

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	
TOTAL	



General Certificate of Secondary Education  
Higher Tier  
June 2012

## Science B

## SCB3HP

### Unit 3 Making My World a Better Place

# H

### Written Paper

Wednesday 20 June 2012 9.00 am to 10.00 am

For this paper you must have:

- a ruler.
- You may use a calculator.

### 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(a) 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

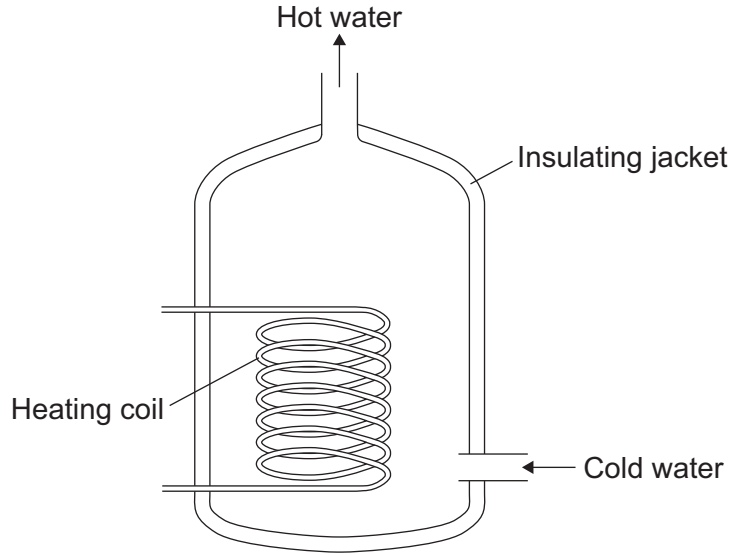
- In all calculations, show clearly how you work out your answer.



J U N 1 2 S C B 3 H P 0 1

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

**1** The diagram shows a hot water tank from the heating system of a house.



**1 (a) (i)** Energy is transferred through the sides of the hot water tank. Name this process.

.....  
(1 mark)

**1 (a) (ii)** The hot water tank is insulated with a silver-coloured jacket.

Name the type of energy transfer that is reduced by the silver colour.

.....  
(1 mark)

**1 (a) (iii)** The payback time for the hot water tank jacket is 0.8 years. Fitting the jacket saves £32.50 a year.

Calculate the original cost of the hot water jacket. Use the equation below to work out your answer.

$$\text{payback time} = \frac{\text{cost}}{\text{savings per year}}$$

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Cost = £ .....  
(2 marks)



**1 (b)** U-values tell you how effective a material is as an insulator.

The lower the U-value the better a material is as an insulator.

A person is going to buy loft insulation. The table gives information about two types of loft insulation, **A** and **B**.

Type of loft insulation	U-value	Cost per roll in £
<b>A</b>	0.4	4.00
<b>B</b>	0.1	8.00

The sales assistant suggests that the person buys type **B**.

Type **B** costs more than type **A**.

Why might the person decide to pay the extra cost to buy type **B**?

Use the information in the table to give reasons for your answer.

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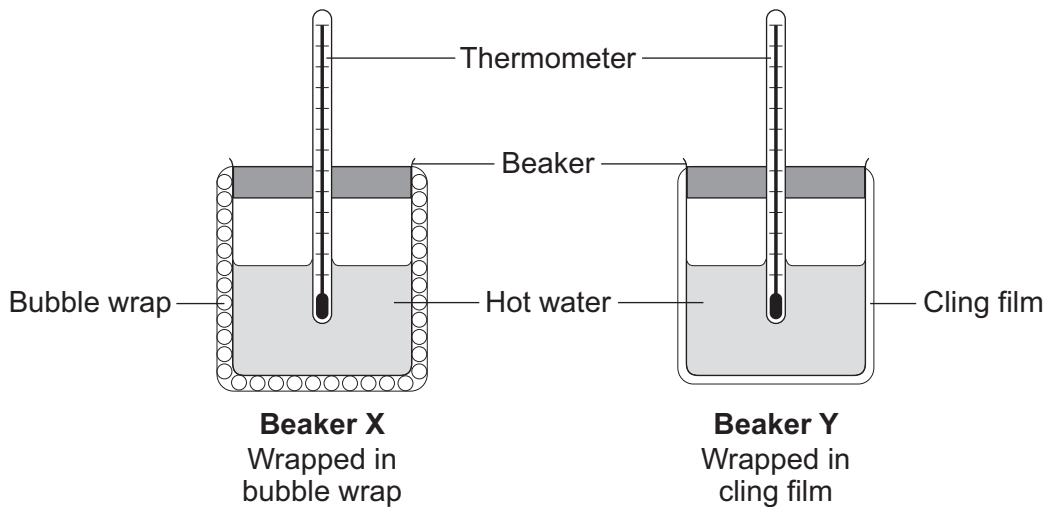
(2 marks)

**Question 1 continues on the next page**

**Turn over ►**



1 (c) Two students investigated the efficiency of two different materials for insulation. The diagram shows the apparatus the students used.



The temperature of the water falls more slowly in beaker X than in beaker Y.

Explain why the bubble wrap is a better insulator than cling film.

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(2 marks)

1 (d) The builder of a house has to make sure there is a lot of ventilation in the room where the boiler is.

This helps to prevent incomplete combustion of the fuel used in the boiler.

Give **two** problems that incomplete combustion of the fuel in the boiler could cause.

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(2 marks)

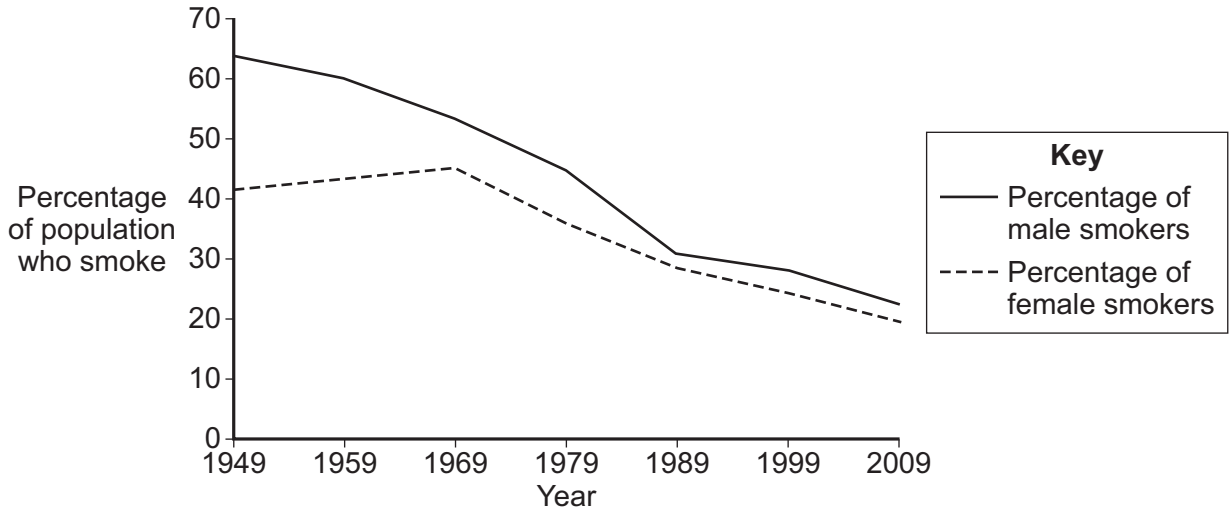
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2 Chemicals in tobacco smoke are known to cause health problems.

Graph 1 shows how smoking habits amongst adults changed between 1949 and 2009.

Graph 1



2 (a) News reports state that men have taken more notice of health warnings about smoking causing cancer than women have.

Use data in the graph to evaluate the claims in the news reports.

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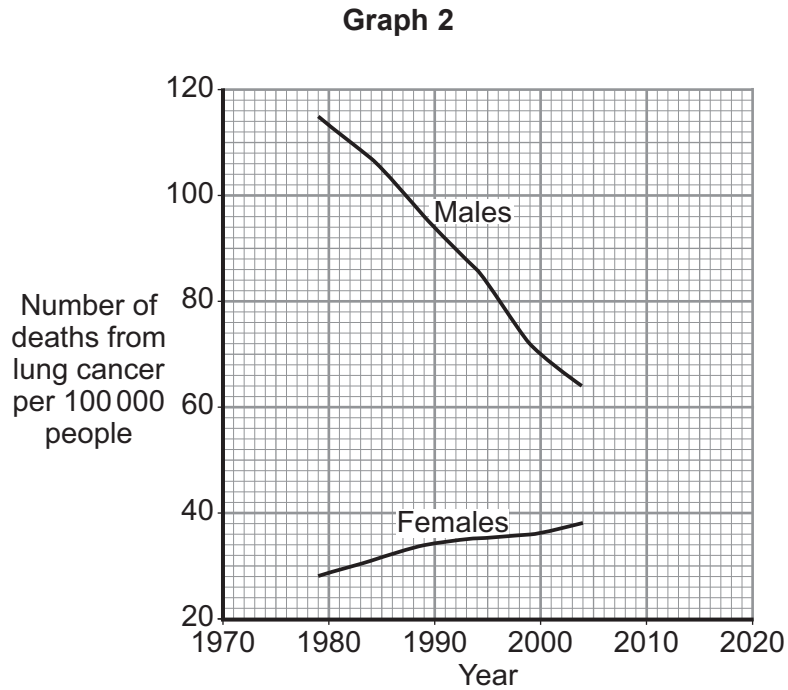
(4 marks)

Question 2 continues on the next page

Turn over ►



2 (b) **Graph 2** shows the number of people who die from lung cancer per 100 000 people in the UK.



2 (b) (i) It has been predicted that by 2018 the number of men dying of lung cancer per 100 000 will be less than the number of women dying of lung cancer per 100 000.

What evidence is there from **Graph 2** to justify this prediction?

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(1 mark)

2 (b) (ii) We cannot be sure that the prediction made in 2 (b) (i) will come true.

Suggest why.

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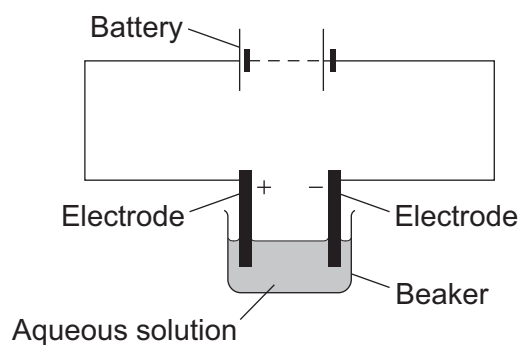
(2 marks)

7



**3** Electroplating can be used to put a metal coating onto another metal.

The diagram shows the equipment used for electroplating.



**3 (a)** In electrolysis, ions move.

Explain how an ion is formed.

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(2 marks)

**3 (b) (i)** Silver is used to electroplate nickel jewellery.

Complete the following equation to show this reaction.



(2 marks)

**3 (b) (ii)** Name the electrode at which the reaction in **3 (b) (i)** occurs.

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 (1 mark)

**3 (b) (iii)** Why does the solution in the beaker need to be aqueous?

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(1 mark)

6
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Turn over ►



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ANSWER IN THE SPACES PROVIDED**





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

The photograph shows a pig that lives on a modern farm.



Farmed pigs were bred from wild pigs. Compared with wild pigs, farmed pigs:

- have more piglets at a time
- are less aggressive
- have less fat in their bodies.

Explain how selective breeding is used to produce the different features in farmed pigs. Describe how this is an advantage for the farmer.

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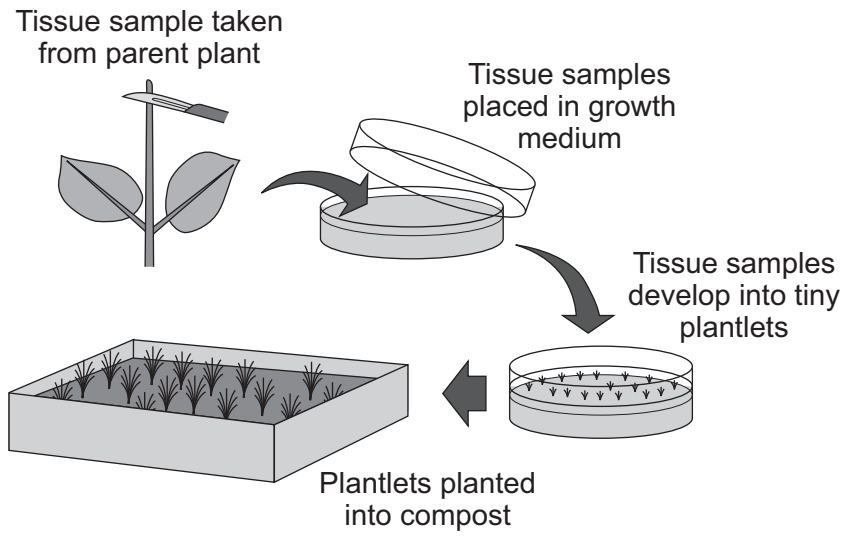
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(6 marks)

**Turn over ►**



4 (b) The diagram shows how tissue culture can be used to produce plants.



Give **one** advantage and **one** disadvantage of producing plants in this way.

Advantage .....

.....

Disadvantage .....

.....

(2 marks)



**4 (c)** The following passage is from an information leaflet about SCID (Severe Combined Immune Deficiency).

**Gene therapy for SCID  
(Severe Combined Immune Deficiency)**

People with SCID do not have a healthy immune system. Children with SCID rarely survive to become adults, because common childhood illnesses such as chicken pox often result in death.

Gene therapy means that doctors can insert the missing genes into the child's white blood cells and then put the white blood cells back into the child's bloodstream.

The treatment is not a cure, and patients have to go into hospital every 2–3 months for the treatment.

What are the advantages and disadvantages of this use of gene therapy?

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(3 marks)

11

**Turn over for the next question**

**Turn over ▶**



**5** Measles, mumps and rubella are very harmful diseases.

Measles, mumps and rubella are caused by pathogens.

**5 (a)** Describe how the cells of the immune system respond to infection by pathogens.

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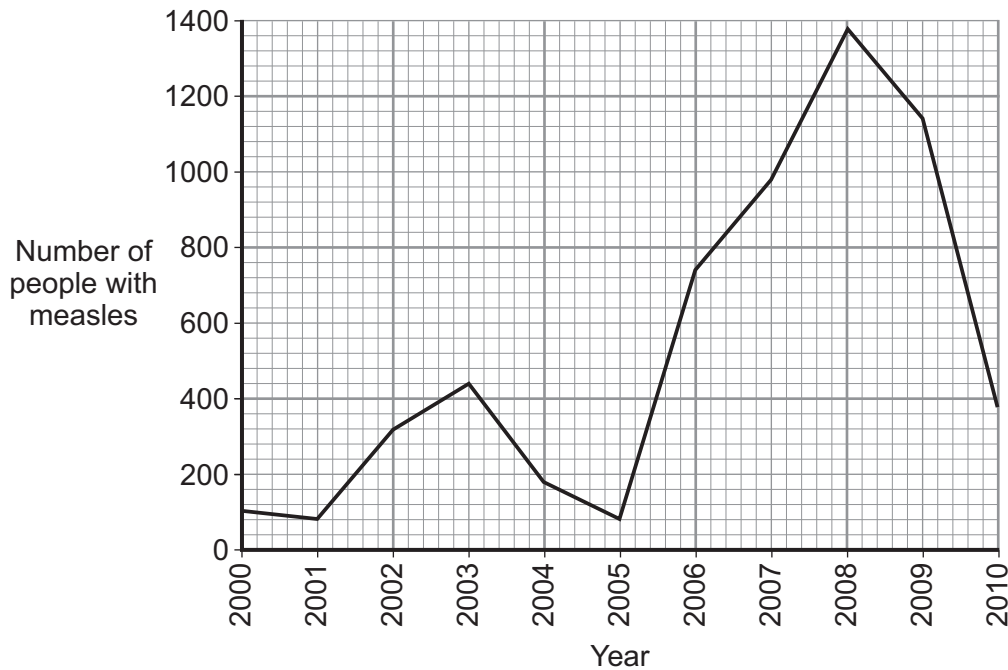
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(3 marks)

**5 (b)** All children are offered the MMR vaccination. The MMR vaccination helps to protect against measles, mumps and rubella.

The graph shows the numbers of people with measles in the UK each year between 2000 and 2010.



**5 (b) (i)** Calculate the percentage decrease in the number of people with measles between 2008 and 2010.

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Answer ..... %  
(3 marks)

**5 (b) (ii)** Suggest a possible reason for the percentage decrease in measles.

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(1 mark)

**5 (c) (i)** Many people are in favour of vaccination programmes. Give **two** reasons why.

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(2 marks)

**5 (c) (ii)** Some people are against vaccination programmes. Give **two** reasons why.

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(2 marks)

11

Turn over for the next question

Turn over ►



**6** Fertilisers provide plants with minerals that they need for growth. Farmers and gardeners can use artificial fertilisers to help plants grow.

**6 (a)** The use of fertilisers can cause eutrophication. Describe how eutrophication is caused.

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(5 marks)

**6 (b)** Many companies are improving their products to reduce the effect on the environment.

The diagram shows 'Scoop the Poop' bags. Dog owners use these bags to dispose of dog faeces.



Manufacturers say that the plastic bags will break down into small pieces within months.

**6 (b) (i)** Name the process that causes the plastic to break down into small pieces.

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(1 mark)

**6 (b) (ii)** What are the advantages of using biodegradable bags?

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(2 marks)

**6 (c)** Name **two** biodegradable plastics that are used for packaging and shopping bags.

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(2 marks)

<b>10</b>

**Turn over for the next question**

**Turn over ►**



7 Prostate cancer is a disease that kills over 10 000 men in the UK each year.

A new drug has been developed to treat prostate cancer.

Describe what happens to a drug while it is being developed and during its use, to ensure that it is safe.

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(5 marks)

<b>5</b>

**END OF QUESTIONS**

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