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
March 2013

Science B

SCB2FP

Unit 2 My Family and Home

F

Written Paper

Thursday 7 March 2013 9.00 am to 10.00 am

For this paper you must have:
- a ruler
- a calculator
- the Equations Sheet (enclosed).

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 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.

Do not write outside the box

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

1 (a) The electricity we use in our homes can be generated using different sources of energy.

Draw **one** line from each picture to the source of energy.

Picture	Source of energy
	biomass
	hydroelectric
	nuclear
	wave
	wind

(4 marks)

Do not write outside the box

1 (b) One of the sources of energy listed in **1(a)** is *non-renewable*.

1 (b) (i) Give the name of the *non-renewable* source.

.....

(1 mark)

1 (b) (ii) What does *non-renewable* mean?

.....

.....

(1 mark)

1 (c) Wind power and hydroelectric power have disadvantages.

Suggest **one** disadvantage of the use of wind power and **one** different disadvantage of the use of hydroelectric power.

Wind power .....

.....

Hydroelectric power .....

.....

(2 marks)

8

Turn over for the next question

Do not write outside the box

2 The human body needs to detect changes and make a response to each change.

The change can be outside the body or inside the body.

An ice cream van plays music to let children know that it is coming. The children hear the music.

2 (a) Use the correct answers from the box to complete the sentences.

brain	**ears**	**effectors**	**eyes**	**neurones**	**receptors**

Children know when the van is coming because of their sense organs.

The sense organs that detect sound are called the ..... .

These sense organs contain ..... , which produce impulses.

The impulses travel to the ..... to be coordinated.

(3 marks)

Do not write outside the box

2 (b) Children hear the music from the ice cream van.

Draw a ring around a frequency of sound that the children can hear.

2 Hz **2000 Hz** **200 000 Hz**

(1 mark)

2 (c) The ice cream contains sugar. The pancreas makes a hormone that reduces the amount of sugar in the blood.

Draw a ring around the name of the hormone that reduces the amount of sugar in the blood.

adrenaline **glucagon** **insulin**

(1 mark)

5

Turn over for the next question

Do not write outside the box

3 People sometimes eat too much food.

3 (a) Draw a ring around the correct answer to complete each sentence.

3 (a) (i) One chemical the stomach produces to help digest food is

hydrochloric acid.

nitric acid.

sulfuric acid.

(1 mark)

3 (a) (ii) People who eat too much food sometimes feel unwell.

To relieve their symptoms they often take antacid tablets.

Antacid tablets are used to treat

diabetes.

headache.

heartburn.

(1 mark)

3 (a) (iii) An antacid works because it

dilutes

hydrolyses

neutralises

the acid in the stomach.

(1 mark)

Do not write outside the box

3 (b) Antacids contain carbonates or hydroxides.

3 (b) (i) The reaction between an acid and calcium carbonate is shown below.

Draw a ring around the formula of the salt made in the equation.

$$2HCl + CaCO_3 \longrightarrow CaCl_2 + H_2O + CO_2$$

(1 mark)

3 (b) (ii) Give the name of the gas made in the reaction shown in **3(b)(i)**.

.....

(1 mark)

3 (b) (iii) The equation for the reaction between an acid and calcium hydroxide is shown below.

$$2HCl + Ca(OH)_2 \longrightarrow CaCl_2 + H_2O$$

Suggest why it is better to use calcium hydroxide as an antacid instead of using calcium carbonate.

.....

.....

(1 mark)

6

Turn over for the next question

Do not write outside the box

4 Electromagnetic radiation is used in many ways.

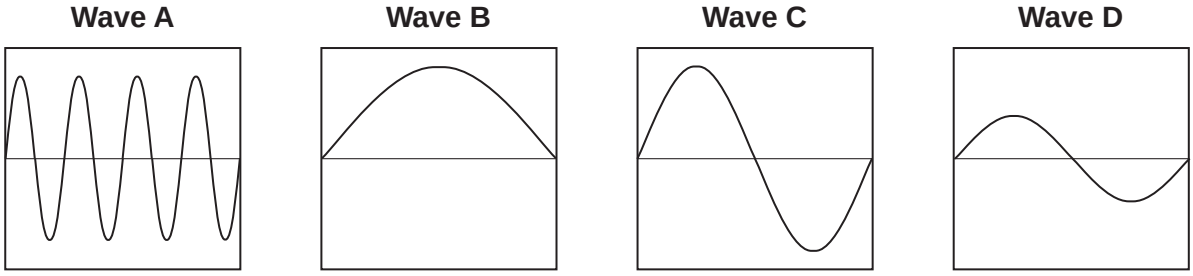
4 (a) Complete the table. Give **one** use for each of the types of electromagnetic radiation shown.

Type of radiation	**Use**
Infrared	……
Microwaves	……
Ultraviolet	……

(3 marks)

4 (b) Electromagnetic radiation travels as a wave.

The diagram shows four waves with the same speed. The horizontal scale is the same for each wave.



4 (b) (i) Which wave, **A**, **B**, **C** or **D**, has the shortest wavelength?

(1 mark)

4 (b) (ii) Which wave, **A**, **B**, **C** or **D**, has the lowest frequency?

(1 mark)

Do not write outside the box

4 (c) Some types of electromagnetic radiation are given below.

Draw a ring around the type of radiation with the shortest wavelength.

microwaves **infrared** **visible light** **X-rays** **gamma rays**

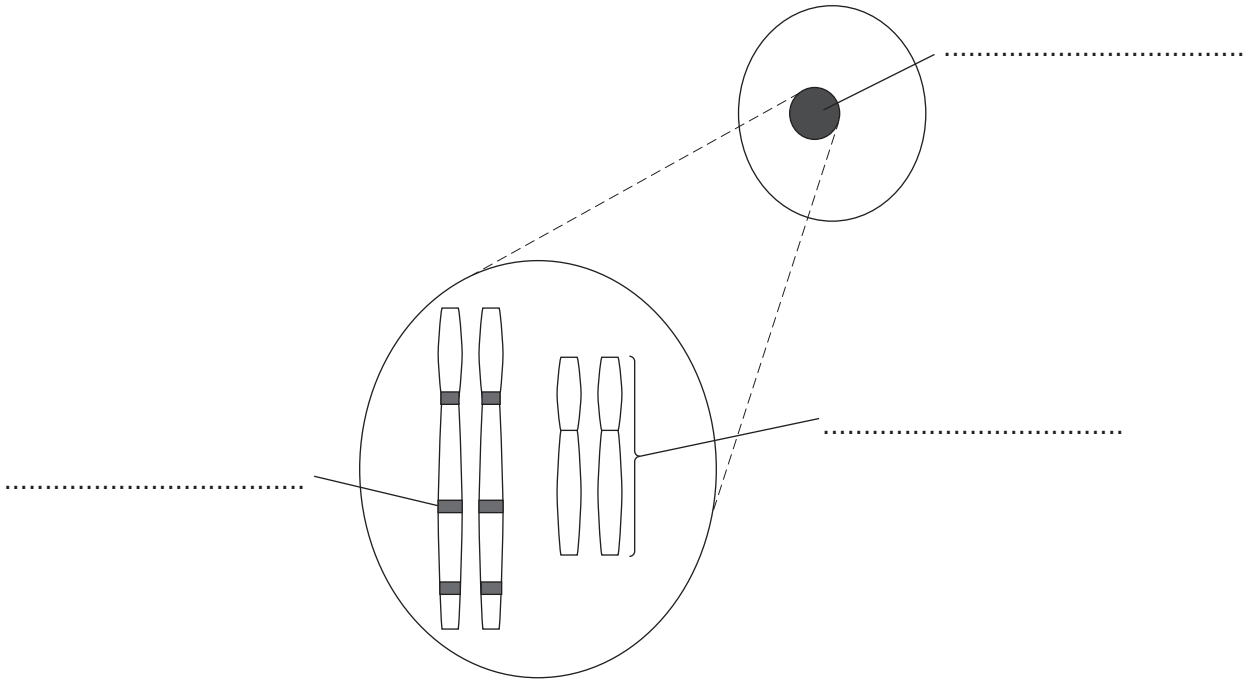
(1 mark)

6

Turn over for the next question

Do not write outside the box

5 (a) The diagram shows part of an animal cell. One part of the cell has been made bigger.



Use the correct answers from the box to label the diagram.

chromosome	**cell wall**	**cytoplasm**	**gene**	**nucleus**

(3 marks)

5 (b) Which condition in the list below is inherited?

Draw a ring around the correct answer.

cystic fibrosis **'flu'** **measles**

(1 mark)

Do not write outside the box

5 (c) Some people inherit a changed gene. The people who inherit this changed gene cannot make the brown colour found in hair and skin. These people are called albinos.

The photograph shows a boy with his sister. The boy is an albino.

The dominant allele (**R**) produces colour in hair and skin.

The recessive allele (**r**) does **not** produce colour.

Albinos do **not** have the dominant allele.

A Punnett square has been drawn for a mother and father.

Complete the Punnett square.

		Mother	
		r	r
Father	.....	R r	R r
	r	.....	.....

(2 marks)

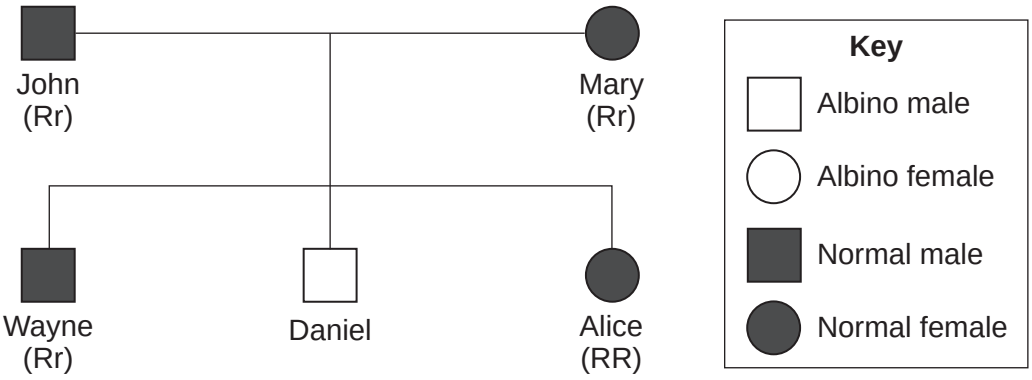
Turn over ▶

Do not write outside the box

5 (d) The pedigree diagram shows the inheritance of the albino characteristic in a family.

Remember:

- The dominant allele (**R**) produces colour in hair and skin.
- The recessive allele (**r**) does **not** produce colour.
- Albinos do **not** have the dominant allele.



What alleles does Daniel have? Give a reason for your answer.

Alleles .....

Reason .....

.....

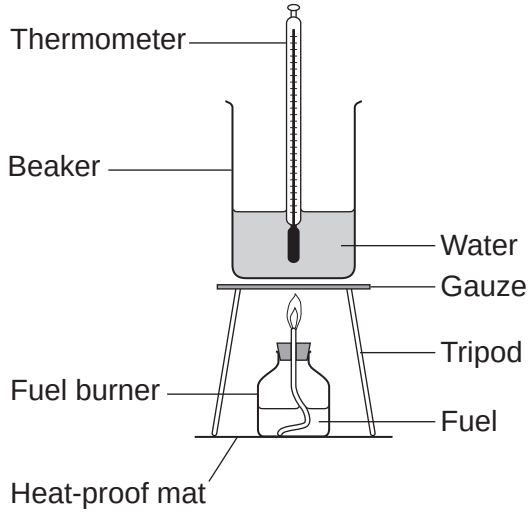
(2 marks)

8

Do not write outside the box

6 Students in a school science club wanted to find out which fuel would be best for their model steam engine. A student was asked to compare the amount of energy in five different fuels.

She used the apparatus in the diagram to burn the fuel and heat some water.



6 (a) Suggest **three** variables the student would have to keep the same to make sure that her results would be repeatable.

1 .....

2 .....

3 .....

(3 marks)

Question 6 continues on the next page

Do not write outside the box

6 (b) The student's results for one fuel are given in **Table 1**.

Table 1

Test number	Temperature rise in °C
1	35
2	36
3	55
4	34
Average	40

The average that the student calculated should **not** be used to compare the fuels. Explain why.

.....

.....

.....

.....

(2 marks)

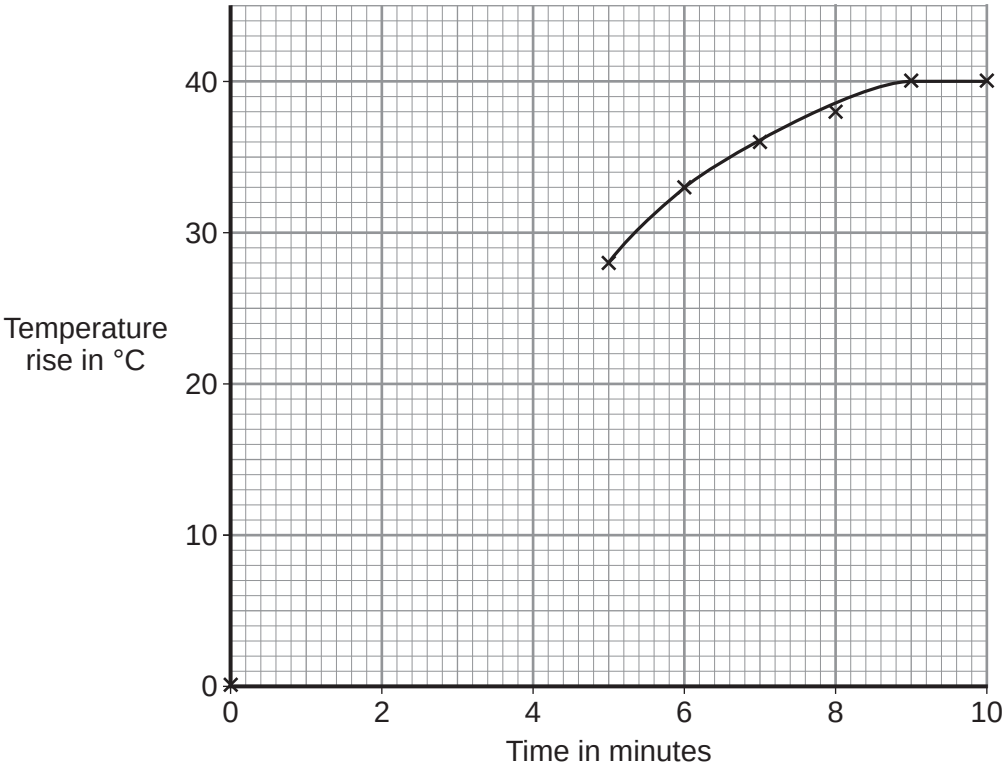
Do not write outside the box

6 (c) The student's results for another fuel are shown in **Table 2**. The student forgot to take the reading at 3 minutes.

Table 2

Time in minutes	0	1	2	3	4	5	6	7	8	9	10
Temperature rise in °C	0	5	12		23	28	33	36	38	40	40

Some of the results have been plotted on the graph below.



6 (c) (i) On the graph, plot the points for the temperature rise at 1, 2 and 4 minutes.

(2 marks)

6 (c) (ii) Complete the line of best fit.

(1 mark)

6 (c) (iii) Use your graph to suggest the temperature rise at 3 minutes.

..... °C

(1 mark)

9

Do not write outside the box

7 (a) Metals are important materials used in the building industry.

Name **two** metals used in buildings. Give a use for each metal and a property of the metal that makes it suitable for this use.

Metal 1 .....

.....

.....

Metal 2 .....

.....

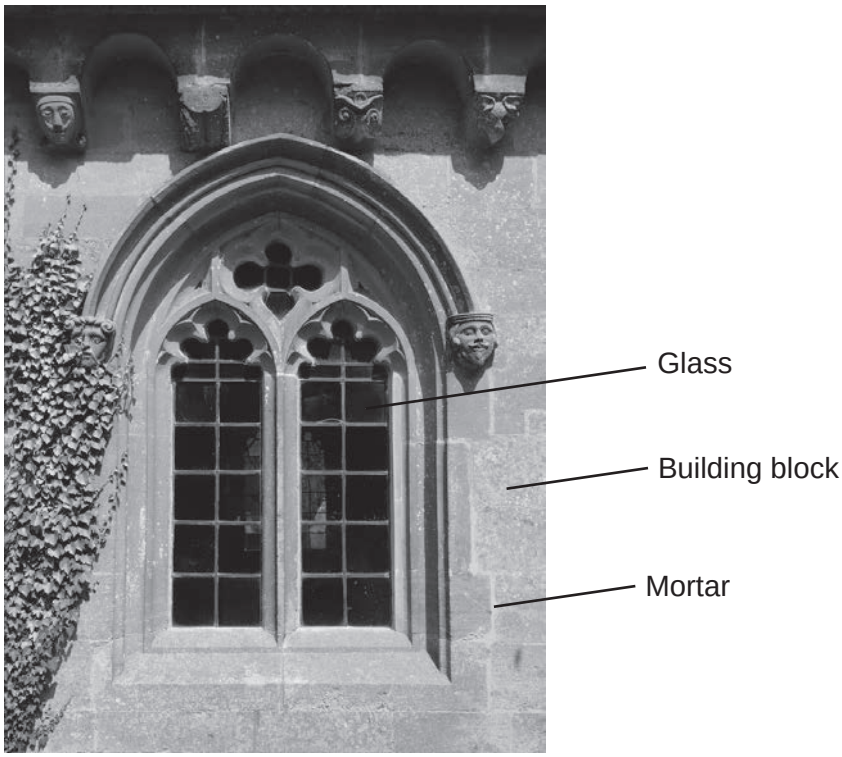
.....

(4 marks)

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

Limestone is also an important material for the building industry.

The photograph shows three ways of using limestone, or materials made from limestone, in a building.



Do not write outside the box

Describe how limestone, and materials made from limestone, are used **in the building in the picture.**

To gain full marks you must also include details of how **one** of the materials in the building is made from limestone.

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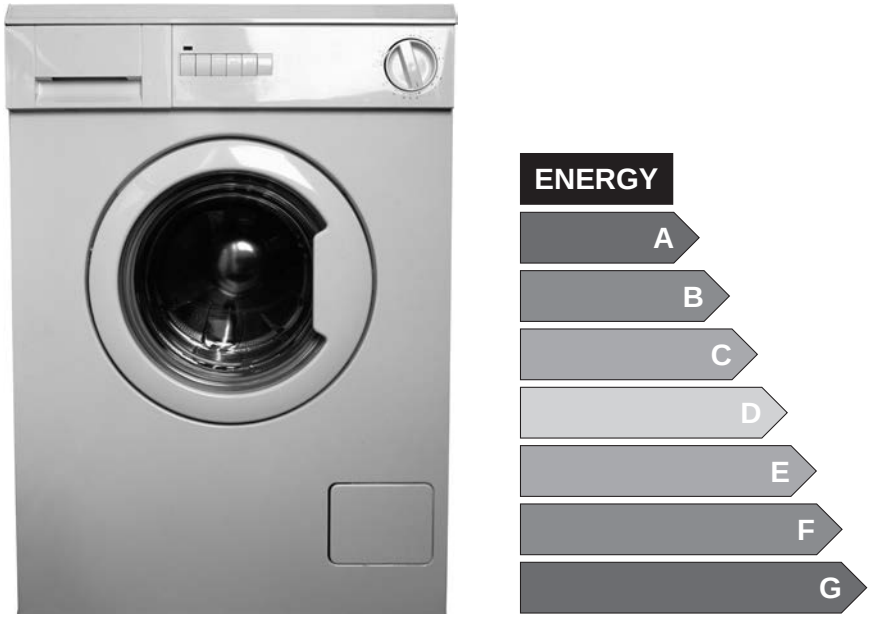
(6 marks)

10

Do not write outside the box

8 All washing machines sold in Britain **must** have a European Union Energy Label.

The label has letters.



The table shows the range of energy efficiency values for each letter.

Energy rating	A	B	C	D	E	F	G
Energy efficiency in kWh per kg of washing	less than 0.19	0.20 – 0.23	0.24 – 0.27	0.28 – 0.31	0.32 – 0.35	0.36 – 0.39	more than 0.39

8 (a) The washing machine shown in the photograph washes clothes at 60 °C and spins the clothes dry.

It takes 1 hour and 35 minutes to complete the wash cycle.

The average power consumed during this wash cycle is 0.96 kW.

Do not write outside the box

8 (a) (i) Calculate the energy transferred during the wash cycle.

Use the equation below to help you answer the question.

Energy transferred during one cycle in kWh = average power consumption × time

.....

.....

.....

.....

Energy transferred during wash cycle ..... kWh

(3 marks)

8 (a) (ii) The washing machine washes 6 kg of clothes during the cycle**.**

Calculate the energy transfer per kg of clothes and give the energy rating of the machine.

.....

.....

.....

Energy transfer per kg .....kWh

Energy rating .....

(2 marks)

8 (b) The machine uses less energy if the washing is done at 30 °C instead of 60 °C.

Suggest why.

.....

.....

(1 mark)

Question 8 continues on the next page

Do not write outside the box

8 (c) Suggest **two** reasons why the European Union started putting energy labels on appliances.

1 .....

.....

2 .....

.....

(2 marks)

8

END OF QUESTIONS

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