Specimen Paper

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
Specimen Paper

Science B (Science in Context)

Unit 2 My Family and Home

Foundation Tier

F

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

You may use a calculator.

Time allowed
- 60 minutes

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 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 Some organs in the human body contain receptor cells. The receptor cells detect different stimuli in the environment.

1 (a) Complete the table by writing the name of the correct organ in each box.

The first one has been done for you.

Receptor for stimulus	**Organ containing the receptor cells**
Taste	tongue
Light	
Smell	
Temperature	

(3 marks)

1 (b) Each year around 840 children in the UK are born with a permanent hearing impairment. Hearing screeners test newborn babies to check that their hearing is not impaired.

What is the normal hearing range for humans?

Tick (✓) **one** box.

Range	**Tick (✓)**
40–60 000 Hz	
20–120 000 Hz	
16–12 000 Hz	
20–20 000 Hz	

(1 mark)

1 (c) Your body needs to keep an internal temperature of around 37 °C.

Which **two** statements describe how your body cools itself down if your temperature goes above 37 °C?

Tick (✓) **two** boxes.

Statement	Tick (✓)
Sweat is released from the sweat glands in the skin	
Less blood flows to the capillaries in the skin	
More blood flows to the capillaries in the skin	
The sweat glands stop releasing sweat	

(2 marks)

1 (d) Complete the sentences.

Your body reduces the amount of glucose in your blood using a hormone. This hormone is called ....

It is produced in the ..... .

(2 marks)

8

Turn over for the next question

2 Some of the electricity that we use in our homes is generated from fossil fuels.

2 (a) Use words from the box to complete the sentences about electricity generation.

burnt	**heat**	**turbine**	**generator**	
light	**sound**	**boiler**	**condensed**	**mined**

When a fossil fuel such as coal is ..... , the

..... energy released changes water in pipes into steam.

The steam turns a ..... , which drives

a ..... .

(4 marks)

2 (b) Give **one** environmental problem that is linked with using fossil fuels for electricity generation.

.....

(1 mark)

2 (c) Name **one** non-renewable energy source for the generation of electricity, **other than** coal.

.....

(1 mark)

2 (d) Wood is a major renewable source of energy, and is often used to heat our homes.

One disadvantage of wood is that 1000 kg may contain up to 600 kg of water.

2 (d) (i) Why is wood considered to be a renewable energy source?

.....

.....

(1 mark)

2 (d) (ii) Suggest why the amount of energy released by wood for heating is less when it is wet than when it is dry.

.....

.....

(1 mark)

2 (e) Name **one** energy source that is **not** a fuel.

.....

(1 mark)

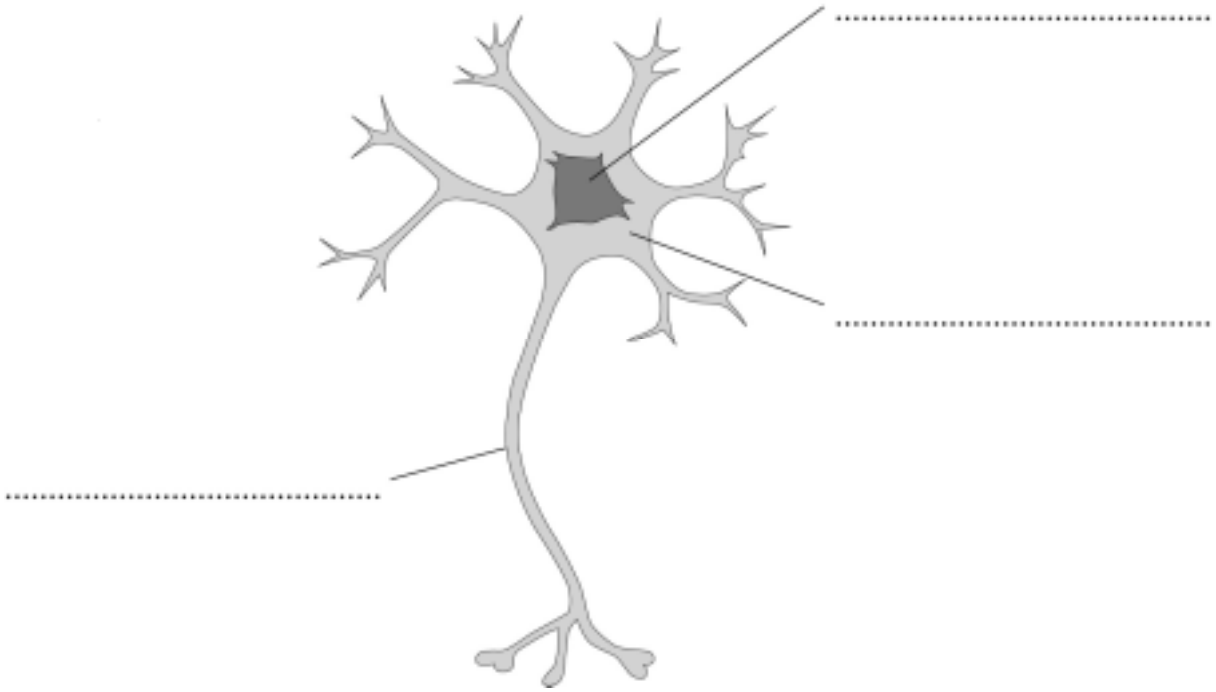
9

Turn over for the next question

3 Our nervous system allows us to respond to changes in our environment.

3 (a) The diagram shows a nerve cell, which is part of our nervous system.

Complete the labels on the diagram.



(3 marks)

3 (b) Which part of the cell contains genes?

.....

(1 mark)

3 (c) Fur colour in rabbits is controlled by two alleles.

B is the allele that causes black fur and is the dominant allele.

b is the allele that causes white fur and is the recessive allele.

The Punnett square below shows a cross between two black rabbits. Each rabbit has the alleles **Bb**.

	B	**b**
B	……	Bb
b	……	……

3 (c) (i) Complete the Punnet square by writing in the alleles in the empty boxes.

(2 marks)

3 (c) (ii) Which of the rabbits in the Punnet square would be white?

Give a reason for your choice.

.....

.....

.....

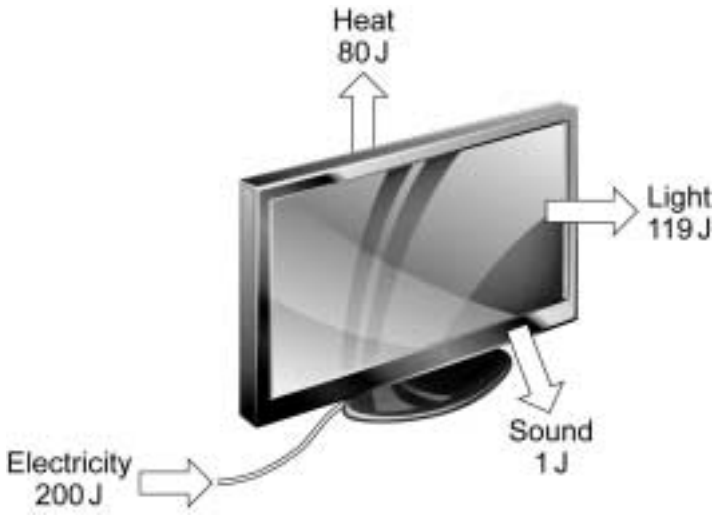
.....

(2 marks)

8

Turn over for the next question

4 (a) The diagram shows the average energy transferred each second by a television.



4 (a) (i) Calculate the average efficiency of the television.

Show clearly how you work out your answer.

.....

.....

.....

.....

Efficiency = ...

(2 marks)

4 (a) (ii) Suggest **one** environmental reason why the average efficiency of the television should be as high as possible.

.....

.....

.....

.....

(2 marks)

4 (a) (iii) Suggest why the energy transferred by a television set changes while you are watching it.

.....

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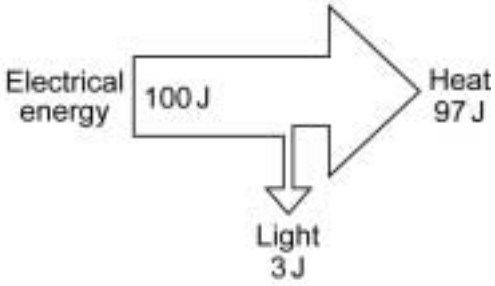
(1 mark)

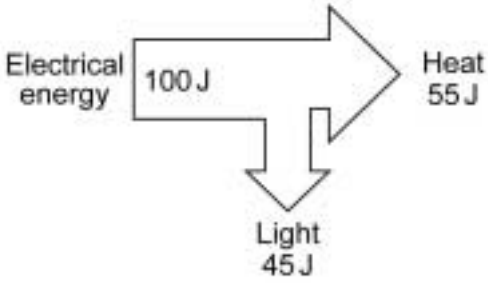
4 (b) The diagrams show the energy transferred each second for three different types of lamp.

For each lamp the electrical energy input each second is 100 joules.

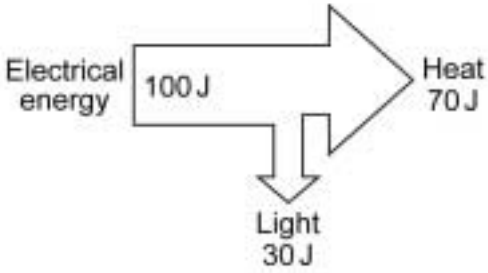
Filament lamp



Street lamp



Fluorescent lamp



The street lamp is the most efficient.

Explain why.

.....

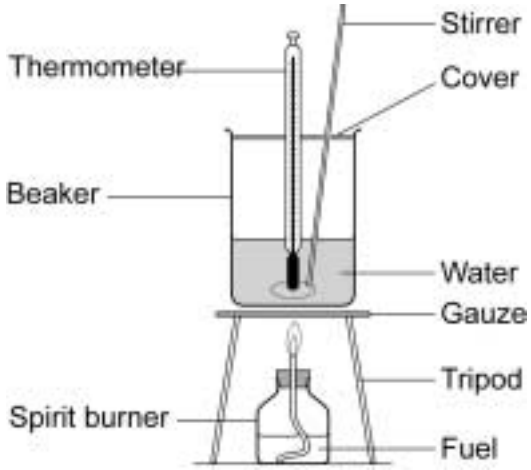
.....

(1 mark)

6

Turn over ▶

5 The diagram shows the apparatus used to measure the energy released when a fuel is burned.



5 (a) Describe how you would use this apparatus to compare the energy released when three different fuels are burned.

.....

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.....

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(4 marks)

5 (b) A student did the experiment and obtained the results shown in the table.

	Fuel A	**Fuel B**	**Fuel C**
Temperature at start in °C	22	21	.....
Temperature at end in °C	35	37	40
Temperature rise in °C	.....	16	12

Calculate the missing values for Fuel **A** and Fuel **C** and put them in the correct places in the table.

(2 marks)

5 (c) Which fuel, **A**, **B** or **C**, released the most energy when it was burned?

.....

(1 mark)

7

Turn over for the next question

6 Chemists who work in a hospital may monitor samples of stomach acid from patients with very bad heartburn.

6 (a) The diagram shows some hazard warning symbols.

Which **two** symbols could be used to label a sample of stomach acid?

Tick (✓) **two** boxes.

☐ ☐ ☐ ☐ ☐

(1 mark)

6 (b) Hospital chemists need to protect themselves from coming into contact with acids.

Suggest **two** safety precautions that a hospital chemist should take when working with stomach acids.

1 .....

2 .....

(2 marks)

6 (c) People with heartburn can take antacids to relieve their symptoms.

6 (c) (i) Why does the stomach work better if the contents are acidic?

.....

.....

(1 mark)

6 (c) (ii) Antacids work because they neutralise excess acid.

Complete the word equation for a neutralisation reaction.

acid + alkali ⟶ ..... + ...

(2 marks)

6 (d) A hospital chemist neutralises a stomach acid sample using a known alkali.

She uses a pH meter to find out when neutralisation is complete.

6 (d) (i) Describe how the hospital chemist could use the pH meter to decide when a sample of acid had been neutralised.

.....

.....

.....

.....

(2 marks)

6 (d) (ii) Which ion in stomach acid makes it acidic?

.....

(1 mark)

9

Turn over for the next question

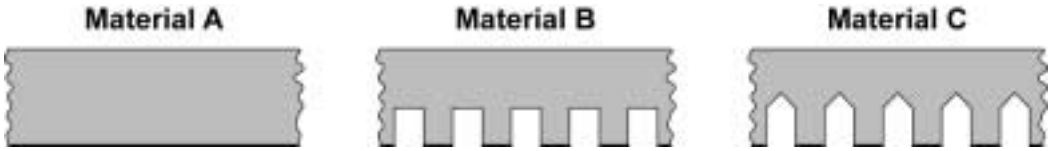
7 *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

Neighbours of a night club have complained about the level of noise made by bands playing loud music.

The night club owners decided to sound-proof their walls.

A builder suggests three different types of sound insulation materials they could use.

He compared results produced by scientists in a laboratory using a decibel meter.



Design an experiment that the scientists could use to find the best material to sound-proof the walls of the night club.

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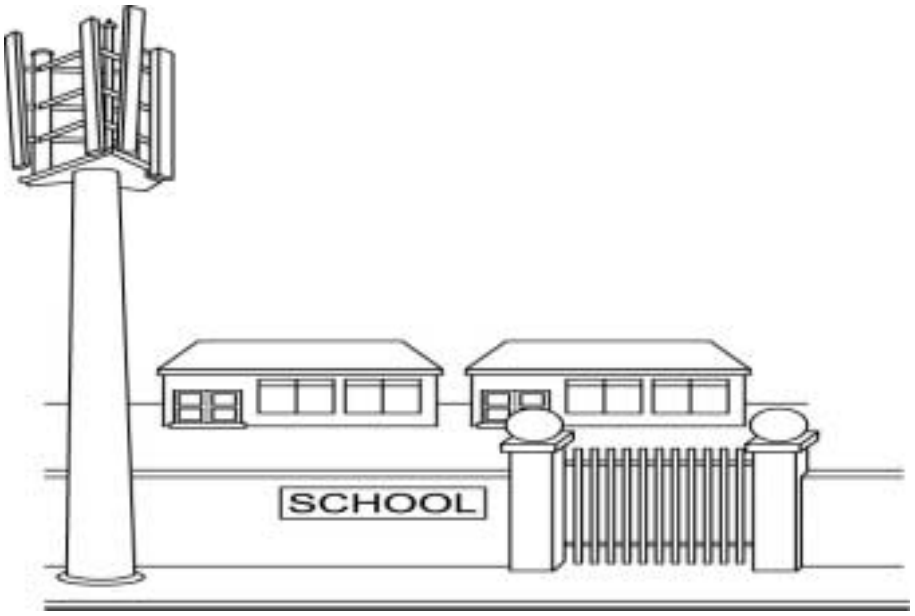
(6 marks)

6

8 Read the article below and answer the questions that follow.



Parents protest against mobile phone mast

Angry parents met yesterday to protest against a 3G (third generation) mobile phone mast being built next to their children's primary school.

Third generation phones require many more base stations to operate effectively. These transmit electromagnetic radiation at a higher frequency than for 2G (second generation) phones, with the highest concentrations within 400 m of the mast. One survey found that one-third of Britain's schools now have a mobile phone mast 200 m away or less.

8 (a) Why might the electromagnetic radiation that comes from 3G masts be more dangerous than the radiation from 2G masts?

.....

.....

(2 marks)

Question 8 continues on the next page

8 (b) At present, there is no scientific evidence that electromagnetic radiation from mobile phone masts is dangerous to health. Suggest why the parents are protesting.

Give **three** reasons.

1 .....

.....

2 .....

.....

3 .....

.....

(3 marks)

8 (c) The mobile phone company is concerned about the parents' protest, because it wants to attract more customers to buy 3G phones.

Suggest actions the mobile phone company should take to persuade the parents to stop their protest.

.....

.....

.....

.....

(2 marks)

7

END OF QUESTIONS

GCSE Science B Equations Sheet

Unit 2

power = potential difference × current
power = energy transferred ÷ time
total cost = number of kilowatt-hours × cost per kilowatt-hour
$\text{efficiency} = \frac{\text{useful energy out}}{\text{total energy in}}$
$\text{efficiency} = \frac{\text{useful power out}}{\text{total power in}}$
velocity = frequency × wavelength