

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	
9	
TOTAL	



General Certificate of Secondary Education  
Foundation Tier  
November 2012

## Science B

SCB2FP

Unit 2 My Family and Home

F

Written Paper

Wednesday 7 November 2012 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 expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 9 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.



N 0 V 1 2 S C B 2 F P 0 1

G/K87074 6/6/6/6

SCB2FP

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

**1** Acids are found in laboratories and have to be used carefully.

**1 (a)** Which **two** hazard labels are used on bottles of acid?

Tick (✓) **two** answers.



(2 marks)

**1 (b)** Give **two** safety precautions a scientist should take when using acids.

1 .....

.....

2 .....

.....

(2 marks)

4



2 These questions are about electromagnetic radiation.

2 (a) Draw a ring around the correct answer in the box to complete each sentence.

2 (a) (i) Electromagnetic radiation

- transfers energy from place to place.
- travels as particles through space.
- travels only in a vacuum.

(1 mark)

2 (a) (ii) The frequency of electromagnetic radiation is measured in

- hertz.
- metres per second.
- miles per hour.

(1 mark)

2 (a) (iii) The energy of a wave increases when the frequency

- decreases.
- increases.
- stays the same.

(1 mark)

2 (b) Give the type of electromagnetic radiation used in television remote controls.

.....

(1 mark)

2 (c) Gamma radiation is **not** used in the home.

Give the reason why.

.....

.....

(1 mark)

5

Turn over ►



**3** Metals have many useful properties.

Use the correct answer from the box to complete each sentence.

**hard**

**ductile**

**malleable**

**corrosion resistant**

**a good conductor**

**3 (a)** Aluminium window frames do not need painting because

aluminium is .....  
(1 mark)

**3 (b)** An electric current passes through copper because

copper is .....  
(1 mark)

**3 (c)** Iron can be made into thin wires because

iron is .....  
(1 mark)

**3 (d)** Lead can be hammered into different shapes because

lead is .....  
(1 mark)

4



4 This question is about energy.

4 (a) Draw **one** line from each quantity to the unit the quantity is measured in.

**Quantity**

**Unit**

energy

joules

power

volts

watts

(2 marks)

4 (b) Draw a ring around the correct answer to complete the sentence.

One watt is equal to

- 1 joule per hour.
- 1 joule per minute.
- 1 joule per second.

(1 mark)

4 (c) An electric fire was turned on for 5 hours and used 10kWh of electricity.

Calculate the power of the fire.

Use the Equations Sheet to help you answer the question.

Give the correct unit.

.....

.....

.....

Power = .....

(2 marks)

5

Turn over ►



**5** The fuels used to power cars often contain molecules made of carbon and hydrogen only.

**5 (a)** Complete the sentence.

Molecules made of carbon and hydrogen only are

called .....

(1 mark)

**5 (b)** The table gives some information about the energy in fuels.

Fuel	Average number of carbon atoms in the fuel molecules	Energy content in MJ per litre
Liquefied petroleum gas	3.5	26
Petrol	8	35
Diesel	12	40

Use the information in the table to answer the questions.

**5 (b) (i)** Describe the pattern shown in the table between average number of carbon atoms in the fuel molecules and the energy content per litre.

.....

.....

.....

.....

.....

(2 marks)



**5 (b) (ii)** A car engine usefully transfers only 40% of the energy in one litre of petrol.

The equation shows how to calculate the energy in a fuel that is usefully transferred.

$$\text{Energy usefully transferred (MJ)} = \frac{\text{percentage transferred} \times \text{energy content per litre (MJ)}}{100}$$

Calculate the energy usefully transferred from one litre of petrol.

.....  
.....

Energy usefully transferred = ..... MJ  
(2 marks)

**5 (b) (iii)** Most energy that is **not** usefully transferred is wasted.

Complete the sentence.

Most energy is wasted as .....

(1 mark)

**Question 5 continues on the next page**

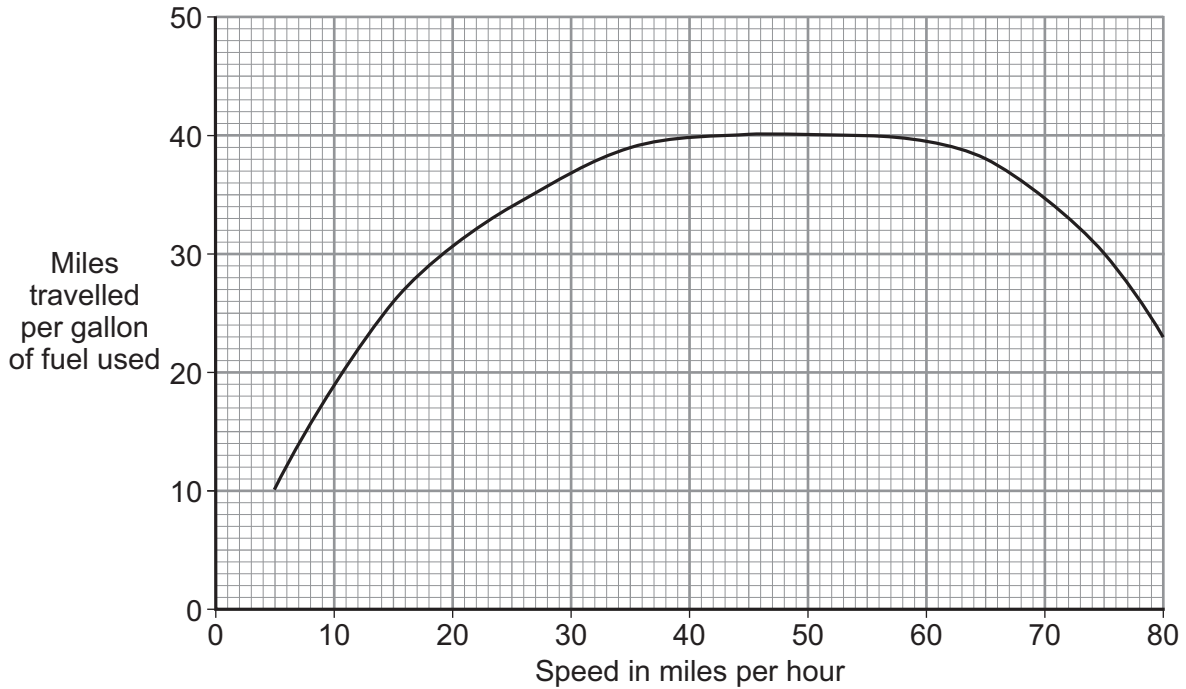
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5 (d) The graph shows how the speed of a car affects the distance travelled per gallon of fuel used.



5 (d) (i) Describe how the speed of the car affects the miles travelled per gallon. Use data from the graph in your answer.

.....

.....

.....

.....

(2 marks)

5 (d) (ii) The government is thinking of increasing the speed limit on UK motorways from 70 miles per hour to 80 miles per hour. Some people think this is a bad idea.

Suggest **two** reasons why people think this is a bad idea.

.....

.....

.....

.....

(2 marks)



**6** If a person has excess acid in their stomach they can suffer from heartburn. They could take an antacid to reduce their symptoms.

Antacids can be made from alkalis and carbonates.

**6 (a)** Give the name of the reaction between acids and alkalis.

.....  
(1 mark)

**6 (b)** Some antacids contain calcium carbonate.

Calcium carbonate reacts with dilute hydrochloric acid.

Tick (✓) the **three** correct products of this reaction.

Calcium oxide

Calcium chloride

Carbon dioxide

Water

Hydrogen

Oxygen

(3 marks)

**6 (c)** A student was doing some practical work to investigate the reaction of dilute acid with calcium carbonate powder and with calcium hydroxide powder. Both powders are white.

The student forgot to label his powders.

How would the student know which powder was calcium carbonate when he added the acid? Draw a ring around the correct answer.

**the powder  
would dissolve**

**the powder  
would fizz**

**the powder  
would change colour**

(1 mark)



7 A scientist studied two differences in a group of 100 children.

7 (a) Difference 1 was the height of each child.

Give the word that describes the differences seen in a group of children.

.....  
(1 mark)

7 (b) Suggest **two** variables the scientist should keep the same in the study.

1 .....

2 .....  
(2 marks)

7 (c) Difference 2 was whether the child could taste a chemical called PTC.

To some people PTC tastes bitter. To other people PTC has no taste.

The ability to taste PTC is controlled by a gene.

What is the name given to different forms of the same gene?

.....  
(1 mark)

7 (d) (i) A man and a woman can both taste PTC. They have a child who can **not** taste PTC.

The two forms of the gene are **T** and **t**.

The **T** form of the gene allows people to taste PTC.

Complete the Punnett square for the inheritance of tasting PTC.

		<b>Mother</b>	
		<b>T</b>	<b>t</b>
<b>Father</b>	<b>T</b>	.....	<b>Tt</b>
	<b>t</b>	.....	.....

(2 marks)

7 (d) (ii) Draw a ring around **one** child in your completed Punnett square who will **not** be able to taste PTC.

(1 mark)

7
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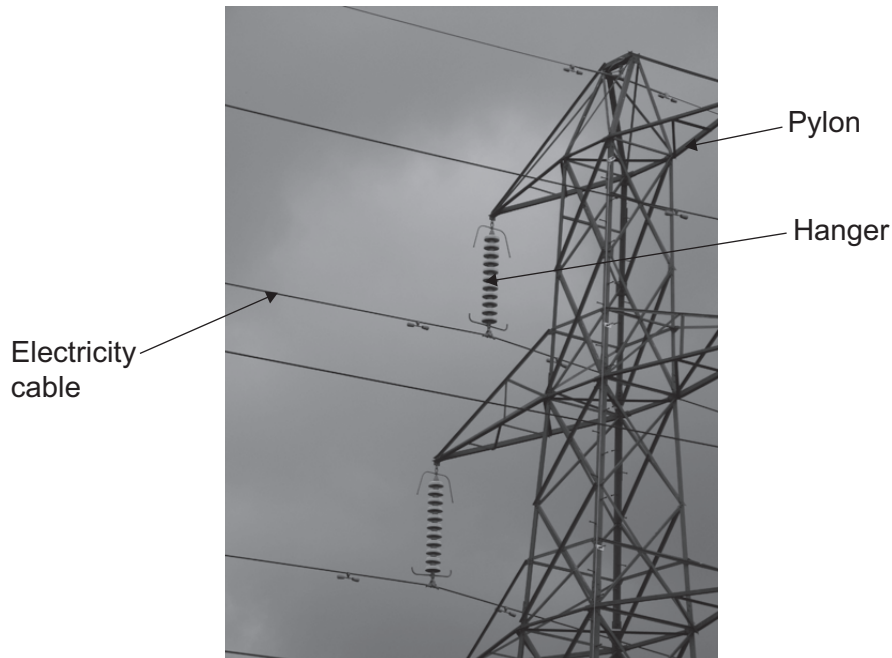
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- 8** **Photograph 1** shows part of a pylon used to support electricity cables of the National Grid.

Electricity is carried at very high voltage along the cables.

**Photograph 1**



- 8 (a)** The table gives information about some metals.

	<b>Steel</b>	<b>Copper</b>	<b>Aluminium</b>	<b>Titanium</b>
Mass in grams per cm <sup>3</sup>	7.9	8.9	2.7	4.5
Strength in units	18	4.5	4.0	21
Ability to conduct electricity in units	1.1	6.5	4.1	0.5
Cost per tonne in £	530	7061	2109	6200

Use the information in the table to answer the questions.



**8 (a) (i)** Steel is a good metal for making the pylon.

Suggest **two** reasons why.

1 .....

.....

2 .....

.....

(2 marks)

**8 (a) (ii)** The cables used in the picture are made from aluminium.

Suggest **one** advantage and **one** disadvantage of using aluminium instead of copper for the cables.

Advantage .....

.....

Disadvantage .....

.....

(2 marks)

**8 (b) (i)** The hanger is made from a ceramic material.

Suggest why.

.....

.....

(1 mark)

**8 (b) (ii)** The pylon is **not** made from a ceramic material.

Suggest why.

.....

.....

(1 mark)

**Question 8 continues on the next page**

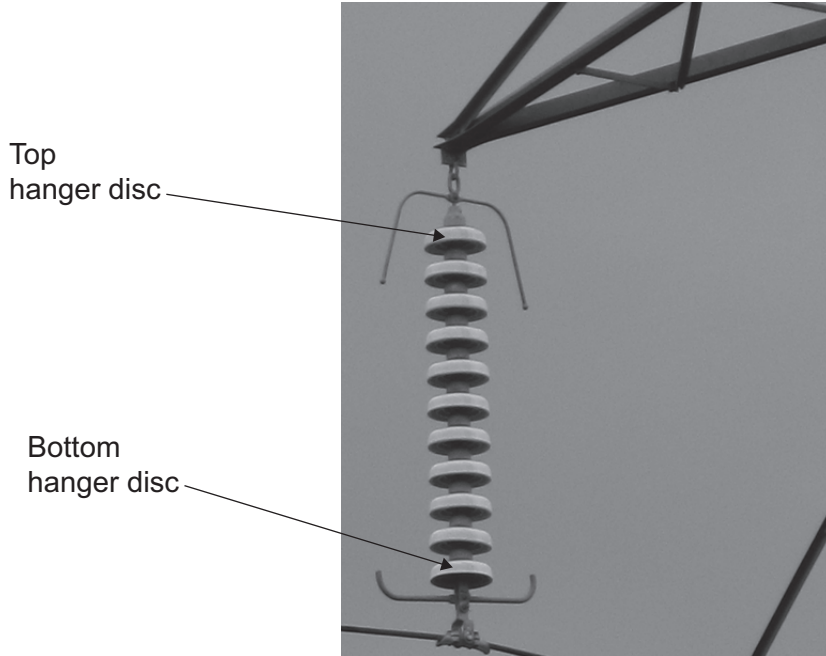
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8 (c) **Photograph 2** is an enlarged picture of a ceramic hanger.

Use **Photograph 2** to help you answer the questions.

**Photograph 2**



The hanger is made of separate discs. The number of discs needed in the hanger increases as the voltage in the cable increases.

The cables in the photograph carry 165 kV.

Calculate the number of discs needed in a hanger for cables carrying 390 kV.

.....

.....

.....

Answer ..... discs  
(3 marks)

8 (d) The high voltage in the overhead cables is stepped down to 230 volts to supply houses.

Give the name of the equipment that 'steps down' the voltage.

.....  
(1 mark)

10
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**9** *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

The human body needs to keep a constant internal environment.

An athlete goes for a training run for 30 minutes.



Explain how the athlete's body responds to get her core temperature back to normal.

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(6 marks)

6
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**END OF QUESTIONS**



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