

Specimen Paper

Centre Number						Candidate Number					
Surname											
Other Names											
Candidate Signature											



General Certificate of Secondary Education
Higher Tier
Specimen Paper

Science B (Science in Context)

Unit 3 Making My World a Better Place

Higher Tier

H

<p>For this paper you must have:</p> <ul style="list-style-type: none">• a ruler. <p>You may use a calculator.</p>

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 space 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 5(b) 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.

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
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5	
6	
7	
TOTAL	

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

1 Some recreational drugs have harmful effects on the body.

1 (a) Name **two** harmful substances in tobacco smoke, and describe their harmful effect on the body.

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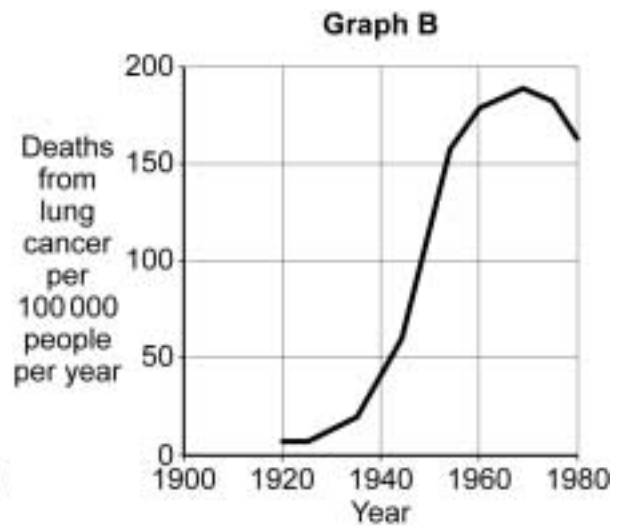
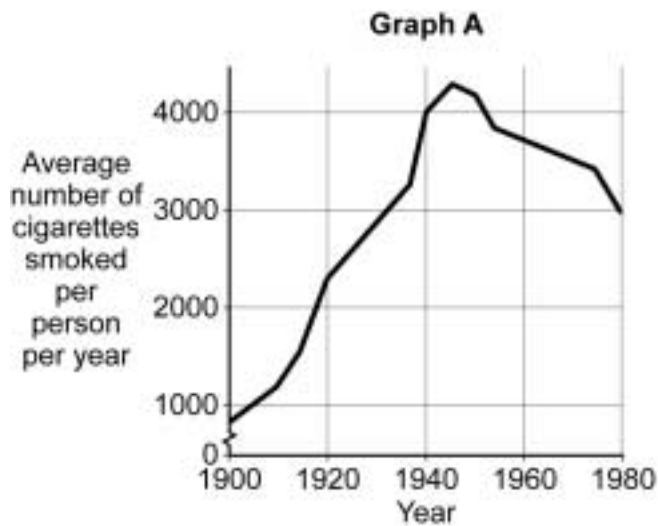
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(4 marks)

1 (b) **Graph A** shows information about average numbers of cigarettes smoked in the UK.

Graph B shows information about numbers of deaths in the UK from lung cancer.



1 (b) (i) In 1920, the average number of cigarettes smoked per person was 2200.

How many more cigarettes per person were being smoked on average in 1940?

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(2 marks)

1 (b) (ii) What evidence is there in the graphs to suggest that smoking causes lung cancer?

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(3 marks)

9

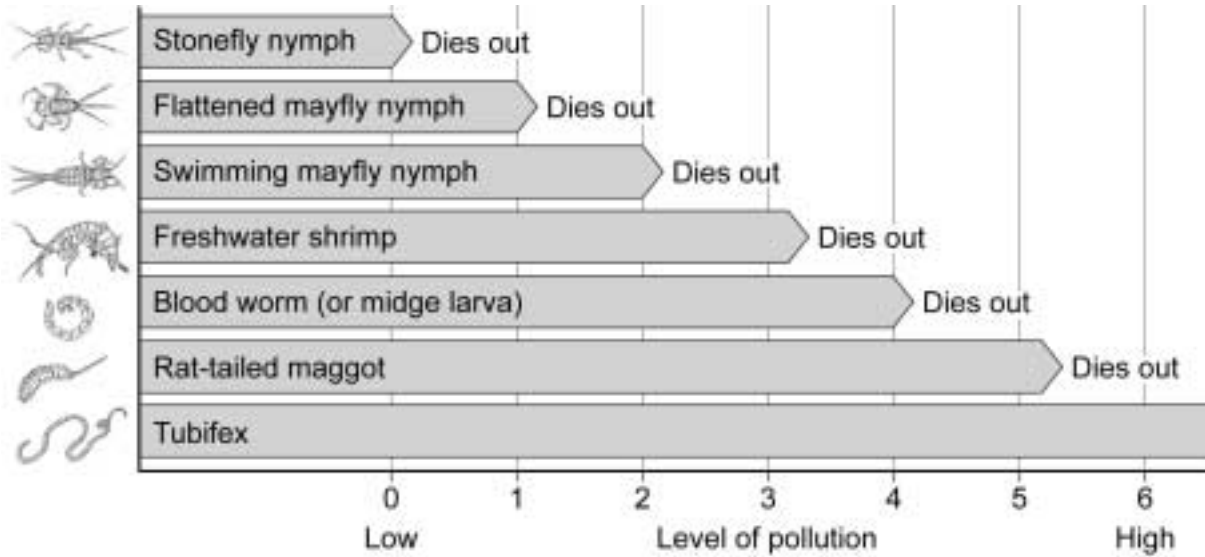
Turn over for the next question

Turn over ►

2 Environmental scientists study the levels of pollution in lakes and rivers and decide how dangerous the pollution is to organisms living in or around the water.

2 (a) Some students were asked to study the pollution levels in a stream running through the school grounds.

They were given the chart shown below.



Describe how the students would use the information in the chart to determine how polluted the stream is.

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(4 marks)

2 (b) At one point in the stream, students found freshwater nymphs and bloodworms, but no mayfly nymphs.

Suggest the level of pollution at that point in the stream.

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(1 mark)

2 (c) In part of the stream near a farm, all of the organisms had died because of eutrophication.

Explain the process of eutrophication caused by fertiliser leaching.

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(4 marks)

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Turn over for the next question

Turn over ►

- 3** The boxes show information about some new materials, their uses and their properties.
- Draw **one** straight line from each new material to **one** use for that material.
- Then draw **one** straight line from the new material to **one** description of its properties.
- One box in each column is not used.

**Use of new
material**

New material

**Property of new
material**

High power
electromagnets

Shape memory
alloy

Returns to original
shape when
warmed

Spectacle lenses

Smart paint

Almost zero
electrical resistance

Dental braces

Superconductors

Changes colour
reversibly in
sunlight

Frozen food
packaging

Photochromic
plastic

Glows in the dark

(6 marks)

6

4 An energy minister said that people could do more to conserve energy.
He advised home owners to fit insulating jackets to their hot water tanks.

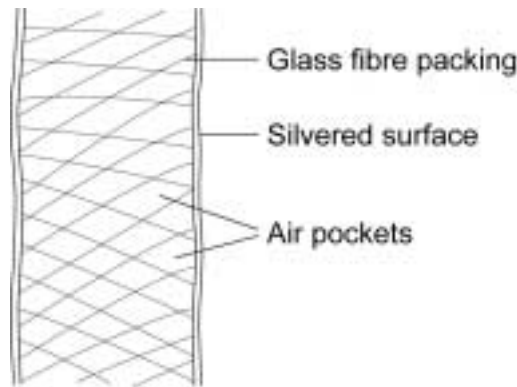
4 (a) A home owner paid £10 to fit a hot water tank jacket. By doing this, he saved £15 a year on his fuel bill.

How many months would it take to pay back the cost of fitting a hot water tank jacket?

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..... months
(2 marks)

4 (b) Modern hot water tank jackets are made of a silvered plastic bag containing glass fibre packing.



Explain how this type of jacket reduces heat loss from the hot water tank.

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(3 marks)

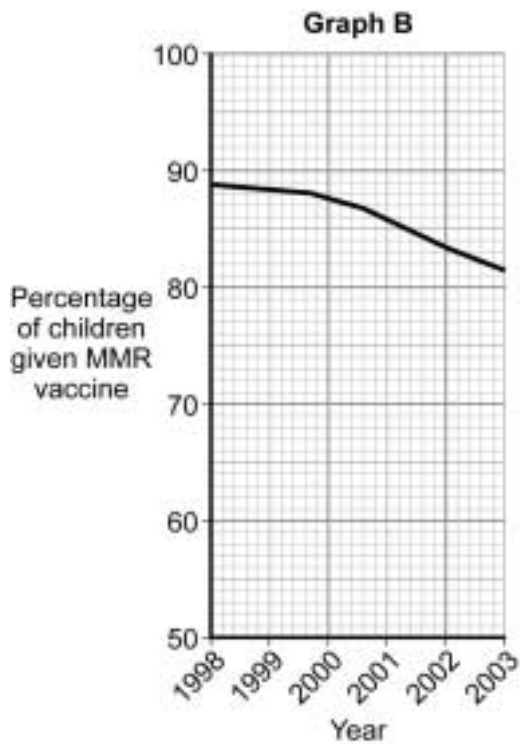
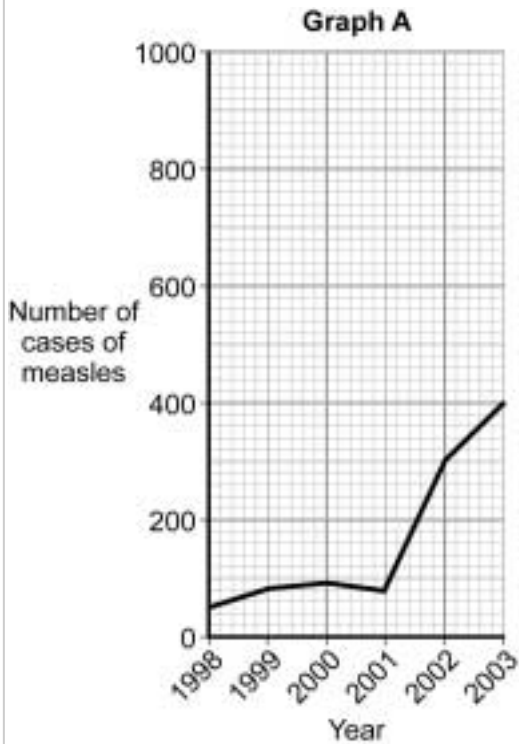
5

Turn over ►

5 Scientists have been developing vaccines to protect children against diseases for many years.

5 (a) **Graph A** shows the number of cases of measles in the UK between 1998 and 2003.

Graph B shows the percentage of children given the MMR vaccine each year between 1998 and 2003.



5 (a) (i) Suggest a reason for the trend shown in **Graph B**.

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(1 mark)

5 (a) (ii) Calculate the percentage increase of measles cases between 2001 and 2003.

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..... %
(2 marks)

5 (a) (iii) Suggest a reason for this increase.

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(1 mark)

5 (a) (iv) Use evidence from the graphs to suggest what the minimum percentage of children given the MMR vaccine should be to prevent a measles epidemic.

Give a reason for your answer.

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(3 marks)

Question 5 continues on the next page

Turn over ►

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

Describe how vaccination helps people to develop immunity to a disease.

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(6 marks)

13

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED**

Turn over ►

6 This question is about genetic modification in agriculture.

- Cotton plants are badly affected by insect pests that eat the plants.
- Sometimes the insect pests are killed by predators, which eat them.
- A type of bacteria called Bt produces a toxin that poisons insects.
- Cotton plants can be genetically modified to produce Bt toxin.

6 (a) Describe how scientists would make a cotton plant produce Bt toxin.

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(2 marks)

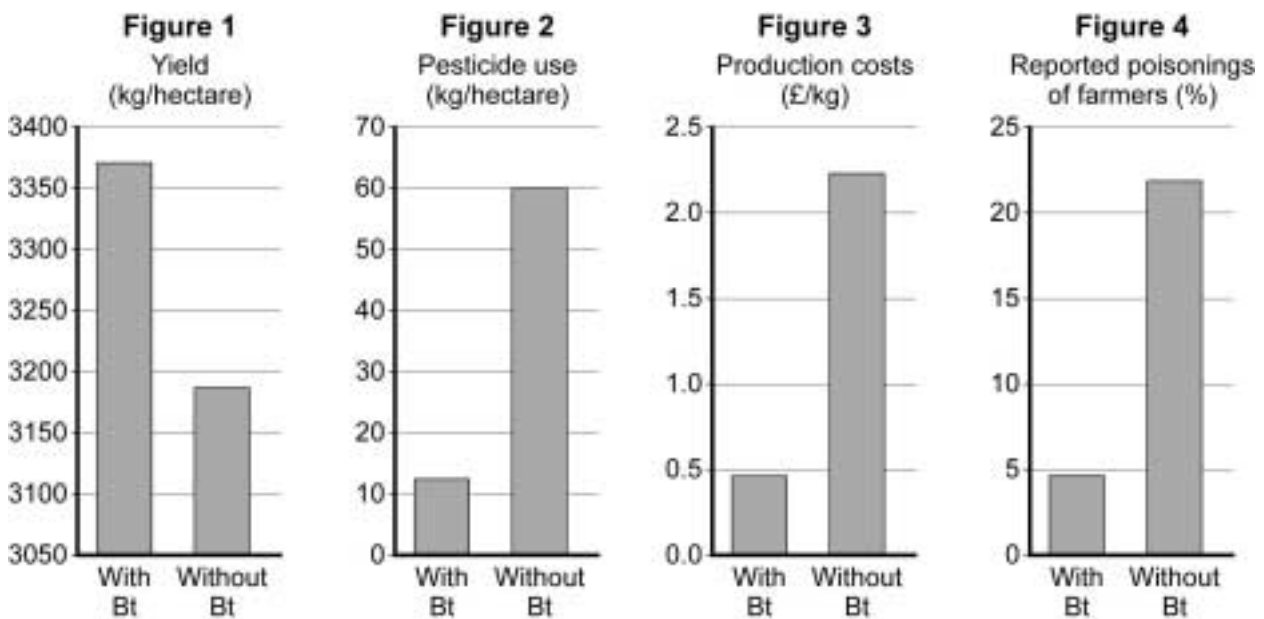
6 (b) Use the information to suggest **one** reason why this genetic modification might have a bad effect on the environment.

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(1 mark)

6 (c) The diagrams show some of the effects of growing Bt cotton crops in China.



6 (c) (i) How does the pattern in **Figure 1** relate to the pattern in **Figure 3**?

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(2 marks)

6 (c) (ii) How does the pattern in **Figure 2** relate to the pattern in **Figure 4**?

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(2 marks)

6 (d) Other products beside textiles are made from cotton plants. These products include cotton seed oil for cooking and cotton seed for animal food.

Suggest why some scientists are concerned about the increased use of GM cotton plants.

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(2 marks)

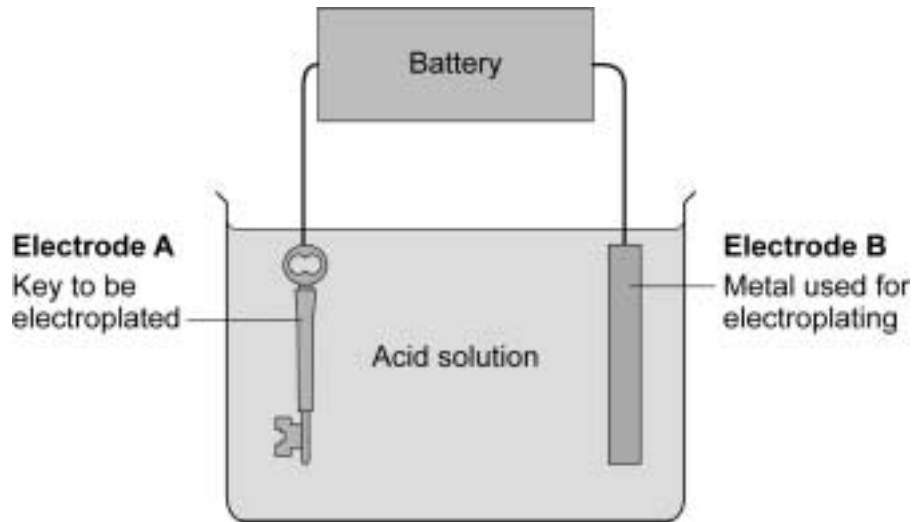
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7 Some objects can be electroplated (coated with metals).

The diagram shows how a key can be electroplated. The key and the metal used for electroplating are used as the electrodes.



7 (a) Name electrodes **A** and **B**.

A

B

(2 marks)

7 (b) Use the diagram to explain what happens to the atoms in the metal of electrode **B** used for electroplating during electrolysis.

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(4 marks)

7 (c) Use the diagram to explain how the key becomes electroplated with the metal used for electroplating.

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(3 marks)

9

END OF QUESTIONS

There are no questions printed on this page

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