AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
SCIENCE B

H

Higher Tier Unit 2 My Family and Home

Thursday 19 May 2016 Morning Time allowed: 1 hour

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

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 2(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.

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

1 (a) Give **one** property that is the same for all electromagnetic waves.

[1 mark]

Draw a ring around the correct answer.

frequency **speed in a vacuum** **wavelength**

1 (b) (i) **Table 1** shows some types of electromagnetic waves and some uses of electromagnetic waves.

Complete **Table 1**.

[4 marks]

Table 1

Type of electromagnetic wave	Use
Ultraviolet	
X-rays	
	Mobile phones
	Remote controls for televisions

1 (b) (ii) Energy is carried by electromagnetic waves.

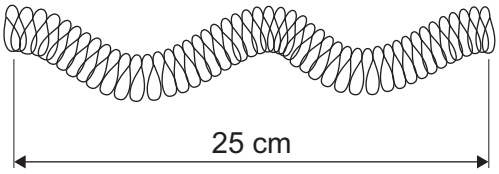
Describe how the energy carried by an electromagnetic wave changes with the wavelength of the wave.

[1 mark]

1 (c) A teacher demonstrates how waves travel using a slinky spring.

The resulting wave is shown in **Figure 1**.

Figure 1



The wave produced has a frequency of 5 Hz.

1 (c) (i) How many complete waves are shown in **Figure 1**?

[1 mark]

Draw a ring around the correct answer.

2 **4** **5**

1 (c) (ii) Calculate the velocity of the wave shown in **Figure 1**.

Use the Equations Sheet to help you answer the question.

[2 marks]

Velocity of wave = _____ cm/s

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Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

2 A student planned to investigate the change in mass of the reaction mixture when different metal carbonates react completely with **excess** hydrochloric acid.

2 (a) (i) Name a piece of equipment the student should use to measure the volume of hydrochloric acid.

[1 mark]

_____

2 (a) (ii) State **one** variable the student should keep the same in this investigation.

[1 mark]

_____

2 (b) (i) The chemical reaction can be shown as a word equation.

hydrochloric acid + metal carbonate ⟶ salt + carbon dioxide + water

What type of chemical reaction is shown in the chemical equation?

[1 mark]

Tick (✓) **one** box.

	Tick (✓)
Displacement	
Neutralisation	
Oxidation	

2 (b) (ii) Why does the mass of the reaction mixture change during the reaction?

[1 mark]

_____

_____

2 (b) (iii) What readings should the student take in this investigation?

[1 mark]

_____

_____

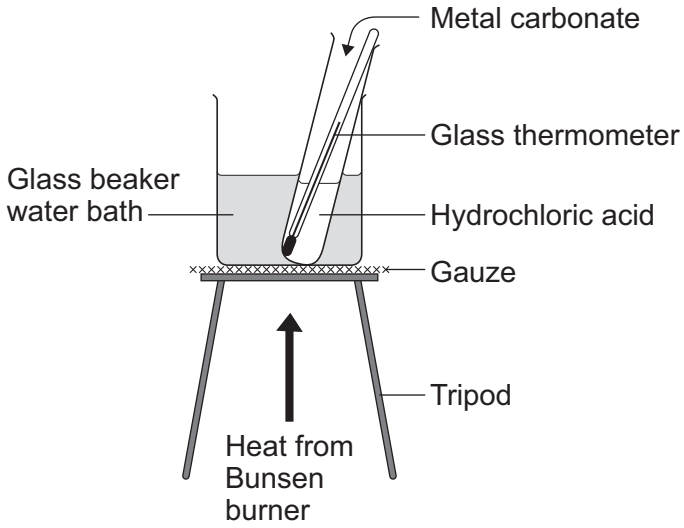
Question 2 continues on the next page

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

The student planned a new investigation to look at the effect of temperature on the rate of chemical reaction between hydrochloric acid and metal carbonates.

Figure 2 shows a diagram of the apparatus the student planned to use for the investigation.

Figure 2



Describe the hazards, risks and safety precautions the student should consider before using the apparatus shown in **Figure 2** to do this investigation.

[6 marks]

Extra space _____

11

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

3 (a) (i) Lime mortar is made from limestone.

State the chemical formula of limestone.

[1 mark]

_____

3 (a) (ii) **Figure 3** shows part of The Great Wall of China that was built over 2000 years ago.

Figure 3

Lime mortar was used in the building of the Great Wall of China.

What was lime mortar used for in the building of the Great Wall of China?

[1 mark]

_____

_____

3 (b) Limestone has many modern day uses other than lime mortar.

Give **one** use of limestone.

[1 mark]

_____

3 (c) Most of the mortar we use today does not contain lime.

State what ingredients are mixed together to make the mortar we use today.

[1 mark]

_____

_____

3 (d) An incorrect ratio of ingredients in mortar can make mortar shrink too much when it sets.

3 (d) (i) Suggest **one** problem caused when mortar shrinks too much.

[1 mark]

3 (d) (ii) **Table 2** shows the mean mortar shrinkage for three different mortar mixtures, **A**, **B** and **C**.

Table 2

Time in days	Mean shrinkage of mortar in arbitrary units		
	Mixture A	Mixture B	Mixture C
0	0	0	0
5	220	120	140
10	360	250	290
15	420	340	360
20	460	380	400
25	470	405	410
30	480	420	420

Describe how scientists calculate a mean for their results.

[2 marks]

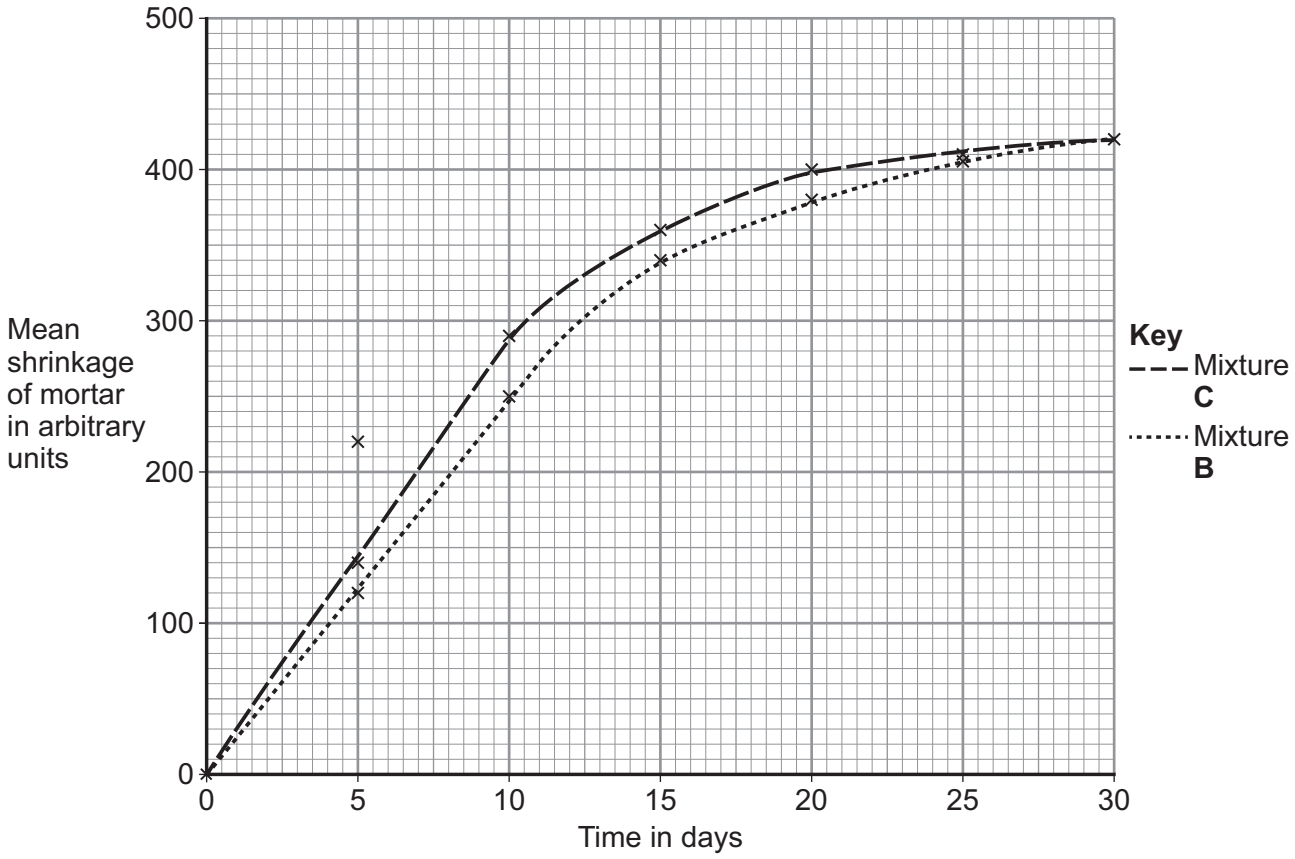
3 (d) (iii) Use the data in **Table 2** to complete **Figure 4** for the plots of mixture **A**.

The first **two** have been done for you.

You should draw a line of best fit.

[3 marks]

Figure 4



3 (d) (iv) Use **Figure 4** to compare the trends in the mean shrinkage of mortar for the three mixtures.

[3 marks]

13

4 (a) The general formulae for alkanes is C_nH_{2n+2}

What does C_nH_{2n+2} mean?

[1 mark]

4 (b) Methane can be combusted in power stations.

Write a balanced symbol equation for the complete combustion of one molecule of methane.

[3 marks]

_____ + _____ ⟶ _____ + _____

4 (c) Two methods of producing electricity without burning fossil fuels are the use of nuclear fuels and wave energy sources.

4 (c) (i) Explain **one** disadvantage of using nuclear fuel to produce electricity.

[2 marks]

Disadvantage _____

Explanation _____

4 (c) (ii) Explain **one** disadvantage of using wave energy sources to produce electricity.

[2 marks]

Disadvantage _____

Explanation _____

4 (d) **Figure 5** is part of a newspaper report about another source of energy.

Figure 5

Biomass, such as straw and wood can be burnt. The energy from burning biomass can be used to generate electricity.

Farmers are paid by the government to grow plants for biomass instead of for food.

Companies can sell electricity generated from biomass at a higher price than electricity generated from burning fossil fuels.

Use information in **Figure 5** and your own knowledge to suggest **two** advantages and **one** disadvantage of the use of biomass as an energy source.

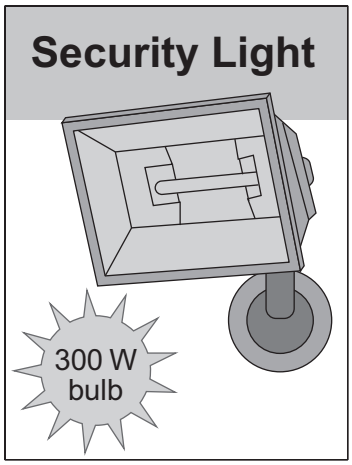
[3 marks]

11

Turn over for the next question

5 **Figure 6** shows a security light a homeowner plans to use outside his home.

Figure 6



5 (a) The security light will be used for an average of 8 hours each night.

Use **Figure 6** to calculate the energy transferred by the light bulb used in the security light each night.

Give the correct unit in your answer.

Use the Equations Sheet to help you answer the question.

[3 marks]

Energy transferred = _____

5 (b) The light bulb used in the security light in **Figure 6** is 35% efficient at transferring electrical energy into light energy.

5 (b) (i) What does the term 'efficiency' mean?

[1 mark]

_____

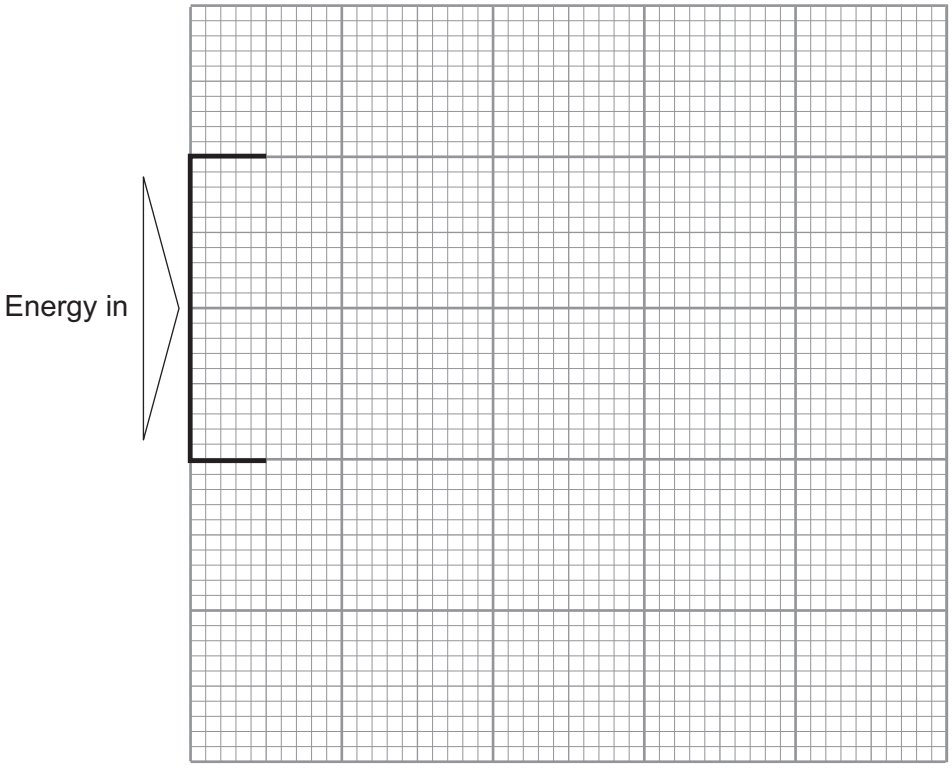
_____

5 (b) (ii) Complete the Sankey diagram in **Figure 7** for the light bulb used in the security light.

Label your diagram.

[2 marks]

Figure 7



6

6 The human body responds to internal changes using negative feedback.

6 (a) What does negative feedback enable the body to do?

[1 mark]

6 (b) Some of the human body's negative feedback responses involve secretory glands.

How do these secretory glands cause negative feedback?

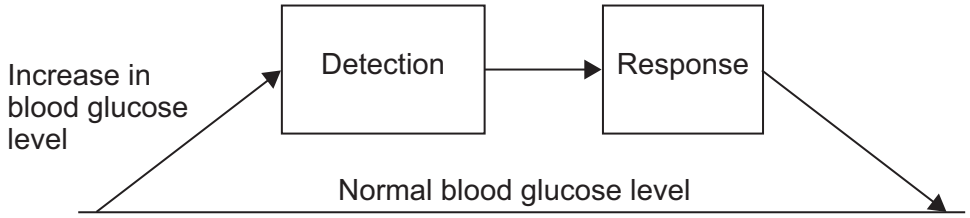
[1 mark]

6 (c) Explain how the circulatory system of the human body responds to a severe drop in temperature.

[4 marks]

6 (d) **Figure 8** shows an incomplete diagram for the human body's response to changes in blood glucose level.

Figure 8



Describe how the body detects and responds to the change in blood glucose level shown in **Figure 8**.

[4 marks]

10

END OF QUESTIONS

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