Surname

Other Names

Candidate Signature

AQA

General Certificate of Secondary Education
Higher Tier
June 2013

Science B

SCB2HP

H

Unit 2   My Family and Home

Written Paper

Monday 10 June 2013   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 4 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.

SCB2HP

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

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

1 Modern homes are made from many different materials.

1 (a) (i) Limestone is a natural material.

Limestone is important in the construction of buildings.

How is limestone obtained for use as a building material?

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....

(1 mark)

1 (a) (ii) Limestone is used to make cement.

Describe how cement is made using limestone.

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....

(2 marks)

Question 1 continues on the next page

Turn over ▶

1 (b) Concrete reinforced with metal is used as a building material.

1 (b) (i) What type of material is reinforced concrete?

....

(1 mark)

1 (b) (ii) Name the metal used to reinforce concrete.

Give the property that makes this metal a good choice for reinforcing concrete.

Metal ....

Property ....

(2 marks)

1 (c) An engineer tried to find out how the strength of a concrete bar changed with the thickness of the bar.

She set up the experiment shown in the diagram.
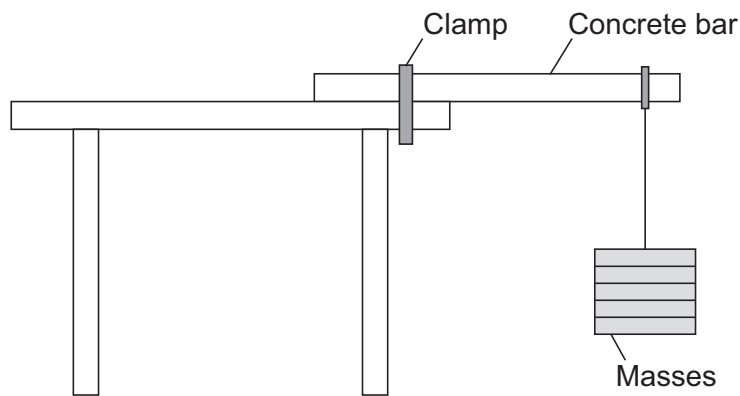
The engineer added masses to the concrete bar and recorded the mass needed to break the bar. She repeated each experiment once.

Her results are shown in the table.

Thickness of concrete bar in cm	Mass needed to break concrete bar in kg		
	1st	2nd	Mean
2	9.2	9.4	9.3
3	14.1	13.9	14.0
4	18.5	18.9	18.7
5	23.5	23.3	23.4

1 (c) (i) Give **three** variables the engineer should control to make sure that the experiment gives repeatable readings.

1 ....

....

2 ....

....

3 ....

....

(3 marks)

1 (c) (ii) Use the table of results to give a conclusion about the thickness of the concrete bar and the mass needed to break the bar.

....

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....

....

(2 marks)

1 (c) (iii) Use the information in the table to estimate the mass needed to break a concrete bar with a thickness of 6 cm.

....

....

Mass = ... kg

(1 mark)

12

Turn over ▶

2   Anna and Mark are twins.

Mark has a condition called cystic fibrosis.

Anna does **not** have cystic fibrosis.

Their parents do **not** have cystic fibrosis.
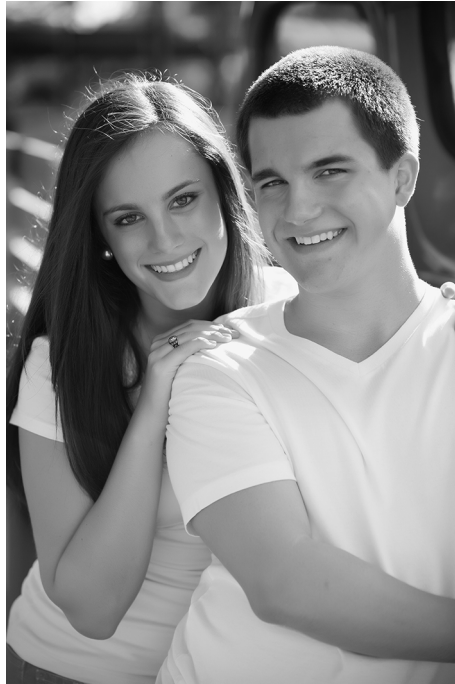
2 (a)   Cystic fibrosis is caused by a recessive allele. The two alleles are G and g.

2 (a) (i)   Use the Punnet square to show inheritance of cystic fibrosis in the family.

Draw a ring around the child that would inherit cystic fibrosis.

		Mother	
		....	....
Father	....	....	Gg
	g	....	....

(4 marks)

2 (a) (ii) The parents of Anna and Mark decide to have another child.

What is the probability of the next child having cystic fibrosis?

....

(1 mark)

2 (b) Name **two** other genetic disorders.

1 ....

2 ....

(2 marks)

7

Turn over for the next question

Turn over ▶

3 A homeowner wants the most efficient way of heating his home. His choice is between a wood burning stove or a gas heater.

Wood Burning Stove   **Gas Heater**

3 (a) (i) The gas heater uses propane. Propane is a *hydrocarbon*.

What is a hydrocarbon?

....

(1 mark)

3 (a) (ii) The gas heater burns propane (C_3H_8) in a plentiful supply of air.

Complete and balance the symbol equation to show the complete combustion of propane (C_3H_8).

C_3H_8 + ... → .... + ...

(3 marks)
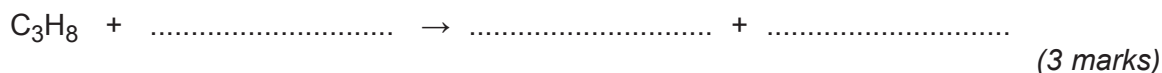
3 (b) The homeowner buys a wood burning stove. The wood burning stove uses 16 kg of wood per day to keep a room at 18 °C.

3 (b) (i) Wood costs 40p per kilogram.

Calculate the cost per day for using the wood burning stove.

....

....

Cost per day = £ ....

(1 mark)

3 (b) (ii) To keep the room at a temperature of 18 °C, the homeowner needs 180 MJ of heat energy from the wood each day.

The wood burning stove is 75% efficient.

Calculate the energy content of the wood fuel per kilogram.

....

....

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....

Energy content per kilogram = ... MJ

(3 marks)

8

Turn over for the next question

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

Glucose is carried around the body in the blood so that cells can use it for energy.

Diabetes is a condition where people cannot regulate their blood sugar levels.

One reason for the development of type 2 diabetes is that the body does not produce enough of the hormone that controls blood sugar levels.

Describe the three methods that people with type 2 diabetes use to control their blood sugar levels.

In your answer you should include an explanation of how the control methods work.

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(6 marks)

6

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

Turn over ▶

5 Electromagnetic radiation has many uses around the home.

5 (a) (i) Which type of electromagnetic radiation is used in sun beds?

....

(1 mark)

5 (a) (ii) Give **one** danger of the overuse of sun beds.

....

....

(1 mark)

5 (b) Gamma rays are another type of electromagnetic wave. Gamma rays are used in hospitals.

5 (b) (i) Give **one** medical use of gamma rays.

....

....

(1 mark)

5 (b) (ii) Gamma rays are not used in the home. Why are gamma rays not used in the home?

....

....

(1 mark)

5 (c) Describe what happens to the energy and frequency of a wave if the wavelength is increased.

....

....

....

....

(2 marks)

5 (d) Microwaves are used for cooking and for communication.

The microwaves used in a microwave oven have a wavelength of 12 cm.

Calculate the frequency of the microwaves used if the speed of the microwave is 3×10^8 m/s.

Use the Equations Sheet to help you work out your answer.

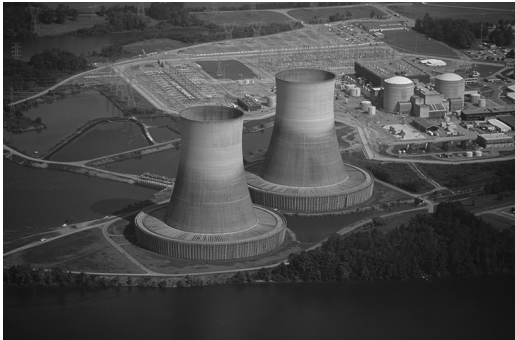Give the correct **unit** in your answer.

....

....

....

....

Frequency = ...

(4 marks)

10

Turn over for the next question

Turn over ▶

6 Nuclear power stations produce 20% of the United Kingdom's electricity.
Coal-fired power stations produce 34% of the United Kingdom's electricity.

Nuclear Power Station	**Coal-fired Power Station**

6 (a) Coal-fired and nuclear power stations both need fuel. These fuels both release energy.

Complete the sentences.

In power stations coal releases energy by ....

Nuclear fuels release energy by ....

(2 marks)

6 (b) Coal-fired and nuclear power stations use different fuels but use the same method to generate electricity.

How is energy from these fuels used to generate electricity?

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(3 marks)

6 (c) The waste material from nuclear power stations is often buried very deep underground.

Some scientists think that the buried waste could still be dangerous to humans.

Suggest how the buried waste could still be dangerous to humans.

....

....

(1 mark)

6 (d) The electricity generated in a power station needs to be distributed to the consumer through the National Grid.

Overhead high-voltage cables have been linked to an increased risk of various cancers.

Suggest how scientists could investigate this link.

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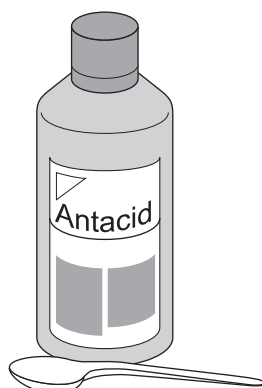
(3 marks)

9

Turn over ▶

7 The stomach contains hydrochloric acid.

Too much acid in the stomach can cause heartburn.

Antacids neutralise acids. A drug company has produced a new antacid.

7 (a) Write the ionic equation for the reaction of an acid and an alkali.

.... + ... ⟶ ....
(2 marks)

7 (b) Scientists compared the new antacid with known antacid **A**.

The scientists looked at how much stomach acid was neutralised after taking the recommended dose of each antacid.

The results of this experiment are shown in the graph.
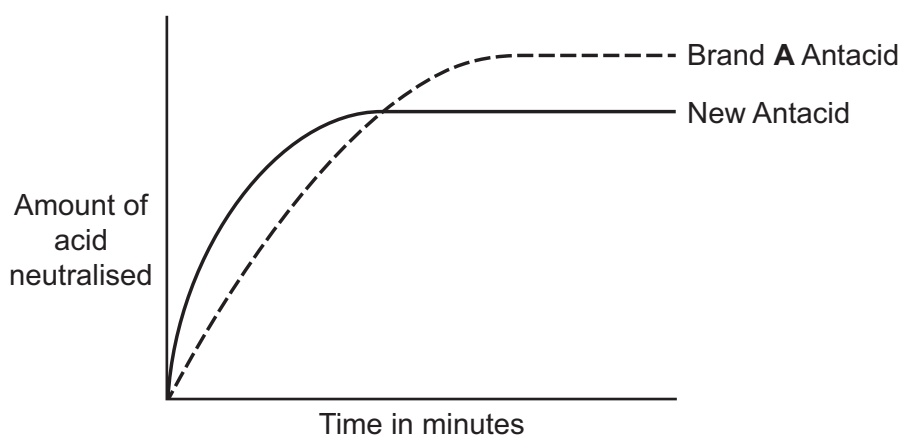
7 (b) (i) Suggest **two** reasons for the difference in shape of the graph for the two antacids.

....

....

....

....

(2 marks)

7 (b) (ii) Use the graph and your knowledge of digestion to evaluate the use of the new antacid in treating heartburn compared with the known brand **A**.

Your evaluation should suggest which antacid would be more effective.

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(4 marks)

8

END OF QUESTIONS

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