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
June 2015

Science B

SCB2FP

F

Unit 2 My Family and Home

Tuesday 9 June 2015 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

A

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 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 **Figure 1** shows a storm.

Thunder and lightning occur in a storm.

Figure 1

1 (a) (i) Give the name of the sense organ used to detect lightning.

[1 mark]

Tick **one** (✓) box.

Ears ☐

Eyes ☐

Nose ☐

1 (a) (ii) After detecting the lightning, the sense organ will send an impulse to a neurone.

Which neurone first receives the impulse from the sense organ?

Draw a ring around the correct answer.

[1 mark]

Motor **Relay** **Sensory**

1 (b) When we hear thunder we may jump suddenly.

What is the name of this automatic response?

Draw a ring around the correct answer.

[1 mark]

Learned action **Practised action** **Reflex action**

1 (c) (i) Thunder is the sound produced in a storm.

Sound travels in waves.

What type of wave is a sound wave?

Draw a ring around the correct answer.

[1 mark]

Electromagnetic **Longitudinal** **Transverse**

1 (c) (ii) What is the hearing range of a healthy young person?

Draw a ring around the correct answer.

[1 mark]

0–20 Hz **20–20 000 Hz** **20 000–200 000 Hz**

5

Turn over for the next question

There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED

2 A student plans to investigate how different metals react with acids.

2 (a) (i) Which hazard symbol would the student see on a bottle of strong acid?

[1 mark]

Tick (✓) **one** box.

☐

☐

☐

2 (a) (ii) What does the hazard symbol that you chose in part **(a)(i)** mean?

[1 mark]

.....

2 (b) The student needs to take safety precautions when handling acids.

Suggest **two** reasons why.

[2 marks]

1 .....

.....

2 .....

.....

Question 2 continues on the next page

2 (c) The student tested different metals by putting small pieces of metal into an acid.

The student's results are shown in **Table 1**.

Table 1

Metal used	Number of bubbles produced in 5 minutes		Mean number of bubbles produced in 5 minutes
	Test 1	Test 2	
Iron	12	8	10
Lead	0	2	1
Magnesium	28	42	
Zinc	16	12	14

2 (c) (i) Calculate the mean number of bubbles produced by the magnesium in 5 minutes.

[1 mark]

.....

.....

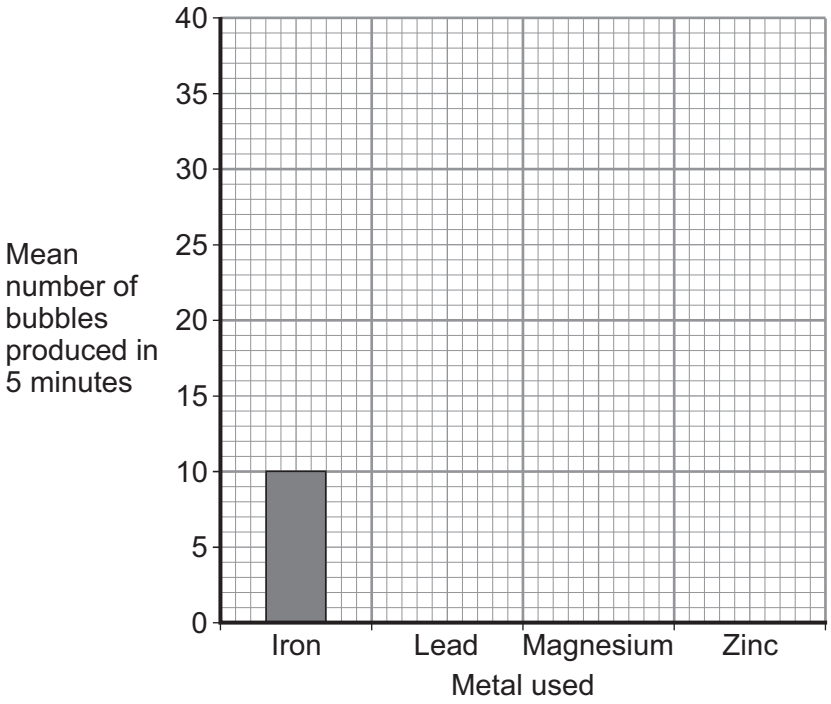
Mean number of bubbles produced = ...

2 (c) (ii) Complete the bar chart in **Figure 2** to show the student's results.

Use the data in **Table 1**.

[2 marks]

Figure 2



2 (c) (iii) The student noticed the two results for magnesium were very different.

Give **three** variables the student should have controlled to produce valid results.

[3 marks]

1 .....

2 .....

3 .....

2 (d) Scientists usually produce a graph or chart to show their results. Suggest why.

[1 mark]

.....

.....

11

Turn over ▶

3 Limestone is used as a building material.

Figure 3 shows a building site. Limestone is used to make some of the materials found on the building site.

Figure 3

3 (a) (i) Use the correct answer from the box to complete each sentence.

[3 marks]

cement	**concrete**	**glass**	**mortar**	**quicklime**

Heating powdered limestone and clay in a kiln makes ..... .

Limestone, sand and soda are heated together to make ..... .

Bricks in walls and buildings can be joined together using ..... .

3 (a) (ii) Reinforced concrete is used as a building material.

What type of material is reinforced concrete?

Draw a ring around the correct answer.

[1 mark]

Aggregate **Composite** **Polymer**

3 (a) (iii) What is the advantage of using reinforced concrete instead of concrete?

[1 mark]

.....

3 (b) Ceramic materials are also used in buildings. Ceramic materials are brittle.

What does brittle mean?

[1 mark]

.....

3 (c) A builder needs to put a new work surface into a kitchen. The work surface will be next to the cooker.

Table 2 shows properties of the work surface materials he can choose from.

Table 2

Work surface material	Heat resistance in °C	Wear resistance	Cost per m^2 in pounds (£)	Impact resistance
Glass	Up to 400	Easily scratched	300	Cracks and chips with little force
Granite	Up to 250	Very hard to scratch	200	Hard to chip or crack
Laminate	Up to 180	Hard to scratch	30	Chips and cracks easily

The builder chooses a laminate work surface for the kitchen.

Give **one** reason for using the laminate work surface for the kitchen, and **one** reason against using the laminate work surface for the kitchen.

Use information from **Table 2**.

[2 marks]

Reason for using laminate .....

.....

Reason against using laminate .....

.....

8

Turn over for the next question

4 (a) Petrol is a common fuel used for cars.

4 (a) (i) Why is petrol a good fuel for cars?

[1 mark]

Tick (✓) **one** box.

	Tick (✓)
It has a high energy content.	
It does not burn.	
It is not renewable.	

4 (a) (ii) What is the raw material used to make petrol?

Draw a ring around the correct answer.

[1 mark]

Crude oil **Natural gas** **Paraffin**

4 (b) Car manufacturers are looking for alternatives to petrol to fuel their cars.

One alternative is to use electric cars.

Electric cars have batteries instead of a fuel tank.

The batteries are recharged using mains electricity at 230 V.

When the batteries are charging, a current of 10 A flows.

Calculate the power supplied to the batteries.

Give the correct unit in your answer.

Use the Equations Sheet to help you.

[2 marks]

.....

.....

.....

Power = ...

4 (c) (i) A different electric car's batteries are supplied with 4 kW for 8 hours.

Use the equation to calculate the energy transferred to the batteries.

Energy transferred = power × time

Give the correct unit in your answer.

[2 marks]

.....

.....

.....

.....

Energy transferred .....

4 (c) (ii) Electricity costs 15p per unit.

Calculate the cost, in pence, of recharging the electric car's batteries, in part **(c)(i)**, for 8 hours.

[1 mark]

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7

Turn over for the next question

5 Fuels are often used to heat our homes.

5 (a) (i) Some fuels are hydrocarbons. What is a hydrocarbon?

[1 mark]

.....

.....

5 (a) (ii) Which gas reacts with hydrocarbons during combustion?

Draw a ring around the correct answer.

[1 mark]

Carbon dioxide **Nitrogen** **Oxygen**

5 (a) (iii) Some hydrocarbons are called alkanes, their chemical formula is C_nH_{2n+2}

An alkane molecule has 8 carbon atoms.

How many hydrogen atoms are in this alkane molecule?

Draw a ring around the correct answer.

[1 mark]

10 **16** **18**

5 (b) Electricity can be generated using coal as a fuel.

The parts of a coal fired power station and electricity distribution system are **not** in the correct order.

A Turbine

B Step up transformer

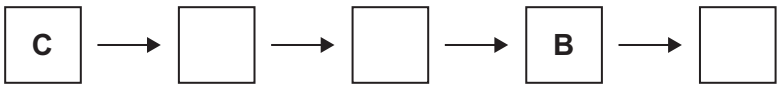
C Boiler

D Generator

E The National Grid

Put the parts of the power station and electricity distribution system in the correct order to show how electricity is generated and distributed.
Two have been done for you.

[2 marks]



5 (c) Scientists have developed a new process for generating electricity using hydrogen produced by algae.

In the new process:

- algae are grown in water tanks
- algae split water into hydrogen and oxygen
- the hydrogen is used to generate electricity
- the waste produced when hydrogen is used to generate electricity is water.

5 (c) (i) Suggest **two** advantages of using the new process to generate electricity.

[2 marks]

1 .....

.....

2 .....

.....

5 (c) (ii) Suggest **one** reason why coal is still used to generate electricity.

[1 mark]

.....

.....

5 (c) (iii) Nuclear fuels are also used to generate electricity.

What is the name of the process that releases energy from nuclear fuels to generate electricity?

Draw a ring around the correct answer.

[1 mark]

Combustion **Electrolysis** **Fission**

9

6 Polydactyly is a genetic disorder.

Figure 4 shows an X-ray of a hand of a person with polydactyly.

Figure 4

6 (a) (i) Polydactyly is caused by the dominant allele of a gene.

Where are genes found in our cells?

Draw a ring around the correct answer.

[1 mark]

In the cytoplasm **In the nucleus** **On the cell membrane**

6 (a) (ii) A child has polydactyly.

The father of the child has one dominant allele (**G**) and one recessive allele (**g**) of the gene that causes polydactyly.

The mother of the child does **not** have the polydactyly allele.

Complete the Punnett square to show the inheritance of polydactyly for the child.

Use **G** for the dominant allele and **g** for the recessive allele.

[3 marks]

		Father	
		.....	.....
Mother	.....	.....	.....
	.....	.....	.....

6 (a) (iii) What is the probability of their next child having polydactyly?

Draw a ring around the correct answer.

[1 mark]

25% **50%** **75%** **100%**

6 (b) Cystic fibrosis is another genetic disorder.

The life expectancy of babies born with cystic fibrosis has increased over the past 50 years.

Suggest **one** reason why.

[1 mark]

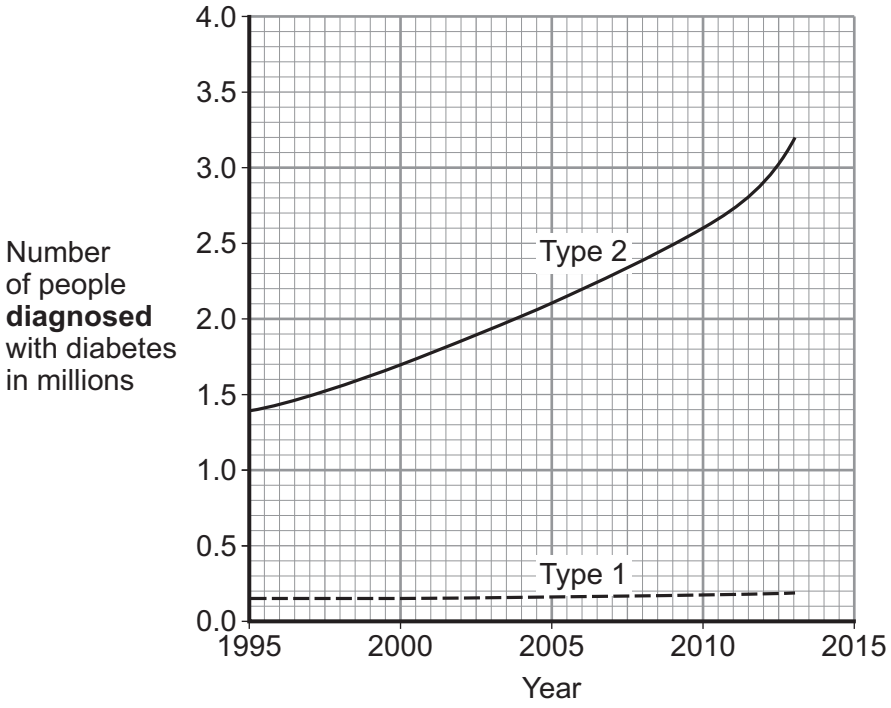
.....

.....

Question 6 continues on the next page

6 (c) **Figure 5** shows some information about the number of people **diagnosed** with type 1 diabetes and type 2 diabetes in the UK.

Figure 5



6 (c) (i) Compare the trends shown in **Figure 5** for the number of people diagnosed with type 1 diabetes and type 2 diabetes.

[1 mark]

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6 (c) (ii) Suggest **two** reasons why genetic (inherited genes) and environmental factors (lifestyle) contribute to the differences in the number of people diagnosed with type 1 diabetes and type 2 diabetes.

[2 marks]

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9

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

Electromagnetic waves, such as radio waves, have many uses.

Identify other electromagnetic waves and describe their uses and hazards.

[6 marks]

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Extra space .....

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6

Turn over for the next question

8 The human body is kept at a constant temperature.

8 (a) Name the centre in the brain that controls body temperature.

[1 mark]

.....

8 (b) Describe **two** ways in which the human body reduces heat loss on a cold winter's day.

[4 marks]

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5

END OF QUESTIONS

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