

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
Higher Tier
June 2012

Science B

SCB2HP

Unit 2 My Family and Home

H

Written Paper

Friday 15 June 2012 1.30 pm to 2.30 pm

<p>For this paper you must have:</p> <ul style="list-style-type: none"> • a ruler • a calculator • the Equations Sheet (enclosed).
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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 3 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

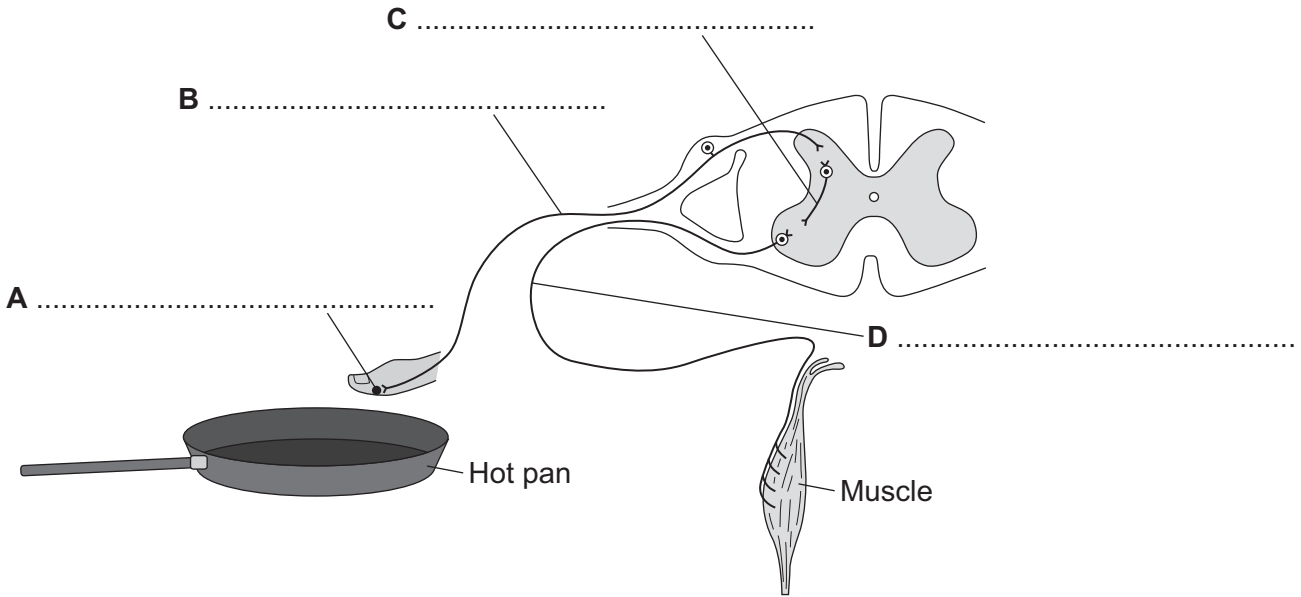
- In all calculations, show clearly how you work out your answer.



J U N 1 2 S C B 2 H P 0 1

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

1 The diagram shows part of the nervous system that allows a rapid automatic response when a finger touches a hot pan.



1 (a) Label parts **A**, **B**, **C** and **D** on the diagram. (4 marks)

1 (b) (i) When a finger touches the hot pan there is a rapid automatic response, which is called a reflex action. Describe what happens in the reflex action shown in the diagram.

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(3 marks)

1 (b) (ii) Suggest why the reflex action shown in the diagram is so rapid.

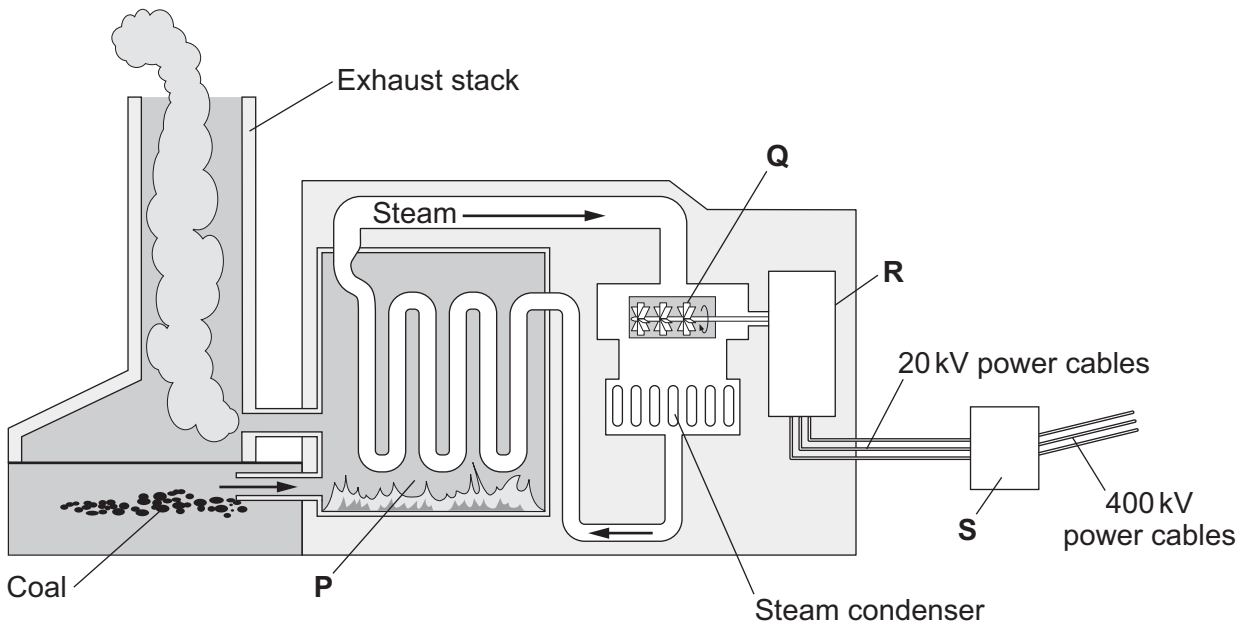
.....

.....

(1 mark)



2 The diagram shows a power station.



2 (a) The parts of the power station are listed below. Name each part and describe what it does.

2 (a) (i) Part P is

What Part P does

..... (1 mark)

2 (a) (ii) Part Q is

What Part Q does

..... (1 mark)

2 (a) (iii) Part R is

What Part R does

..... (1 mark)

2 (a) (iv) Part S is

What Part S does

..... (1 mark)

Turn over ►



2 (b) Some students sharing a house were worried about their electricity bill.
 The students decided to record how much electricity they used.
 The students found that they used 133 units in one week.
 One unit of electricity costs 12p.

2 (b) (i) Calculate the cost of the electricity that the students used in the week.

.....

Cost p
 (1 mark)

2 (b) (ii) During the week the students used an electric oven.

The oven used a total of 42 units.

What percentage of the total electricity used in the week did the oven use?

.....

..... %
 (1 mark)

2 (b) (iii) Cooking using the electric oven costs the students £5.04 a week.

The students found that if they did the cooking using a microwave they would use only 3.75 units in the week.

They bought a microwave for £91.80.

How many weeks did it take for the saving on the electricity bill to cover the cost of the microwave?

.....

..... weeks
 (4 marks)



2 (c) The students used a kettle for a total of 30 minutes each day.

The kettle used 7 units in the week.

Calculate the power of the kettle.

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

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

Power kilowatts
(2 marks)

12

Turn over for the next question

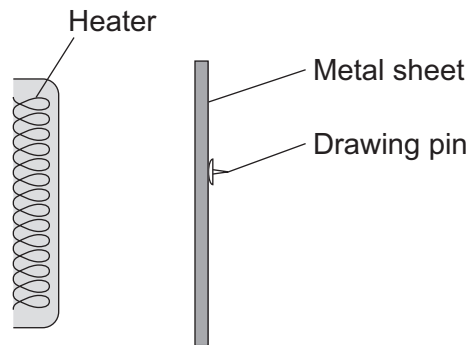
Turn over ▶



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

A student did an experiment to investigate heat conduction by five different metals.

The student used the apparatus shown in the diagram.



The student stuck the drawing pin onto the metal sheet using wax.

The student turned on the heater. The heat melted the wax so the drawing pin fell off.

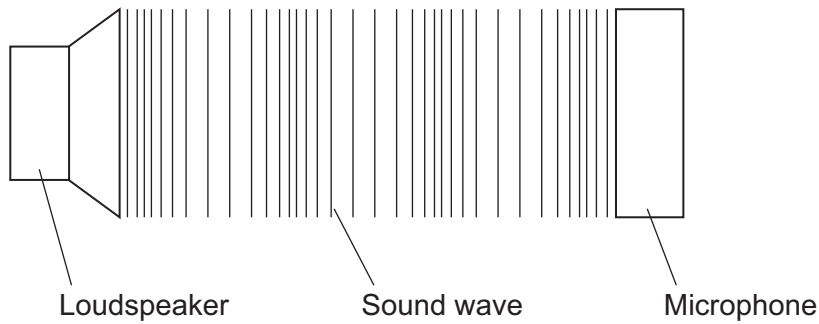
The student recorded the time taken for the pin to fall off.

The student's results are shown in the table.

Metal	A	B	C	D	E
Thickness of metal	5	5	4	6	5
Area of metal surface	100	100	100	100	100
Surface of metal	black	orange	silver	grey	black
Distance from heater	20	20	20	20	20
Mass of drawing pin	1.1	1.1	1.2	1.3	1.0
Time taken to fall off	9.3	11.1	12.2	8.0	13.2



4 The diagram shows how sound waves produced by a loudspeaker travel to a microphone.



4 (a) What type of wave is a sound wave?

.....
(1 mark)

4 (b) Describe how the loudspeaker makes sound waves.

.....
.....
.....
.....
.....
.....
(2 marks)

4 (c) The velocity of a wave is 330 m/s. The wavelength is 275 cm.

Calculate the frequency of the wave.

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

Give the correct unit in your answer.

.....
.....
.....
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Frequency
(4 marks)

7



5 Wind turbines can be used instead of power stations to generate electricity.



Evaluate the use of wind turbines for generating electricity.

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(5 marks)

5

Turn over ►



6 Hydrocarbon gases are often used as fuels.

Methane is a hydrocarbon gas that is used as fuel.

6 (a) Give the chemical formula for methane.

.....
(1 mark)

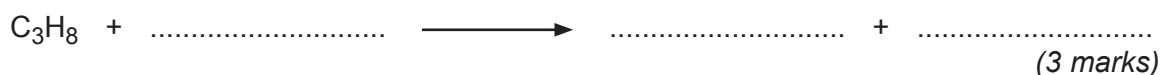
6 (b) Why is methane described as a hydrocarbon?

.....
.....
(1 mark)

6 (c) Propane is another hydrocarbon gas.

Propane is used as a fuel for camping stoves. The chemical formula for propane is C_3H_8 .

Write a balanced symbol equation for the complete combustion of propane.



6 (d) A student used a camping stove to heat 0.5 litres (dm^3) of water from $20^\circ C$ to $100^\circ C$.

4.2 kJ of energy are needed to raise the temperature of 1 litre (dm^3) of water by $1^\circ C$.

Calculate the amount of energy needed to heat the water from $20^\circ C$ to $100^\circ C$.

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

Energy needed = kJ
(3 marks)



6 (e) (i) The power of the camping stove is measured in watts (W).

Give the definition of a watt.

.....
.....

(1 mark)

6 (e) (ii) What does the term *efficiency* mean?

.....
.....

(1 mark)

6 (e) (iii) A consumer group tests the power output of a camping stove and finds that the useful power output is 0.28 kW. The label on the camping stove gives its power as 1.75 kW.

What is the efficiency of the camping stove?

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

.....
.....

Efficiency =

(1 mark)

11

Turn over for the next question

Turn over ►



7 Some disorders are caused by the genes we inherit.

The photograph shows the hand of a person with a genetically inherited disorder called polydactyly.



7 (a) A man has polydactyly. His wife does not have polydactyly.

Polydactyly is caused by an altered allele. The polydactyly gene has two alleles, **G** and **g**. Only one copy of the altered allele is needed to cause polydactyly.

The man and his wife have four children. None of the children have polydactyly.

Give the alleles carried by the man and his wife.

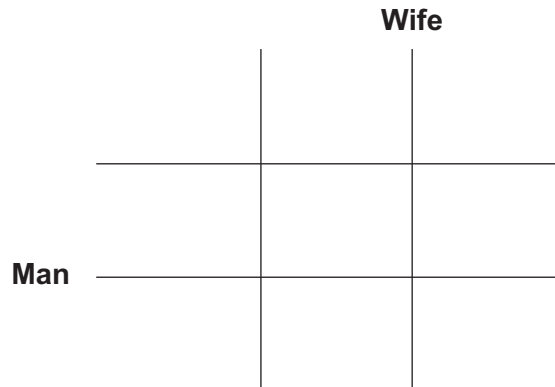
Man's alleles

Wife's alleles

(2 marks)



7 (b) (i) Complete the Punnett square to show the possible allele combinations their children could inherit.



(1 mark)

7 (b) (ii) The man and his wife are surprised that none of their children have polydactyly.

Explain fully why none of their children have polydactyly.

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(2 marks)

5

Turn over for the next question

Turn over ►



8 Poly(ethene) is a plastic made from ethene.

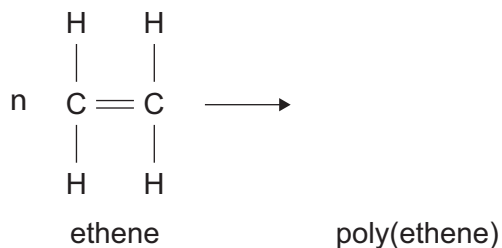
8 (a) Give the name of the reaction which changes ethene into poly(ethene).

.....
(1 mark)

8 (b) Give the scientific name for the small molecules that join together in the type of reaction which changes ethene into poly(ethene).

.....
(1 mark)

8 (c) Complete the diagram (called a displayed formula) to show the conversion of ethene into poly(ethene).



(4 marks)

6

END OF QUESTIONS



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