

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
March 2012

Science B

SCB3FP

Unit 3 Making My World a Better Place

F

Written Paper

Thursday 8 March 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 reminded of the need for good English and clear presentation in your answers.
- Question 8 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.
- You are expected to use a calculator where appropriate.

Advice

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



M A R 1 2 S C B 3 F P 0 1

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

1 Ionising radiation can be harmful to people.

However, we can use ionising radiation to help us treat some diseases such as cancer.

1 (a) (i) The table below shows some of the properties of alpha particles, beta particles and gamma rays.

Use words from the box to complete the table.

Thick aluminium	Thick lead	Thick card
Negative	Neutral	Positive

	Alpha particle	Beta particle	Gamma rays
Substance that stops the particle / ray	Sheet of paper	Thin metal	
Charge			No charge

(3 marks)

1 (a) (ii) Give **one** use of gamma rays in medicine.

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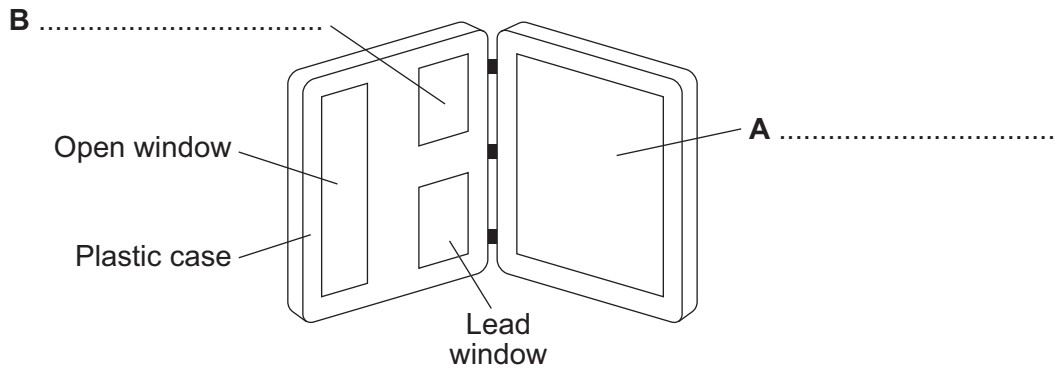
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(1 mark)



1 (b) (i) Hospital staff working with radiation wear film badges.

The diagram shows one of these badges.



Use words from the box to label **A** and **B** on the diagram.

Aluminium	Card	Photographic film
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(2 marks)

1 (b) (ii) These badges need to be checked every month. Why?

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(2 marks)

8

Turn over for the next question

Turn over ►



- 2 (a) (i)** Some medicines are used to treat and cure diseases. Some medicines are used to help reduce the symptoms of the disease.

Draw **one** line from each medicine to its use.

Medicine	Use
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Paracetamol</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Kills viruses</div>
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Penicillin</div>	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Kills bacteria</div>
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Painkiller</div>

(2 marks)

- 2 (a) (ii)** Antibiotics are a group of drugs.

In the past some doctors have over-prescribed antibiotics.

Give **two** problems that over-prescription of antibiotics has caused.

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(2 marks)

- 2 (b) (i)** Alcohol is a recreational drug that can harm the body.

What serious effects can the use of alcohol have on the body?

Tick **one** box.

Loss of self control **and** gum disease

Gum disease **and** liver damage

Liver damage **and** brain damage

(1 mark)



2 (b) (ii) Cannabis is another recreational drug that can harm the body.

Some doctors think that smoking cannabis causes depression.

Doctors did a survey of 1500 young adults who smoked cannabis.

The table shows the percentage of cannabis smokers in the survey who became depressed.

How often the young adult had smoked cannabis	Percentage of male cannabis smokers who became depressed	Percentage of female cannabis smokers who became depressed
Only once or twice a year	9	16
Less than once a week	10	17
1–4 times a week	12	31
Every day	15	60

From the data in the table, give **two** conclusions that can be made about the relationship between cannabis and depression.

1

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2

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(2 marks)

2 (b) (iii) Give an example of a recreational drug, **other than** alcohol or cannabis.

.....

(1 mark)

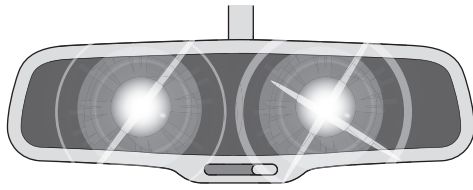
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Turn over for the next question

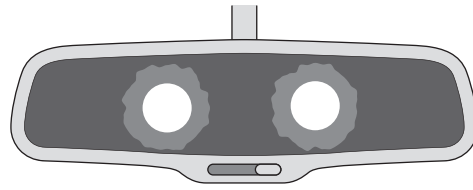
Turn over ►



3 Scientists are always developing new materials.
The diagram shows two mirrors from inside cars.



Traditional mirror



Photochromic mirror

3 (a) (i) Suggest **one** advantage of the photochromic mirror.

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

3 (a) (ii) Suggest **one** disadvantage of the photochromic mirror.

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

3 (b) Complete the following sentences about types of smart materials.

Materials that change colour when the temperature changes are
called materials.

Memory wire is a smart material that can be used to make dental braces
and

(2 marks)



3 (c) Smart paints are another type of new material.

Give **one** advantage of using smart paints to paint a car.

.....
.....

(1 mark)

5

Turn over for the next question

Turn over ►



4 Energy consultants give advice on improving the energy efficiency of buildings.

4 (a) Draw a ring around the correct answer to complete each sentence.

Energy transfer through a substance, when the substance does not move, is

called

conduction.
convection.
radiation.

When hot objects emit heat energy, the heat energy transfer is called

conduction.
convection.
radiation.

The heater in a hot water tank is at the bottom of the tank. The heat is

transferred to all the water in the tank by

conduction.
convection.
radiation.

(3 marks)

4 (b) Most houses lose heat energy through their windows.

Table 1 shows the U-values of different types of window glazing.

The U-value tells us how quickly heat energy is lost.

Table 1

Type of window glazing	Typical U-value
Single glazing	4.8
Double glazing	3.1
Triple glazing	2.4

Describe the pattern shown in the table.

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(2 marks)



4 (c) Payback time can be used to help make decisions about installing different types of insulation.

Table 2 shows typical payback times for different types of insulation in a house.

Table 2

Insulation	Cost in £	Saving per year in £	Payback time in years
Loft insulation	200	50	4.0
Cavity wall insulation	490	70	7.0
Double glazing	3000	60	
Draught proofing	50	50	1.0

4 (c) (i) Payback time can be calculated using the following equation:

$$\text{Payback time} = \frac{\text{cost}}{\text{saving per year}}$$

Use the equation to calculate the payback time for installing double glazing.

.....

Payback time = years
 (2 marks)

4 (c) (ii) John buys a house and plans to live in the house for 5 years.

He wants to install loft insulation to save money.

An energy consultant advises John to install double glazing instead.

Suggest why John's decision to install loft insulation may be correct. Use your answer to **4(c)(i)** and the data in **Table 2** to help you.

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(3 marks)

10

Turn over ►



5 (a) (i) Name **two** pollutants that are often found in houses and which make people feel ill.

1

2

(2 marks)

5 (a) (ii) Give **two** of the common symptoms that a person may experience when indoor pollution is high.

1

2

(2 marks)

5 (b) The diagram shows a hazard symbol that is found on a bottle kept in a kitchen cupboard.



5 (b) (i) What does the hazard symbol mean?

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.....

(1 mark)

5 (b) (ii) Suggest **two** ways of minimising the risks of using this product in the home.

1

2

(2 marks)

7



Turn over for the next question

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ANSWER IN THE SPACES PROVIDED**

Turn over ►



6 Methane is a greenhouse gas. Methane contributes to global warming.

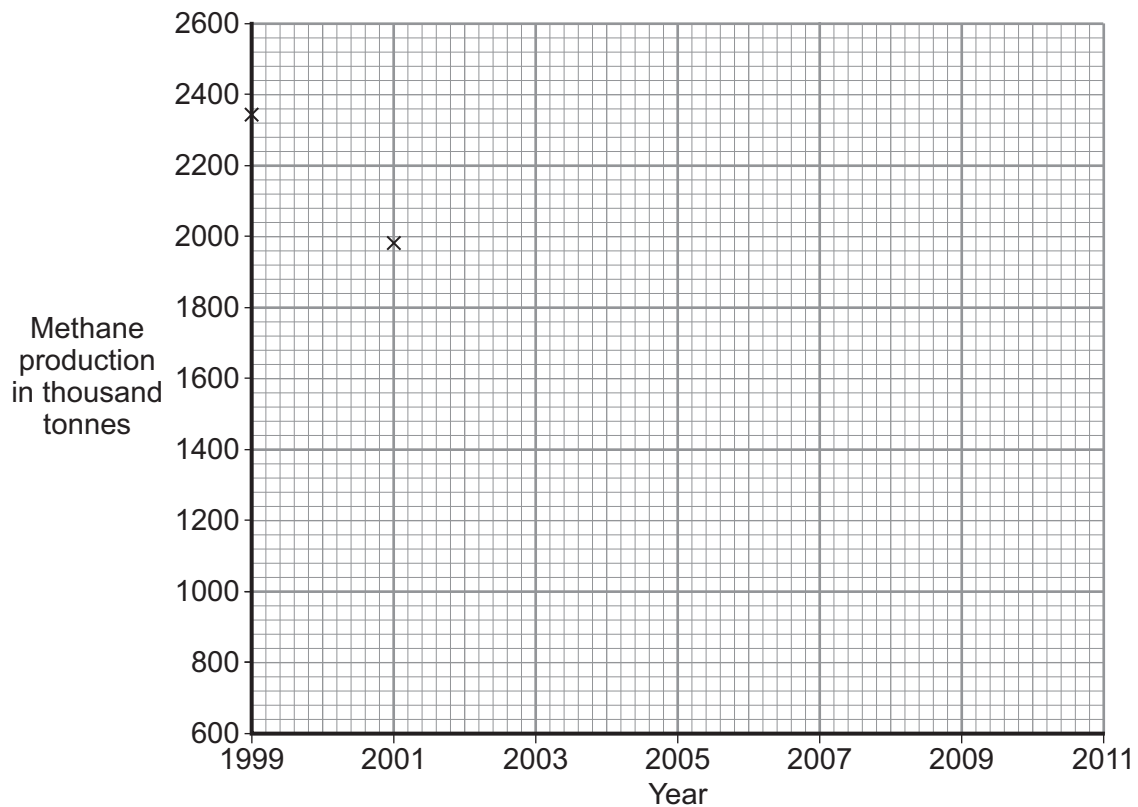
The data in the table shows emissions caused by non-agricultural sources (eg landfill sites) in the UK between 1999 and 2009.

	Year					
	1999	2001	2003	2005	2007	2009
Methane production in thousand tonnes	2348	1980	1600	1400	1280	1220

6 (a) (i) Use the data to plot a graph to show how the production of methane from non-agricultural sources changed between 1999 and 2009.

Draw a smooth line of best fit on your graph.

The first two points have been plotted for you.



(3 marks)



6 (a) (ii) Describe the pattern shown in the graph.

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(2 marks)

6 (b) In 1997, 37 countries made an agreement to reduce greenhouse gas emissions.

What was the name of this agreement?

Draw a ring round the correct answer.

Kyoto Protocol

United Nations Protocol

Global Summit

(1 mark)

6

Turn over for the next question

Turn over ►



7 Pathogens are microorganisms that cause disease in our bodies.

7 (a) The sentences below are about how pathogens enter our bodies and cause disease.

Draw a ring around the correct answer to complete each sentence.

Diseases such as cholera and tuberculosis are caused by

- bacteria.
- fungi.
- viruses.

Diseases such as measles and influenza are caused by

- bacteria.
- fungi.
- viruses.

If pathogens enter the body, they may be digested and destroyed by

- platelets.
- red blood cells.
- white blood cells.

(3 marks)

7 (b) Platelets stop bacteria entering the body through cuts in the skin.

Describe how.

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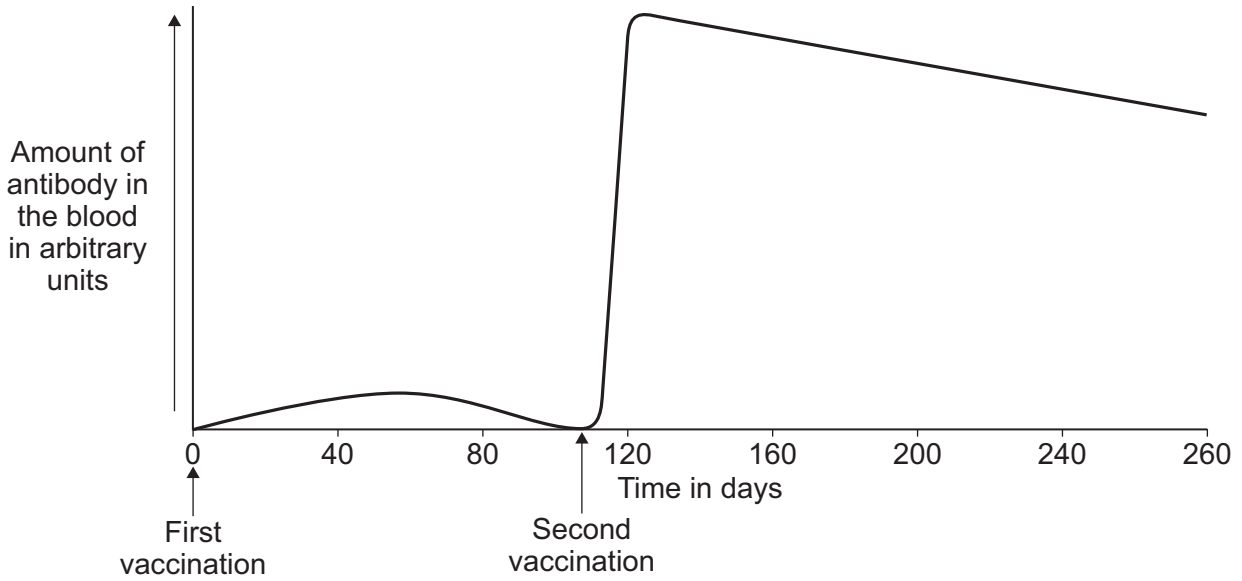
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(2 marks)



7 (c) Vaccinations are used to prevent humans becoming infected by bacteria and viruses.



7 (c) (i) Describe the trends shown on the graph.

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(3 marks)

7 (c) (ii) Suggest **two** reasons why many people are in favour of vaccination programmes.

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(2 marks)

10

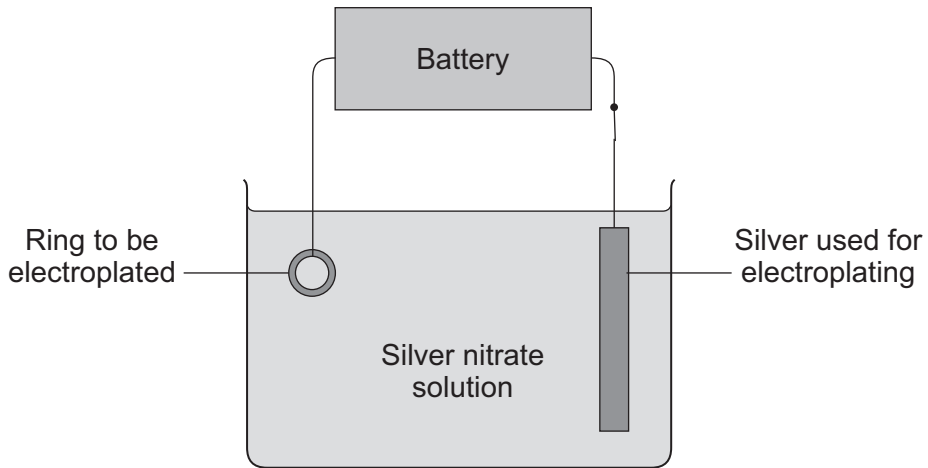
Turn over ►



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

Objects can be electroplated, for example to make silver-plated jewellery.

The diagram shows the apparatus used for electroplating a nickel ring with silver.



The nickel ring becomes electroplated with silver. Why?

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(6 marks)

END OF QUESTIONS

6

