Turn over for the next question

2 All living organisms need a supply of energy and materials to stay alive.



2 (a) (i) What is the name of the process plants use to make carbohydrates?

.....

(1 mark)

2 (a) (ii) Where do plants get energy from to make carbohydrates?

.....

(1 mark)

2 (a) (iii) Plants need carbon to make their food.

Where do plants get the carbon they need from?

.....

(1 mark)

2 (b) (i) Where do animals get the energy, carbon and minerals they need?

.....

(1 mark)

2 (b) (ii) What is the name of the process animals use to get energy from carbohydrates?

.....

(1 mark)

2 (c) Some microorganisms grow on the remains of dead animals and plants.

Use words from the box to complete the sentences.

carbon dioxide	**moist**	**break down**	**cold**	**food**
dry	**warm**	**oxygen**	**nitrogen**	**eat**

Microorganisms ..... dead animals and plants to get the ..... they need.

Microorganisms grow best when conditions are ..... and ..... .

Microorganisms often need a good supply of ..... gas to grow well.

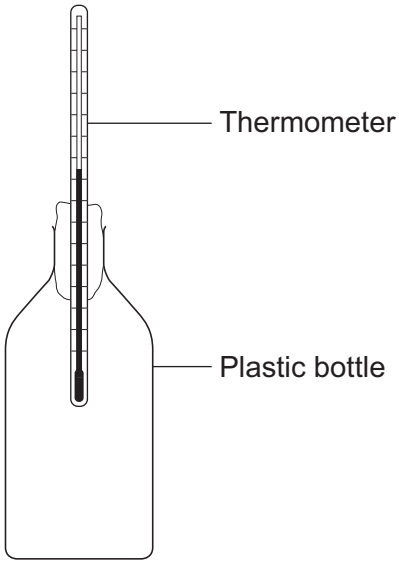
(5 marks)

10

Turn over for the next question

3 A student wanted to find out how quickly carbon dioxide in a plastic bottle absorbs radiation from the sun.

She used the apparatus shown in the diagram.



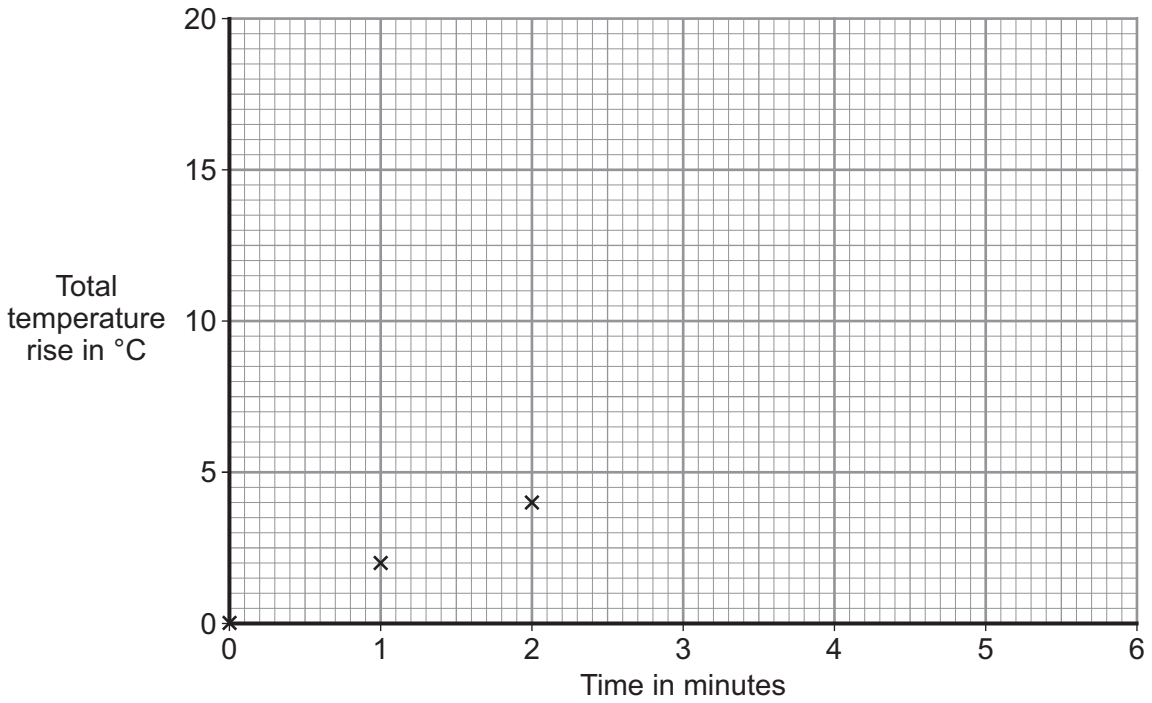
The student filled the bottle with carbon dioxide. She put the bottle in the sunshine.

She measured the temperature every minute for six minutes, and worked out how much the temperature had risen.
Her results are shown in the table.

Time in minutes	Total temperature rise in °C
0	0
1	2
2	4
3	5
4	Forgot the reading
5	10
6	12

3 (a) Complete the graph by plotting the values for time 3, 5 and 6 minutes.

Draw a line of best fit.



(3 marks)

3 (b) Use your graph to suggest the temperature rise at 4 minutes.

Temperature rise = ... °C.

(1 mark)

3 (c) One of the points on the graph does not fit the pattern.

Draw a ring around this point. Suggest a reason why it does not fit the pattern.

.....

(2 marks)

3 (d) Suggest **one** way the student could improve her experiment.

.....

(1 mark)

7

4 A male elephant is shown in the picture.

Male elephants usually have large tusks.

Elephants are hunted and killed for their tusks.

Some elephants in the wild are born without tusks.

The sentences suggest why elephants without tusks are becoming more common.

Complete the sentences using words from the box.

cell	**die**	**gene**	**inherit**	**nucleus**	**reproduce**	**survive**

Some male elephants are born with a changed ..... and do not have tusks.

The elephants without tusks are not killed so they ..... and ..... .

More elephants are born that ..... the tuskless characteristic.

(4 marks)

4

Turn over for the next question

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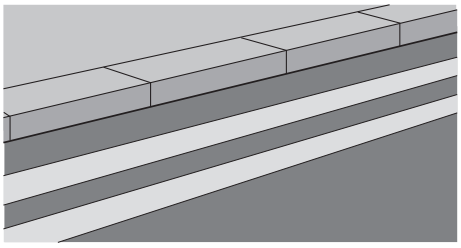
5 Some roads in towns have yellow lines painted on them to show where people can and cannot park.



5 (a) Lead chromate is yellow and gives the paint its yellow colour.

Lead chromate is made by mixing sodium chromate solution with lead nitrate solution.

The word equation for making lead chromate, and the masses used for one reaction are given.

5 (a) (i) Lead nitrate + sodium chromate = sodium nitrate + lead chromate

320 grams + 660 grams = 340 grams + ? grams

Use the values given in the equation to calculate the mass of lead chromate that would be made.

.....

.....

.....

Mass of lead chromate ..... grams.

(2 marks)

5 (a) (ii) Suggest **one** reason why it is important to use the correct amounts of sodium chromate and lead nitrate in the reaction.

.....

.....

(1 mark)

5 (b) Some of the properties of lead chromate are:

- sunlight has no effect on its colour
- it does not dissolve in water
- it is very toxic.

Use the information above and your own knowledge to answer the questions.

5 (b) (i) Suggest **two** advantages of using lead chromate in paint for yellow lines on roads.

1 .....

.....

2 .....

.....

(2 marks)

5 (b) (ii) Suggest **one** disadvantage of using lead chromate in paint for yellow lines on roads.

.....

.....

(1 mark)

6

Turn over for the next question

6 The table gives some information about the first nine elements in the periodic table.

Element	Mass number	Protons	Neutrons	Electrons
Hydrogen	1	1	0	1
Helium	4	2	2	2
Lithium	7	3	4	3
Beryllium	9	4	5	4
Boron	11	5	6	5
Carbon	12	6	6	6
Nitrogen	14	7	7	7
Oxygen	16	8	8	8
Fluorine	19	9	10	9

Use the table to answer the questions below.

6 (a) What is the pattern shown by the number of protons in the first nine elements?

.....

.....

(1 mark)

6 (b) How is the mass number of any element related to the number of protons and neutrons the element has?

.....

.....

(1 mark)

6 (c) An atom of beryllium has a total charge of 0.

Explain why.

Use your knowledge of the charges on protons and electrons, and information in the table.

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.....

(4 marks)

6

Turn over for the next question

7 (a) Some microbes are adapted to live in very harsh environments.

7 (a) (i) Microbes that live in very harsh environments are called .....

(1 mark)

7 (a) (ii) Suggest **two** types of environment where these microbes might live.

1 .....

2 .....

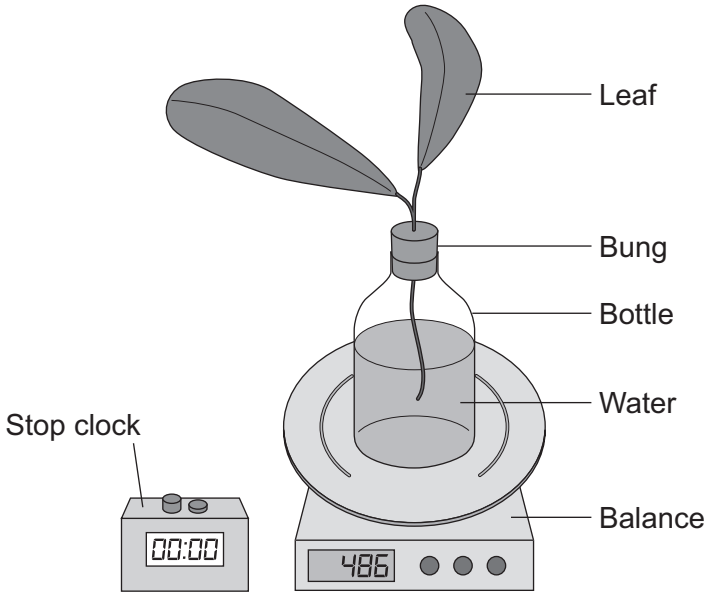
(2 marks)

7 (b) *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

Plants lose water through their leaves. Plants that live in areas where there is a lack of water sometimes have a waxy coating on their leaves to reduce the rate of water loss through the leaves.

A student investigated the rate of water loss through leaves.

The apparatus the student used is shown.
As water is lost through the leaves the mass shown on the balance goes down.



Describe fully how you would use the apparatus shown in the diagram to find out the rate of water loss from leaves in grams per minute per cm^2 of leaf.

You must include:

- how you would use the apparatus
- what you would have to measure
- how you would use the results.

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(6 marks)

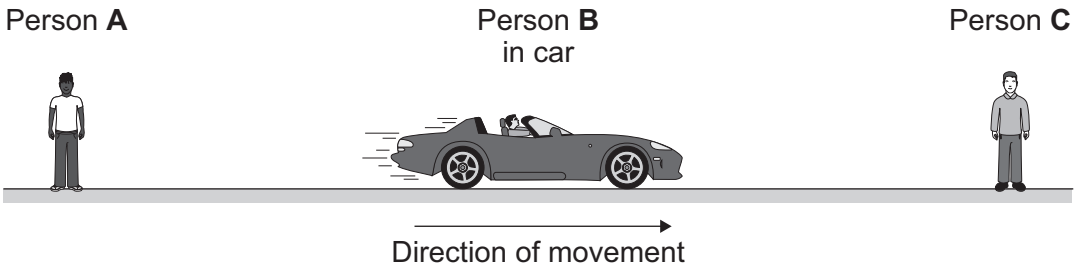
9

8 Light and sound both travel as waves.

When a wave source moves towards or away from an observer, the wavelength and frequency of a wave the observer senses will be changed.

A sports car engine is a wave source.

Three people listen to the sound produced by a sports car moving quickly away from Person **A** towards Person **C** at a constant speed. Person **B** is in the car. The people and car are shown in the diagram.



All three people hear a different frequency (pitch) of sound.

8 (a) (i) What do scientists call this change in frequency?

.....

(1 mark)

8 (a) (ii) Which person hears the frequency of sound that the car is actually making?

Give a reason for your answer.

Person .....

Reason .....

.....

(2 marks)

8 (a) (iii) Which person hears the lowest frequency sound? (The sound with the longest wavelength).

Give a reason for your answer.

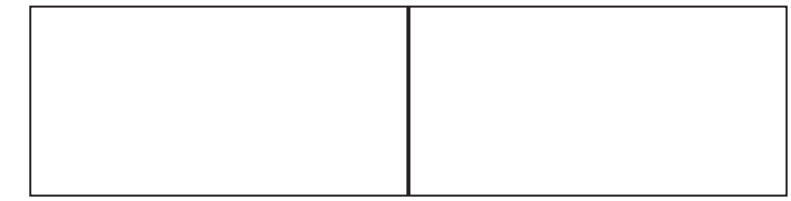
Person .....

Reason .....

.....

(2 marks)

8 (b) Stars produce light. The light can be split to produce a spectrum. The light from the Sun has a black line in its spectrum. This is shown in the diagram.



Astronomers have found a star in a distant galaxy. The star is almost identical to our Sun.

8 (b) (i) Draw a line on the diagram to show where the black line on the spectrum of light from the distant star would be.

(1 mark)

8 (b) (ii) What is the name of the movement of the line?

.....

(1 mark)

8 (b) (iii) Scientists think that this movement supports two theories about the Universe.

What are these two theories?

Theory 1 .....

Theory 2 .....

(2 marks)

9

END OF QUESTIONS

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