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 2012

Science B SCB3FP

Unit 3 Making My World a Better Place

F

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.

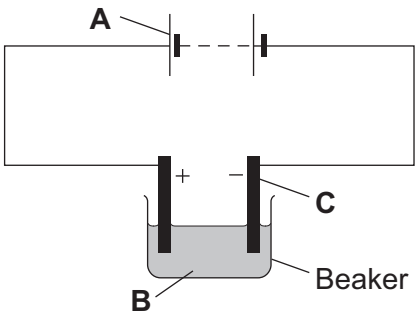
Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 6(a) should be answered in continuous prose. 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.

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

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

The diagram shows the equipment used for electroplating.



anode	**battery**	**electrolyte**	**cathode**

1 (a) Use the correct words from the box to name parts **A**, **B** and **C** shown on the diagram.

A is .....

B is .....

C is .....

(3 marks)

1 (b) (i) Different metals are used for electroplating.

Draw **one** line from each item to the metal it is usually electroplated with.

Item	Metal
Jewellery	Lead
Food cans	Silver
	Tin

(2 marks)

1 (b) (ii) Name **one** other item found in the home that is electroplated.

.....

(1 mark)

1 (c) Chromium is often used to electroplate metal items.

The items need to be cleaned before they are electroplated.

The items are cleaned using concentrated acids. Containers of concentrated acids have the following hazard symbol on them.

Suggest **two** possible risks to workers of using concentrated acids.

1 .....

.....

2 .....

.....

(2 marks)

8

Turn over ▶

2 X-rays and gamma rays are used in medicine.

2 (a) Use the correct words from the box to complete the sentences about X-rays and gamma rays.

gamma rays	**nuclear**	**X-rays**	**electromagnetic**
	bones	**fat**	**skin**

X-rays and gamma rays are ..... waves.

..... can be used to detect broken bones.

They are used because they cannot penetrate ..... ,

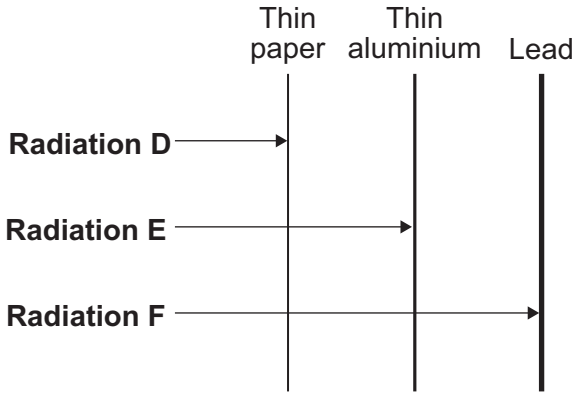
but they can penetrate ..... .

(4 marks)

2 (b) Alpha, beta and gamma are three types of radiation.

Alpha, beta and gamma radiation are used in different ways because they have different penetration properties.

The diagram shows three different materials and the type of radiation that penetrates them.



2 (b) (i) What type of radiation is **D**?

.....

(1 mark)

2 (b) (ii) What type of radiation is **E**?

.....

(1 mark)

2 (b) (iii) What type of radiation is **F**?

.....

(1 mark)

7

Turn over for the next question

3 Pathogens are types of microorganism. Pathogens cause diseases such as measles, mumps and rubella.

3 (a) What type of pathogen causes measles?

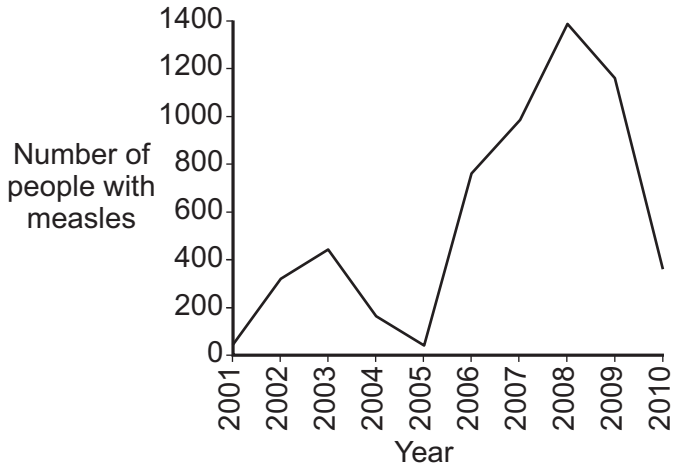
.....

(1 mark)

3 (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 2001 and 2010.



3 (b) (i) Describe how the number of people getting measles has changed since 2001.

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(3 marks)

3 (b) (ii) The number of people getting measles increased after 2005.

Tick (✓) **two** reasons for this increase.

The number of children being vaccinated decreased. ☐

There was a lot of publicity about the side-effects of MMR vaccine. ☐

More babies were born. ☐

More children were vaccinated. ☐

(2 marks)

3 (c) Children with measles often have a headache.

3 (c) (i) Name **two** drugs that are used to treat headaches.

1 .....

2 .....

(2 marks)

3 (c) (ii) Some diseases can be treated with antibiotics.

Doctors need to be careful to prescribe antibiotics only when needed.

Describe why.

.....

.....

.....

.....

.....

(2 marks)

Question 3 continues on the next page

3 (d) All drugs are tested before they are used.

The following sentences describe the stages in developing a drug.

The sentences are not in the correct order.

A Clinical trials are carried out on 200 – 400 patients.

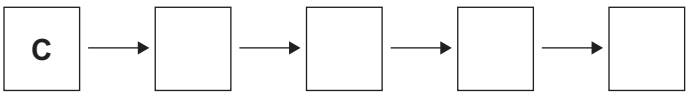
B The drugs are approved for use on all patients.

C The drugs are tested on animals.

D Clinical trials are carried out on more than 3000 new patients.

E Clinical trials are carried out on 10 – 100 healthy volunteers.

Put the sentences **A**, **B**, **C**, **D** and **E** in the correct order. The first one has been done for you.



(3 marks)

13

4 Materials scientists are always developing new and better materials to use.

4 (a) Draw **one** line from each type of new material to its use.

Type of material	Use
Smart paints	MRI scanners
Superconductors	Spectacle lenses
Photochromic plastic	Preventing corrosion
	Dental braces

(3 marks)

4 (b) The photograph shows thermochromic spoons for children.

Cold spoon

Hot spoon

These spoons are better than metal spoons for feeding a baby. Suggest why.

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(2 marks)

5

Turn over ▶

5 (a) A man buys draught excluders for his house. The draught excluders cost £30. Using the draught excluders will save the man £60 a year in energy bills.

5 (a) (i) Payback time can be calculated using the equation below.

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

Calculate the payback time for the draught excluders.

.....

.....

.....

Answer = ...

(2 marks)

5 (a) (ii) Name **one** method of insulation, other than loft insulation and draught excluders, that the man could use to insulate his house.

.....

(1 mark)

5 (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 £
A	0.4	4.00
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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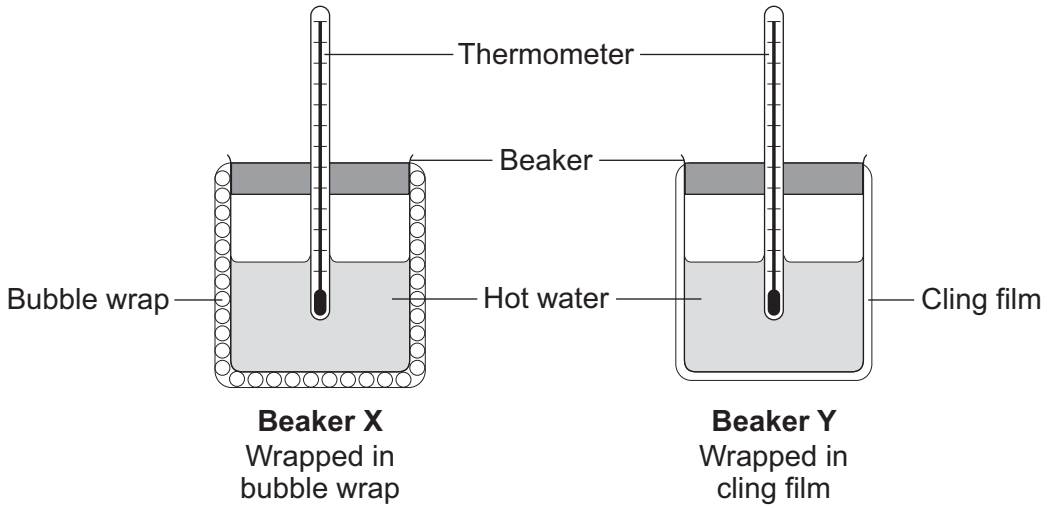
.....

(2 marks)

5 (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)

7

6 (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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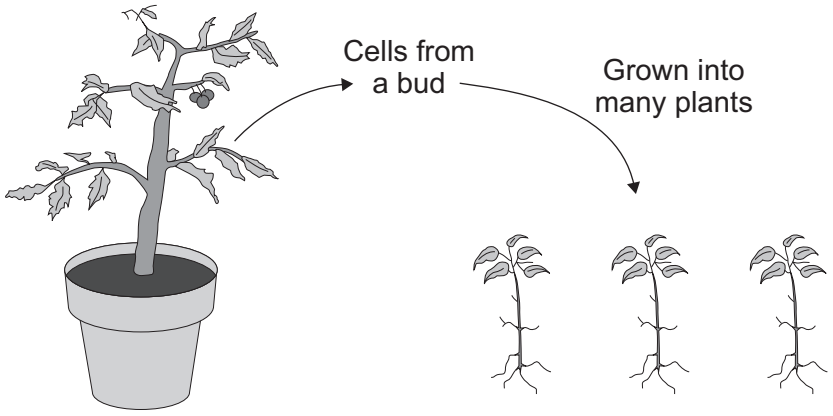
(6 marks)

6 (b) The diagram shows how a lot of plants can be produced from one parent plant.



Complete the sentences.

The process of producing plants in this way is called ..... .

The genes of the offspring will be ..... the parent plant.

(2 marks)

8

Turn over for the next question

7 (a) Greenhouse gases are produced by many types of human activity.

Give **one** human activity that produces lots of:

7 (a) (i) carbon dioxide

.....

(1 mark)

7 (a) (ii) methane

.....

(1 mark)

7 (a) (iii) nitrous oxide.

.....

(1 mark)

7 (b) Greenhouse gases can cause global warming. Explain how.

.....

.....

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.....

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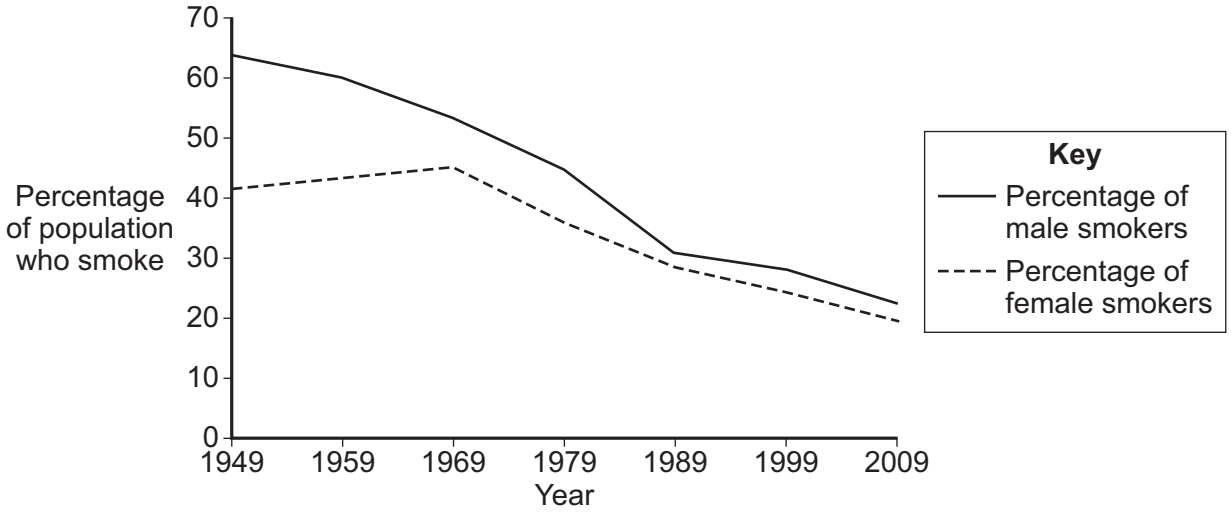
(2 marks)

5

8 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



8 (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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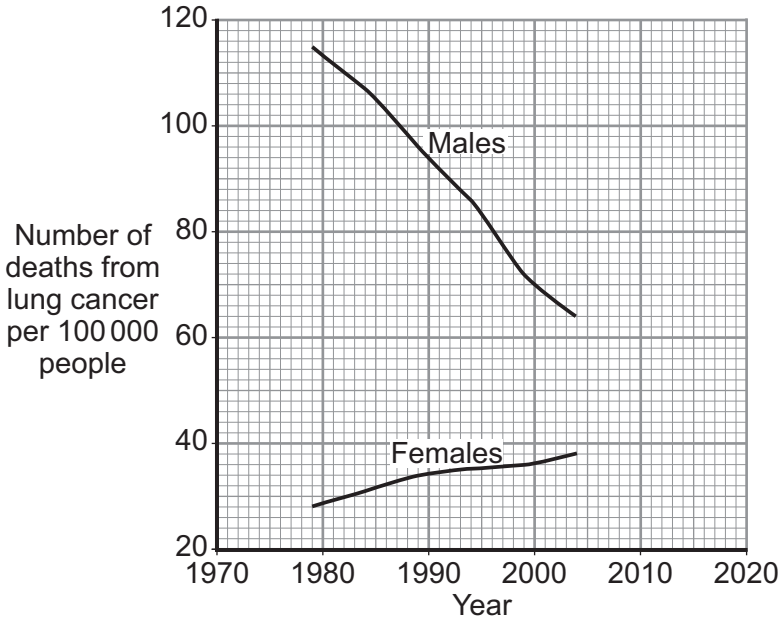
(4 marks)

Question 8 continues on the next page

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

Graph 2



8 (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?

.....

.....

(1 mark)

8 (b) (ii) We cannot be sure that the prediction made in **8 (b) (i)** will come true.

Suggest why.

.....

.....

.....

.....

(2 marks)

7

END OF QUESTIONS