

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

GCSE SCIENCE B

F

Foundation Tier Unit 3 Making My World a Better Place

Wednesday 25 May 2016

Afternoon

Time allowed: 1 hour

Materials

For this paper you must have:

- A ruler.

You may use a calculator.

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 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.

Advice

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



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

1 Tuberculosis is a disease caused by bacteria. Tuberculosis affects the lungs.

1 (a) How do tuberculosis bacteria enter the body?

[1 mark]

Tick (✓) **one** box.

Breathed in

☐

On the food we eat

☐

Through a cut in the skin

☐

1 (b) Some diseases are caused by viruses.

1 (b) (i) Which disease is caused by a virus?

[1 mark]

Draw a ring around the correct answer.

cholera

mumps

typhoid

1 (b) (ii) A virus can make us ill when it reproduces rapidly in the body.

How does a virus affect the body?

[1 mark]

Tick (✓) **one** box.

Causes cell damage

☐

Produces toxins

☐

Reduces the oxygen in the blood

☐

- 1 (c)** A virus called HIV causes AIDS.

Scientists are developing a vaccine to protect humans from HIV.

- 1 (c) (i)** Use the correct answer from the box to complete the sentence.

[1 mark]

platelets	red blood cells	white blood cells
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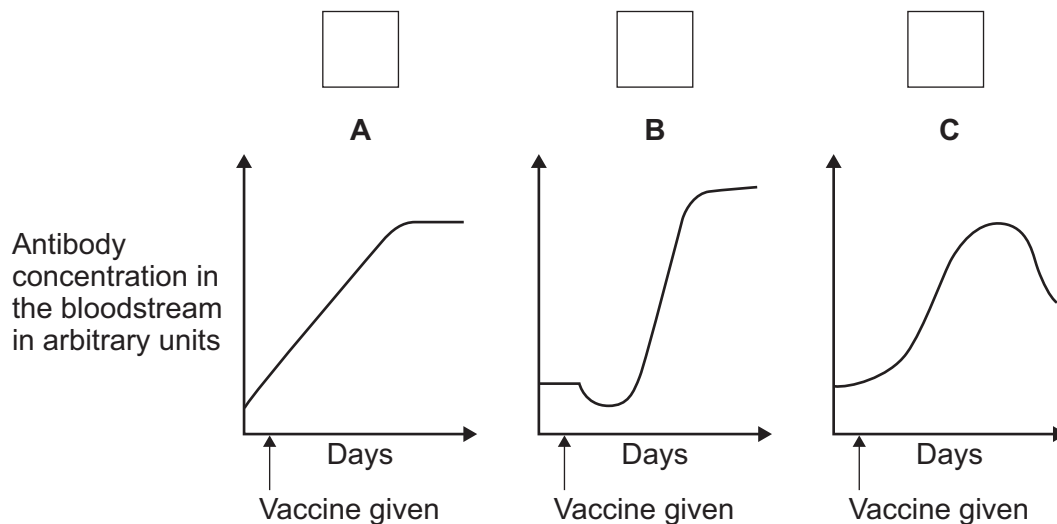
The vaccine will cause antibodies to be produced by

a person's _____.

- 1 (c) (ii)** Which graph, **A**, **B** or **C**, shows what will happen to the concentration of antibodies against HIV after the HIV vaccine is given?

[1 mark]

Tick (✓) **one** box.



Question 1 continues on the next page

Turn over ►



1 (d) **Table 1** shows the number of AIDS related deaths in the world from 2001 to 2011.

Table 1

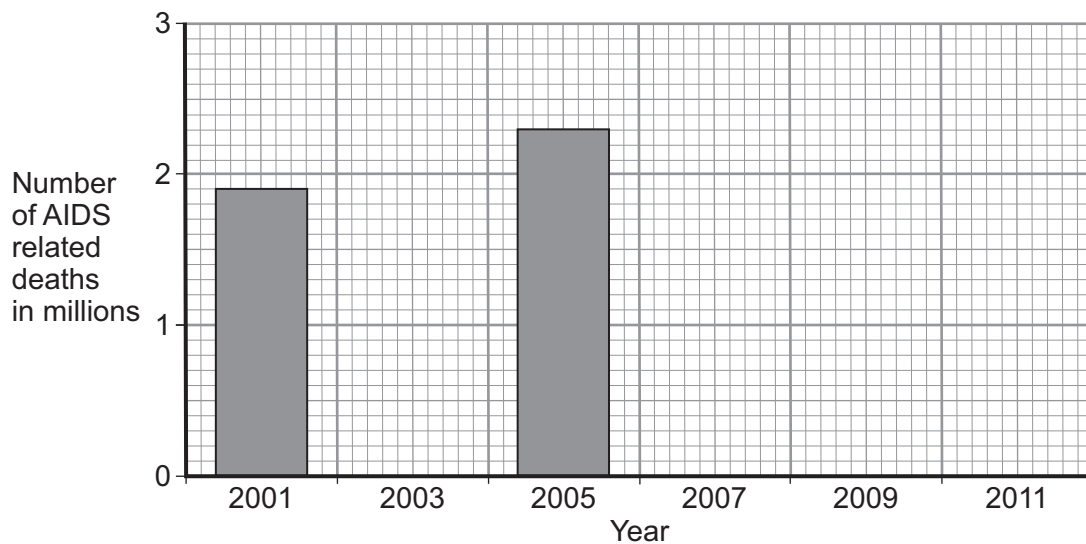
Year	Number of AIDS related deaths in millions
2001	1.9
2003	2.2
2005	2.3
2007	2.2
2009	2.0
2011	1.8

1 (d) (i) Use the data in **Table 1** to complete the bar chart in **Figure 1**.

[2 marks]

Two of the bars have been done for you.

Figure 1



- 1 (d) (ii)** Use data from **Figure 1** to describe the pattern in the number of AIDS related deaths in the world from 2001 to 2011.

[3 marks]

- 1 (d) (iii)** Suggest **one** possible reason for the pattern shown on the bar chart in **Figure 1** between 2005 and 2009.

[1 mark]

Tick (✓) **one** box.

There are more people in the world.

☐

Treatment for AIDS has improved.

☐

There is less knowledge on how to stop AIDS spreading.

☐

11

Turn over for the next question

Turn over ►



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2 Many items such as jewellery are electroplated.

2 (a) Give **two** reasons for electroplating a nickel necklace.

[2 marks]

1 _____

2 _____

2 (b) Key words used in electroplating are cathode, electrolyte and ion.

Draw **one** line from each key word to its correct definition.

[3 marks]

Key word

Definition

Cathode

Aqueous solution containing
ions of the metal needed

The positive electrode

Electrolyte

The negative electrode

Ion

A charged particle

5

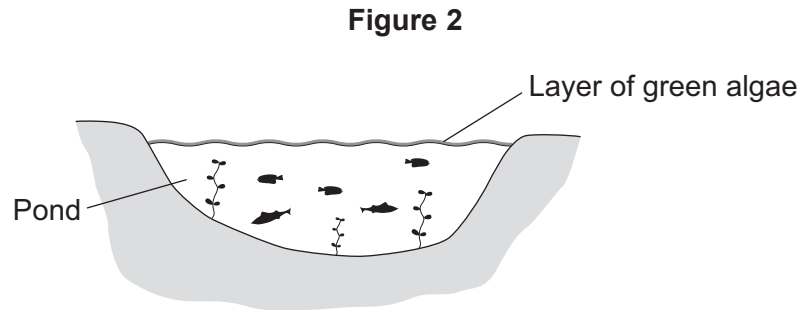
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Turn over ►



- 3 Fertiliser used on farms can sometimes get into ponds and cause green algae to rapidly cover the surface.

Figure 2 shows a fish pond after it has been polluted with fertiliser.



- 3 (a) (i) Describe how the layer of green algae covering the fish pond causes the plants below the algae to die.

[2 marks]

- 3 (a) (ii) After the plants die, the dead plants begin to decay.

Name **one** type of organism that causes the decay.

[1 mark]

- 3 (a) (iii) Which gas is used up by organisms when they cause dead plants to decay?

[1 mark]

Draw a ring around the correct answer.

oxygen

methane

nitrogen



3 (a) (iv) What happens in the fish pond when the gas in part **(a)(iii)** is all used up?

[1 mark]

Tick (✓) **one** box.

The algae photosynthesise more

☐

The fish die

☐

The plants grow faster

☐

3 (b) Fertilisers are used by farmers to improve their crops.

Name **two** other substances, used by farmers to improve their crops, that could pollute water.

[2 marks]

1 _____

2 _____

7

Turn over for the next question

Turn over ►



4 Many people take drugs to treat medical conditions.

4 (a) Which drug would you take to treat the pain of backache?

[1 mark]

Tick (✓) **one** box.

Antidepressant

☐

Aspirin

☐

Penicillin

☐

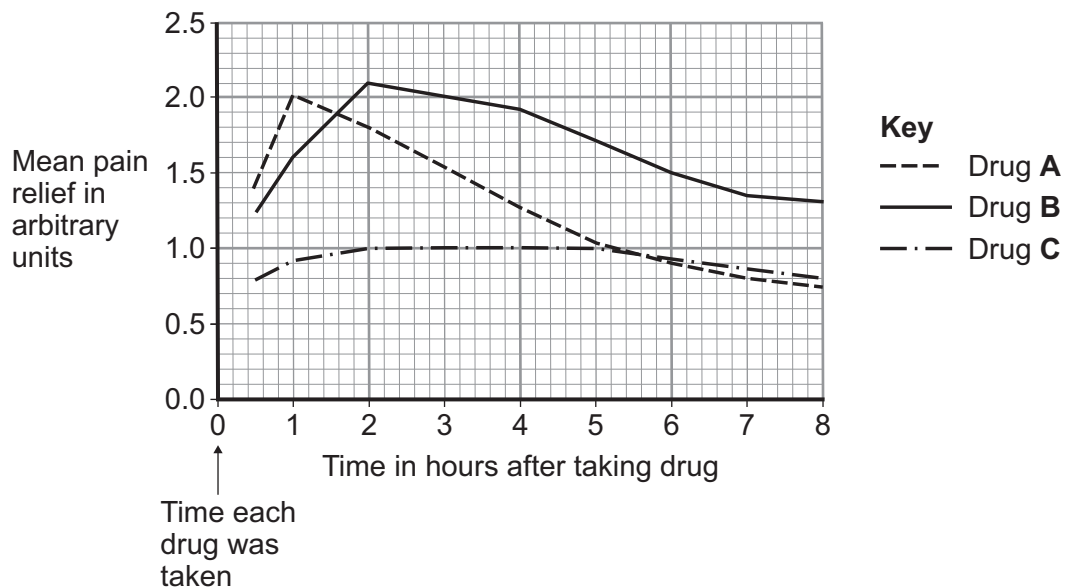
4 (b) Scientists investigated the effects of three different drugs, **A**, **B** and **C**.

The drugs were used on volunteers with back ache.

The volunteers' mean pain relief was measured.

Figure 3 shows their results.

Figure 3



Use **Figure 3** to help you answer the following questions.

4 (b) (i) What was the mean pain relief 3 hours after taking drug **B**?

[1 mark]

Mean pain relief = _____ arbitrary units



4 (b) (ii) After 3 hours how much more effective was drug **B** compared to drug **C**?

[1 mark]

Tick (✓) **one** box.

Drug **B** is half as effective as drug **C**.

☐

Drug **B** is twice as effective as drug **C**.

☐

Drug **B** is three times more effective than drug **C**.

☐

4 (b) (iii) Give **one** disadvantage of taking drug **B** and **not** drug **A**.

[1 mark]

4 (b) (iv) Give **two** advantages of taking drug **B** and **not** drug **A**.

[2 marks]

1

2

Question 4 continues on the next page

Turn over ►



4 (c) Drug trials test new drugs for safety.

What are new drugs tested on before they are tested on healthy volunteers?

[1 mark]

Tick (✓) **one** box.

Animals

☐

Patients

☐

Plants

☐**4 (d) (i)** Some people take drugs for recreation.

Nicotine in tobacco is a recreational drug. Nicotine and tobacco smoke harm the body.

Give **two** ways tobacco smoke harms the body.

[2 marks]

1 _____

2 _____

4 (d) (ii) Give **two** recreational drugs, other than nicotine, that harm the body.**[2 marks]**

1 _____

2 _____



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- 5 Energy-saving measures, such as insulation, are used to improve the energy efficiency of a house.

Table 2 shows information about different energy-saving measures.

Table 2

Energy-saving measure	Cost to install in £	Saving per year in £	Payback time in years
Loft Insulation	250	50	5
Draught proofing	30	30	1
Thermostatic heating controls	120	30	

- 5 (a) (i) The equation below is used to calculate the payback time.

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

Calculate the payback time for installing thermostatic heating controls.

[1 mark]

Payback time = _____ years

- 5 (a) (ii) A woman decides to put draught proofing and thermostatic heating controls in her home, but **not** loft insulation.

Give **two** reasons to support her decision for choosing draught proofing and thermostatic heating controls.

[2 marks]

1 _____

2 _____



5 (b) Energy-saving measures often show the U-value for the product.

What does a U-value measure?

[1 mark]

Tick (✓) **one** box.

The rate of heat loss through a material

☐

The cost-effectiveness of a material

☐

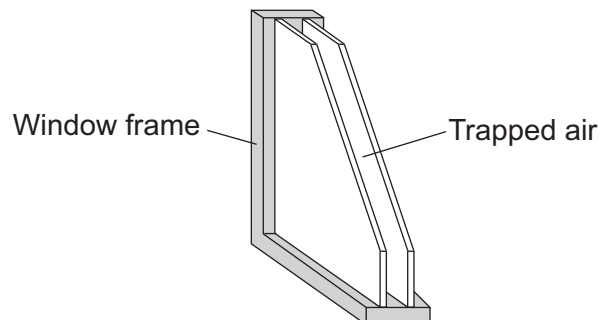
The type of heat transfer mechanism

☐

5 (c) Double glazing in windows is an energy-saving measure because double glazing reduces heat loss through windows.

Figure 4 shows a corner of a double glazing unit.

Figure 4



Complete the following sentence.

[2 marks]

The layer of trapped air between the two pieces of glass reduces heat loss by reducing the processes of _____ and _____ .



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- 6 Many household products are hazardous.

Figure 5 shows the label from a spray bottle of oven cleaner.

Figure 5



- 6 (a) (i) What do the hazard symbols on the oven cleaner label in **Figure 5** mean?

[2 marks]

- 6 (a) (ii) A man uses the oven cleaner shown in **Figure 5** in his kitchen.

Give **three** ways the man should protect himself when using the oven cleaner.

[3 marks]

1

2

3

- 6 (b) A few weeks later, when the man is using his gas cooker, the man's carbon monoxide alarm goes off.

Suggest what caused carbon monoxide to be produced by the gas cooker.

[1 mark]



7 Human activities can cause pollution and affect the amounts of different gases in our atmosphere.

7 (a) (i) Give **one** human activity that releases methane into the atmosphere.

[1 mark]

7 (a) (ii) Give **one** source of pollution that releases nitrous oxide into the atmosphere.

[1 mark]

7 (b) An increase in the amount of methane and nitrous oxide in our atmosphere causes global warming.

How does the increase in these gases cause global warming?

[1 mark]

Tick (✓) **one** box.

The gases absorb more long-wave radiation.

☐

The gases absorb more short-wave radiation.

☐

The gases reflect more long-wave radiation out into space.

☐

7 (c) Changes in the amount of pollution can be monitored using indicator species.

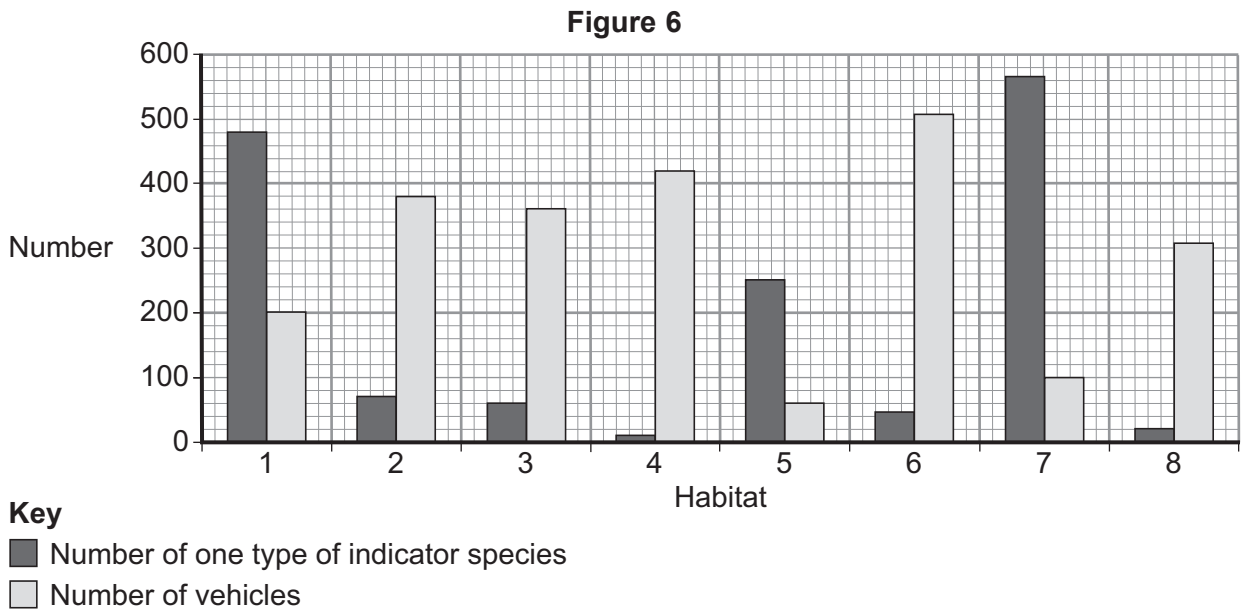
Name **one** indicator species that can be used to measure air pollution.

[1 mark]



- 7 (d)** On **one** day some students:
- counted the number of one type of indicator species in eight different habitats
 - counted the number of vehicles that passed close to each habitat.

Figure 6 shows their results.



- 7 (d) (i)** Describe **one** trend shown in **Figure 6**.

[1 mark]

- 7 (d) (ii)** Suggest **two** ways the students could improve their investigation.

[2 marks]

1

2

- 7 (e)** The students decided to investigate water pollution.

Name **one** indicator species that can be used to measure water pollution.

[1 mark]



[6 marks]

[illegible]

Extra space _____

6

END OF QUESTIONS



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