

Centre Number						Candidate Number				
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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 2014

Science B

SCB2FP

F

Unit 2 My Family and Home

Tuesday 10 June 2014 1.30 pm to 2.30 pm

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 7(c) 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.



J U N 1 4 S C B 2 F P O 1

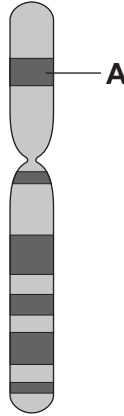
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SCB2FP

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

- 1** **Figure 1** shows a structure which can be found in a cell.

Figure 1



- 1 (a)** Where in the cell would you find the structure shown in **Figure 1**?

[1 mark]

.....

- 1 (b)** Use words from the box to complete each sentence about **Figure 1**.

a chromosome

the cytoplasm

a gene

a ribosome

- 1 (b) (i)** The structure shown in **Figure 1** is called

[1 mark]

- 1 (b) (ii)** The part labelled **A** is called

[1 mark]



1 (c) Huntington's disease is an inherited disorder.

The allele that causes Huntington's is dominant, **H**.

The allele that does not cause Huntington's is recessive, **h**.

A woman and a man both have Huntington's and are having a child.

1 (c) (i) Complete the Punnett square (**Figure 2**) for the woman and the man by writing the correct letters in the spaces to show how Huntington's is inherited.

[3 marks]

Figure 2

		Woman	
		H	h
	H		
Man	h		

1 (c) (ii) What is the probability of their child having Huntington's?

[1 mark]

.....

7

Turn over for the next question

Turn over ►



2 A student toasts some bread in a toaster.



2 (a) The student picks up the toast but it is very hot.
His automatic response is to drop the hot toast.

2 (a) (i) What name is given to this automatic response?

Draw a ring around the correct answer.

[1 mark]

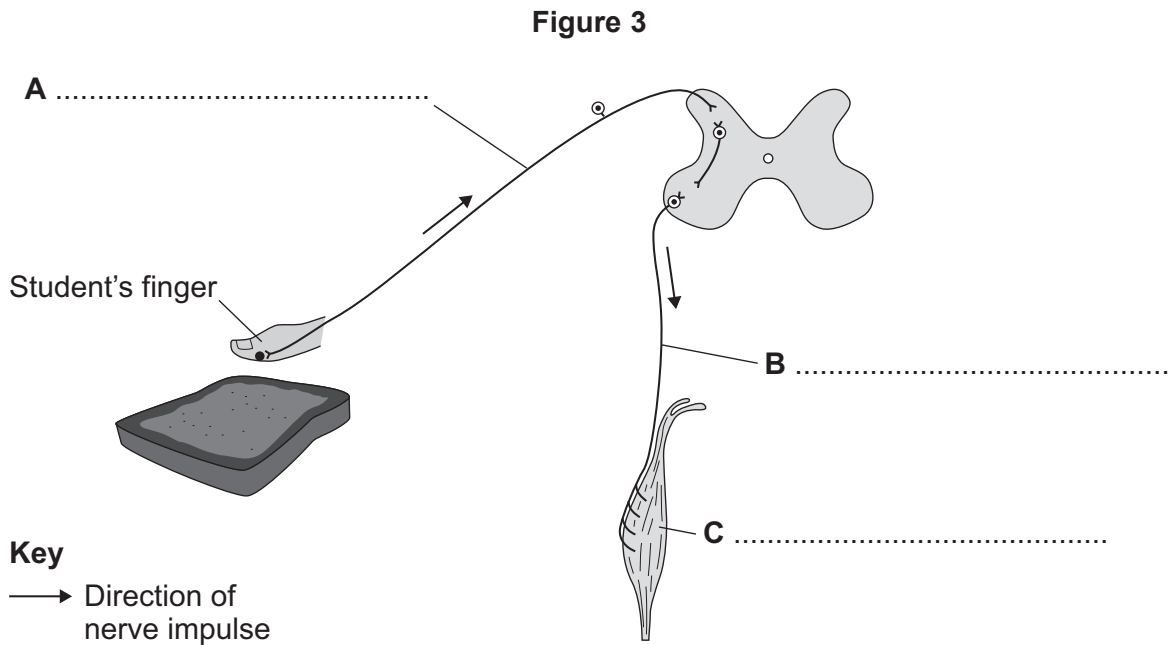
fast action

forced action

reflex action



Figure 3 shows the parts of the body used in the automatic response.



2 (a) (ii) Use the correct words from the box to label parts **A**, **B** and **C** on **Figure 3**.

[3 marks]

brain	motor neurone	muscle
relay neurone	sensory neurone	skin

2 (a) (iii) What is the stimulus which caused the automatic response of dropping the hot toast?

[1 mark]

.....

5

Turn over for the next question

Turn over ►



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

3 (a) (i) The human body maintains a constant internal environment by

[1 mark]

a process called

excretion.
homeostasis.
respiration.

3 (a) (ii) When a person gets hot, more sweat is released which

[1 mark]

cools the body down by

condensation.
evaporation.
radiation.

3 (a) (iii) Blood flow to the skin increases when a person gets hot because

[1 mark]

blood vessels supplying the skin

constrict.
contract.
dilate.

3 (a) (iv) When a person gets cold, decreasing the blood flow to the skin

[1 mark]

will cause the amount of heat lost to

decrease.
increase.
stay the same.

4



- 4** A woman wants to save money on lighting in her house.
She uses filament light bulbs in her house.
All light bulbs are inefficient. Filament light bulbs are the most inefficient.

4 (a) Which of these sentences is correct?

Tick (✓) **one** box.

[1 mark]

	Tick (✓)
A more efficient light bulb would waste less energy than a filament light bulb.	
A more efficient light bulb would waste more energy than a filament light bulb.	
A more efficient light bulb would waste the same amount of energy as a filament light bulb.	

Question 4 continues on the next page




Turn over ►



4 (b) The woman decides to compare the efficiency of different light bulbs.

Figure 4 gives some information about energy transfer per second for three different types of light bulb.

Figure 4

Filament light bulb	LED light bulb	Compact light bulb
		
<p>40.0 J energy in</p> <p>→ 0.8 J useful energy</p> <p>↓ wasted energy</p>	<p>4.0 J energy in</p> <p>→ 1.2 J useful energy</p> <p>↓ wasted energy</p>	<p>9.0 J energy in</p> <p>→ J useful energy</p> <p>↓ 8.1 J wasted energy</p>
efficiency = 0.02	efficiency = 0.30	efficiency =

4 (b) (i) All three light bulbs waste energy.

What is the main form of the wasted energy?

[1 mark]

.....

4 (b) (ii) How much useful energy is released per second by the compact light bulb?

Use information from Figure 4 to help you.

[1 mark]

.....

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..... J



4 (b) (iii) Calculate the efficiency of the compact light bulb.

Use your answer to part **(b)(ii)** and the Equations Sheet to help you answer the question.

(If you did not get an answer for part **(b)(ii)**, use 2.0 J. This is not the correct answer.)

[2 marks]

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.....
.....

Efficiency =

4 (b) (iv) The woman thinks that all three light bulbs give the same amount of light and that they cost the same amount of money.

Which light bulb should the woman use in her house? Explain your answer.

[2 marks]

Light bulb

Explanation

.....
.....
.....

4 (c) Some light bulbs contain small amounts of mercury.

Mercury is a toxic substance.

Light bulbs containing mercury should not be thrown away in normal household rubbish which goes to landfill.

Suggest why light bulbs containing mercury should not be thrown away in normal household rubbish.

[1 mark]

.....
.....

8

Turn over ►



5 Electromagnetic radiation has many uses.

5 (a) Draw **one** line from each type of radiation to its use.

[3 marks]

Type of radiation

Use

gamma rays	fibre optic broadband
microwaves	medical treatment
visible light	mobile phones
	TV remote control

5 (b) Different types of electromagnetic radiation have different frequencies.

The sentences describe some properties of electromagnetic radiation.

Complete the following sentences.

[3 marks]

Electromagnetic radiation travels as

The unit of frequency is

When the frequency of the radiation is high, the

energy is



5 (c) Sunbeds use ultraviolet (UV) radiation.

Sunbeds can be used to treat skin disorders such as acne and eczema.

Adults who suffer from skin disorders can use sunbeds every week to treat their skin disorders.

5 (c) (i) Suggest **one** reason for using sunbeds to treat skin disorders.

[1 mark]

.....
.....

5 (c) (ii) Suggest **two** disadvantages of using sunbeds every week to treat skin disorders.

[2 marks]

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9

Turn over for the next question

Turn over ►



6 The stomach contains acid which is used to break down food.

Stomach acid is hydrochloric acid.

Heartburn is caused by excess stomach acid.

6 (a) Suggest **one** cause of excess stomach acid.

[1 mark]

.....

6 (b) Heartburn is treated with antacids.

Magnesium hydroxide is a substance found in some antacids.

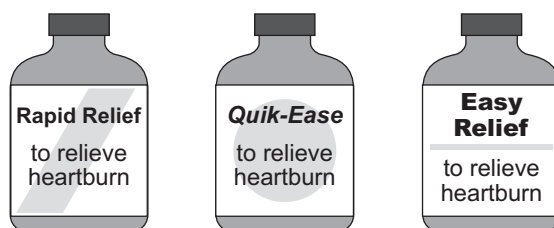
Magnesium hydroxide neutralises the excess stomach acid in the stomach. This type of reaction is called a neutralisation reaction.

Complete the word equation to show the reaction between magnesium hydroxide and excess stomach acid.

[2 marks]

magnesium hydroxide + hydrochloric acid → +

6 (c) Three new antacid compounds have recently been put on the market.



A student carried out an experiment to compare the effectiveness of the three new antacid compounds for neutralising hydrochloric acid.

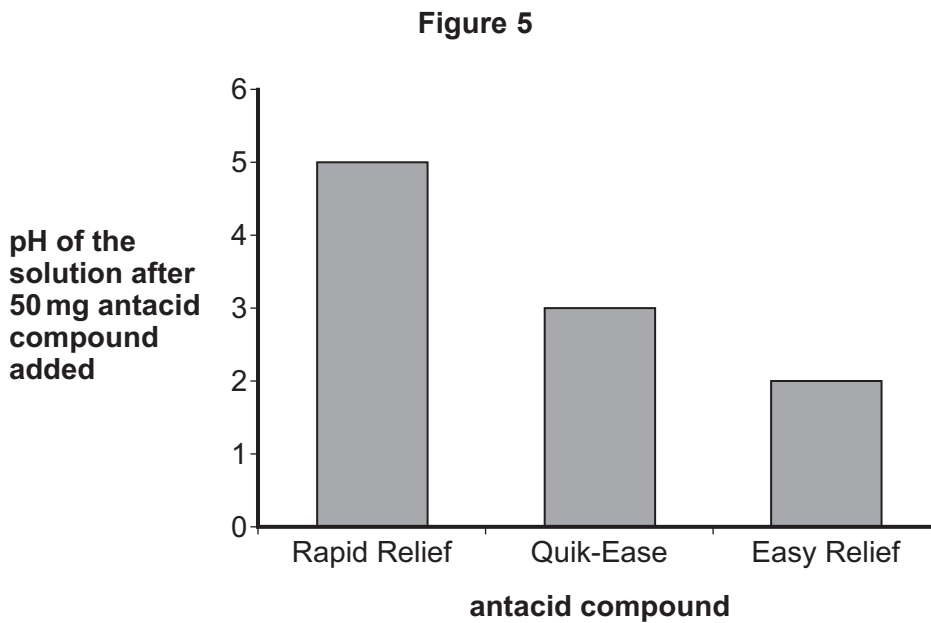
The hydrochloric acid was pH 2.

The student:

- poured 20 cm³ of hydrochloric acid into a beaker
- added 50 mg of Rapid Relief (antacid compound) to the beaker of hydrochloric acid
- measured the pH of the new solution
- repeated the experiment with Quik-Ease and Easy Relief (antacid compounds).



The graph in **Figure 5** shows the result of each experiment.



Use the graph in **Figure 5** to answer the following questions.

6 (c) (i) Describe what the graph in **Figure 5** shows about the **pH** of each solution after 50 mg of antacid compound had been added.

[2 marks]

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6 (c) (ii) Which antacid compound was the most effective?

[1 mark]

.....

6 (d) Antacid compounds can be in a liquid form or a tablet form.

Suggest why a liquid antacid might be quicker at reducing heartburn than a tablet antacid.

[1 mark]

.....

7

Turn over ▶



7 Methane (natural gas) is used in power stations to generate electricity.

7 (a) Methane is combusted (burned) in air.

Complete the word equation for the combustion of methane.

[2 marks]



7 (b) Some fuels are non-renewable.

What does 'non-renewable' mean?

[1 mark]

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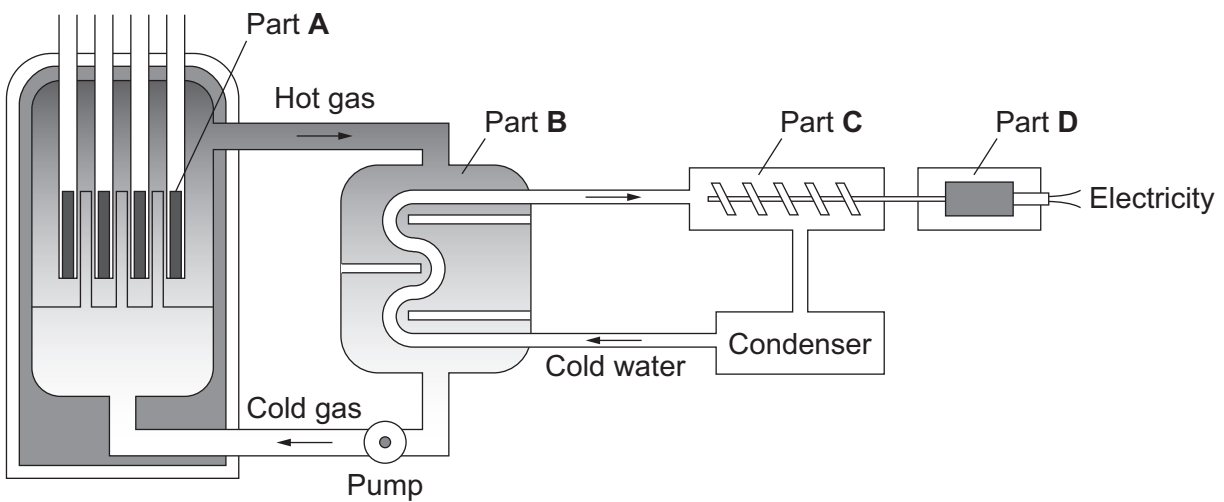
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7 (c) **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

A nuclear power station is an alternative to a natural gas power station.

Figure 6 shows how nuclear fuels can be used in a nuclear power station to generate electricity.

Figure 6



Use **Figure 6** to describe how a nuclear power station uses nuclear fuels to generate electricity.

In order to gain full marks you should name parts **A, B, C** and **D** and describe what each part does.

[6 marks]

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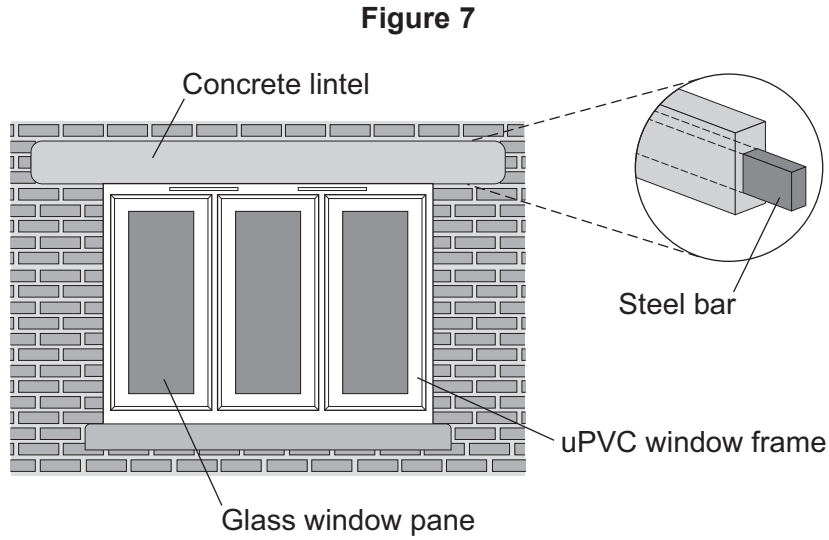
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8 Plastics are used to make many everyday objects.

Figure 7 shows a window frame made of uPVC (polyvinyl chloride) which is a type of plastic.



8 (a) Describe how plastics are produced.

[3 marks]

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8 (b) Many window frames are made from plastic instead of steel.

Give **two** reasons why.

[2 marks]

1

.....

2

.....



8 (c) Glass is used to make windows.

Glass is a ceramic material.

8 (c) (i) Give **one** property of ceramic materials.

[1 mark]

.....

8 (c) (ii) Describe how glass is made from limestone.

[2 marks]

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8 (d) Concrete is used as a building material.

8 (d) (i) What materials are mixed to make concrete?

[2 marks]

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8 (d) (ii) Suggest why a steel bar is added to the concrete lintel as shown in **Figure 7**.

[1 mark]

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11

END OF QUESTIONS



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