AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
BIOLOGY

F

Foundation Tier Unit Biology B3

Friday 9 June 2017 Morning 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 7 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.

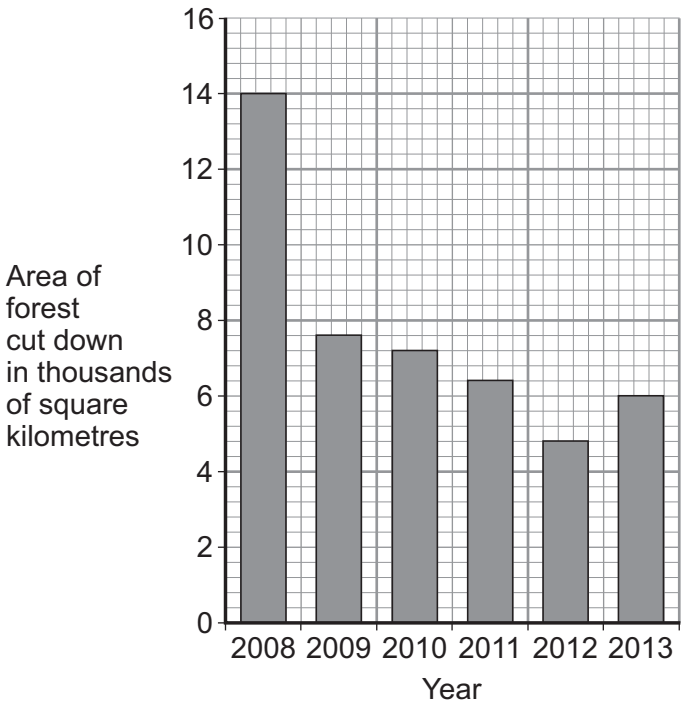
For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

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

1 Large areas of the Amazon rainforest have been cut down.

Figure 1 shows the area of forest cut down each year between 2008 and 2013 in the Amazon.

Figure 1



1 (a) (i) How many more thousand square kilometres of forest were cut down in 2008 than in 2013?

[1 mark]

Tick (✓) **one** box.

6.0 ☐

6.5 ☐

7.0 ☐

8.0 ☐

1 (a) (ii) Give **two** reasons why forests are cut down.

[2 marks]

Tick (✓) **two** boxes.

To decrease global warming ☐

To decrease the amount of sulfur dioxide released ☐

To increase biodiversity ☐

To provide land to grow crops ☐

To provide space for building ☐

1 (b) Deforestation changes the concentration of gases in the atmosphere.

The changes contribute to global warming.

Which **two** gases contribute to global warming?

[2 marks]

Tick (✓) **two** boxes.

Carbon dioxide ☐

Hydrogen ☐

Methane ☐

Nitrogen ☐

Oxygen ☐

5

2 Substances travel from the soil into plant roots by different processes.

2 (a) One of these processes is osmosis.

What is the definition of osmosis?

[1 mark]

Tick (✓) **one** box.

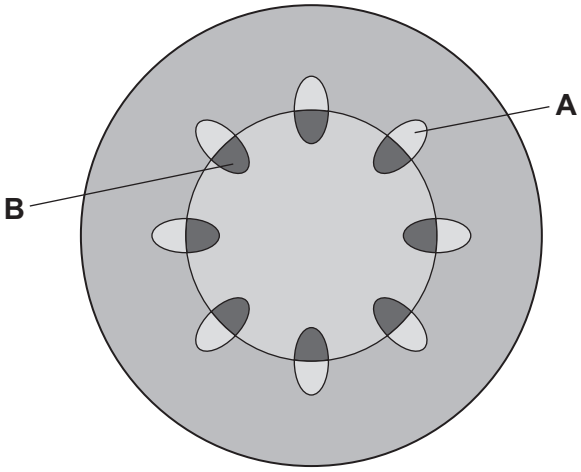
The movement of water from a concentrated solution to a more dilute solution through a partially permeable membrane. ☐

The movement of water from a dilute solution to a more concentrated solution through a partially permeable membrane. ☐

The movement of water through a partially permeable membrane using energy. ☐

2 (b) **Figure 2** shows a cross-section through a plant stem.

Figure 2



Parts **A** and **B** in **Figure 2** contain tubes that transport materials in plants.

A student collected fluid from parts **A** and **B**.

The fluid from **A** contained a lot of sugar.

The fluid from **B** contained a lot of mineral ions.

What are the names of parts **A** and **B** in **Figure 2**?

[2 marks]

Use the correct answers from the box.

guard cells	**phloem**	**stomata**	**storage organ**	**xylem**

A _____

B _____

2 (c) In plants water moves from the roots, up through the stem and out of the leaves.

What is the name of this movement of water?

[1 mark]

Complete the sentence.

The _____ stream.

Question 2 continues on the next page

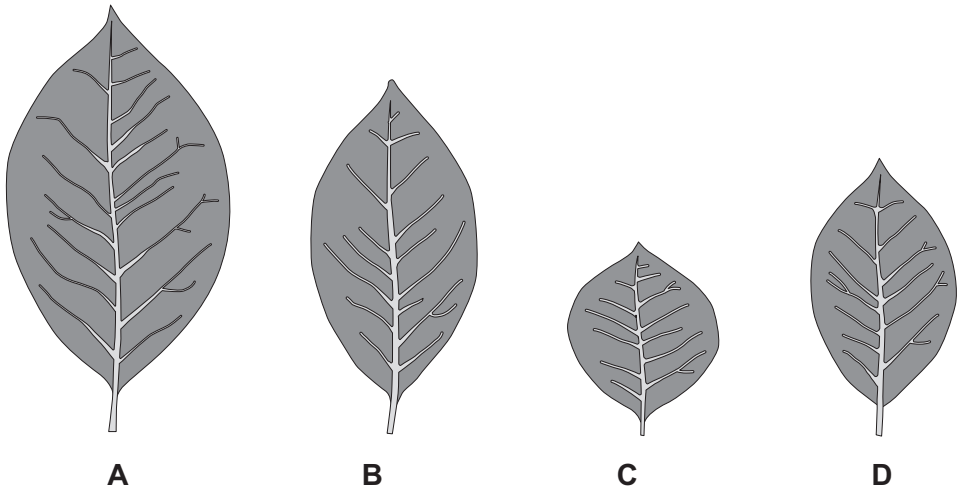
2 (d) The student investigated the rate of water loss from leaves.

The student:

- took four leaves, **A**, **B**, **C** and **D**, from the same plant
- measured the mass of each leaf
- kept the leaves in the same room for 3 hours
- measured the mass of each leaf again.

Figure 3 shows the four leaves she used.

Figure 3



2 (d) (i) How could the student calculate the mass of water lost for each leaf?

[1 mark]

Tick (✓) **one** box.

mass after ÷ mass before ☐

mass after × mass before ☐

mass before + mass after ☐

mass before – mass after ☐

2 (d) (ii) Suggest which leaf, **A**, **B**, **C** or **D**, lost the most water.

Give a reason for your answer.

[2 marks]

Leaf _____

Reason _____

_____

2 (d) (iii) The student changed the conditions in the room.

Suggest **two** conditions that would increase the rate of water loss from the leaves.

[2 marks]

1 _____

2 _____

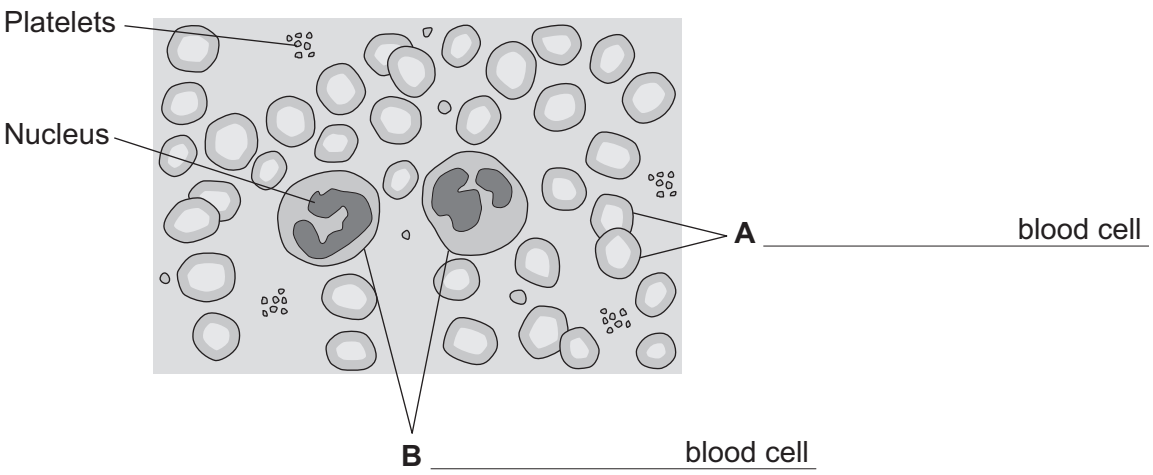
9

Turn over for the next question

3 Blood is a tissue.

Figure 4 is a diagram of the parts of the blood.

Figure 4



3 (a) **A** and **B** are different types of blood cell.

Label cells **A** and **B** in **Figure 4**.

[2 marks]

3 (b) A man has a bad cut on his arm that continues to bleed.

The man goes to hospital and has a blood test.

Table 1 shows the results of the man's blood test.

Table 1

Blood test results

Test	Normal range	Result	Healthy	Abnormal
Platelets	140 – 400	98		✓
Cholesterol	112 – 328	297	✓	
Iron	12 – 300	120	✓	

3 (b) (i) Use information from **Table 1** and your own knowledge to explain why the man's cut does not stop bleeding.

[2 marks]

3 (b) (ii) The doctor gives the man a blood transfusion.

Suggest why the blood needs to be the same blood group as the man.

[1 mark]

Tick (✓) **one** box.

So the donor is not harmed ☐

To prevent rejection of the new blood cells ☐

To reduce the number of blood cells ☐

To suppress the immune system ☐

3 (c) Blood plasma carries substances around the body.

Use the correct answers from the box to complete the sentences.

[3 marks]

bladder	**carbon dioxide**	**kidneys**	**lungs**
oxygen	**small intestine**	**starch**	

Blood plasma carries _____ from the organs to the lungs.

Blood plasma carries the soluble products of digestion from the _____ to other organs.

Blood plasma carries urea from the liver to the _____ to be removed.

8

4 Biogas is produced when bacteria break down some plant or animal materials.

4 (a) What is the main useful gas found in biogas?

[1 mark]

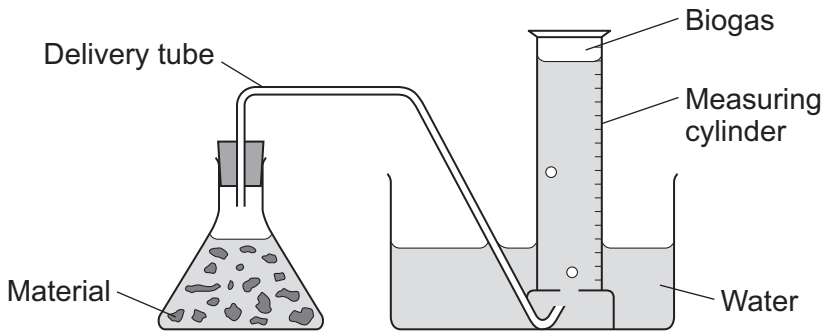
_____

4 (b) Some students investigated which of four types of material produced the most biogas.

The students:

- chopped the material into small pieces
- placed 200 g of each material into a different flask with 100 cm^3 of water
- set up the apparatus as shown in **Figure 5** to collect the biogas produced
- left each set of apparatus at 25 °C for 7 days
- repeated the investigation twice more.

Figure 5



Give **two** variables the students controlled in their investigation.

[2 marks]

1 _____

_____

2 _____

_____

4 (c) **Table 2** shows the students' results.

Table 2

Type of material	Volume of biogas collected in 7 days in cm^3			
	Test 1	**Test 2**	**Test 3**	**Mean**
Beans	12.0	12.4	12.2	12.2
Manure	15.0	15.2	8.2	15.1
Manure and beans	18.6	18.8	18.4	18.6
Sweet potato	14.3	14.1	14.5	

4 (c) (i) One of the results in **Table 2** is anomalous.

Draw a ring around the anomalous result shown in **Table 2**.

[1 mark]

4 (c) (ii) Calculate the mean volume of biogas collected, in 7 days, for sweet potato in **Table 2**.

[1 mark]

4 (c) (iii) Which type of material in **Table 2** would be the most effective to use in a biogas generator?

Give a reason for your answer.

[2 marks]

Question 4 continues on the next page

4 (d) A farmer built a biogas generator on his cow farm.

Suggest **one** advantage and **one** disadvantage of having a biogas generator.

[2 marks]

Advantage _____

_____

Disadvantage _____

_____

9

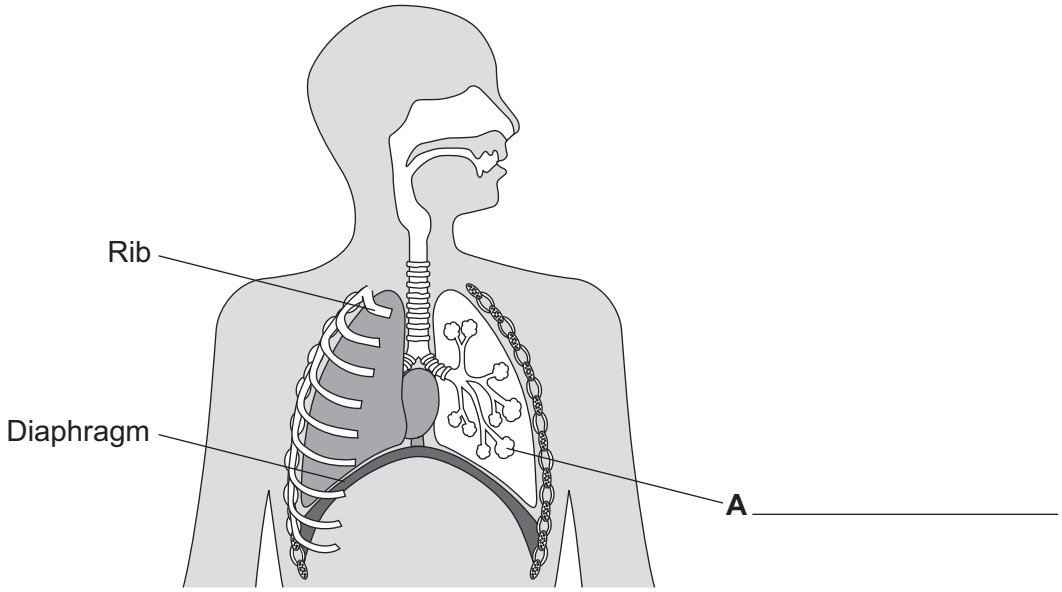
5 Some organs in the human body are adapted to exchange materials.

5 (a) **Figure 6** shows the human breathing system and heart.

5 (a) (i) Label part **A** in **Figure 6**.

[1 mark]

Figure 6



5 (a) (ii) Complete the sentences about breathing in.

[4 marks]

To make air move **into** the lungs the ribs move up and _____

and the diaphragm moves _____ .

These movements are caused when muscles between the ribs and muscles in the diaphragm _____ .

The increase in volume in the thorax causes the pressure in the thorax to _____ .

5 (a) (iii) In the lungs, which type of blood vessel does oxygen pass into?

[1 mark]

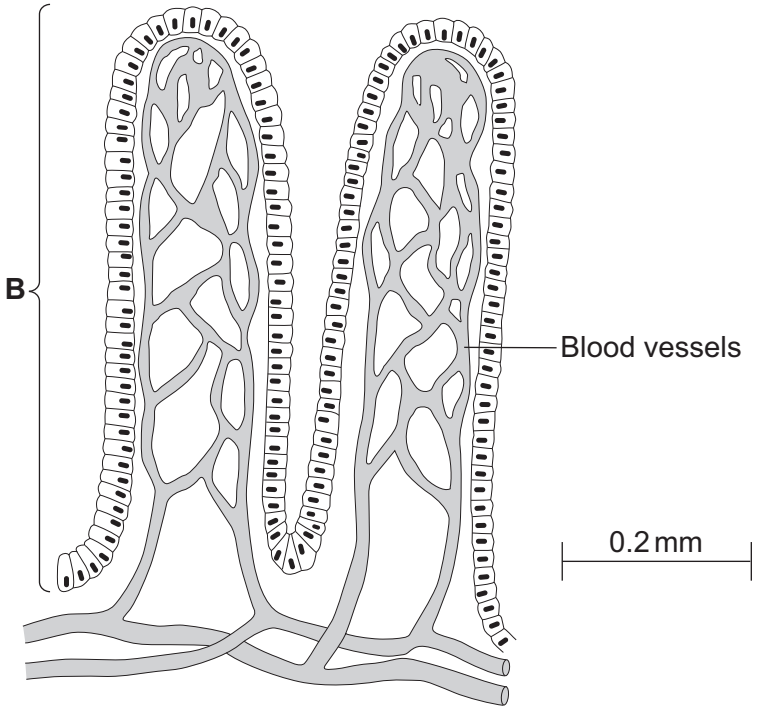
_____

Question 5 continues on the next page

5 (b) The small intestine is adapted to absorb digested food.

Figure 7 shows the lining of the small intestine.

Figure 7



5 (b) (i) Name part **B** shown in **Figure 7**.

[1 mark]

_____

5 (b) (ii) Give **two** ways that part **B** in **Figure 7** is adapted to help the small intestine absorb digested food quickly.

[2 marks]

1 _____

_____

2 _____

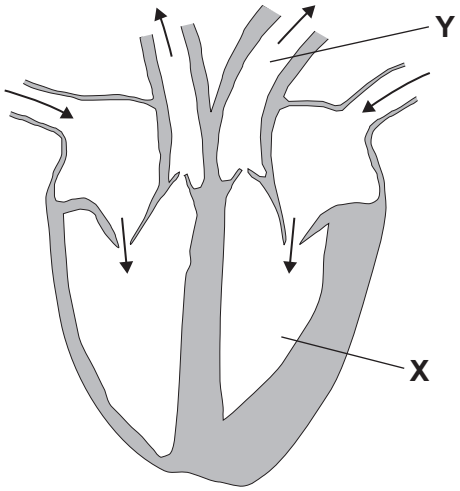
_____

9

6 Each year people need to have treatment for heart problems.

Figure 8 shows a human heart.

Figure 8



6 (a) (i) Name part **X** in **Figure 8**.

[1 mark]

_____

6 (a) (ii) Name part **Y** in **Figure 8**.

[1 mark]

_____

6 (a) (iii) There are valves inside the heart.

What is the function of these valves?

[1 mark]

_____

_____

Question 6 continues on the next page

6 (b) Some patients need to have their heart valves replaced.

Table 3 shows the percentage of patients who died from different causes after having heart valve replacements.

Two types of heart valve were used:

- mechanical – made of metal and plastic
- pig tissue – made from pig heart tissue on a metal frame.

The data was collected over 15 years and 400 patients were involved.

Table 3

Cause of death	Percentage of patients who died	
	Mechanical valve	Pig tissue valve
Blood clots blocking coronary arteries	9	9
Bleeding	26	15
Second operation	5	15
Bacterial heart infection	4	8
Heart valves stopped working	0	12

Use information from **Table 3** and your own knowledge to answer the following question.

A patient decides to have a mechanical valve replacement rather than a pig tissue valve replacement.

Suggest reasons for **and** against choosing a mechanical valve.

[4 marks]

6 (c) Some people have narrowed arteries.

Describe how stents can be used to prevent a heart attack in a person with narrowed arteries.

[2 marks]

9

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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

Humans need to remove (excrete) waste products from the bloodstream.

Describe the processes that produce waste products **and** how the products are removed from the body.

In your answer you should include the names of the organs involved in producing waste products and those involved in removing the waste products.

You should **not** refer to faeces in your answer.

[6 marks]

Extra space

6

8 Human activities pollute the air with smoke and gases.

One of these gases is sulfur dioxide.

8 (a) What effect does sulfur dioxide have on our environment?

[1 mark]

Tick (✓) **one** box.

Causes acid rain ☐

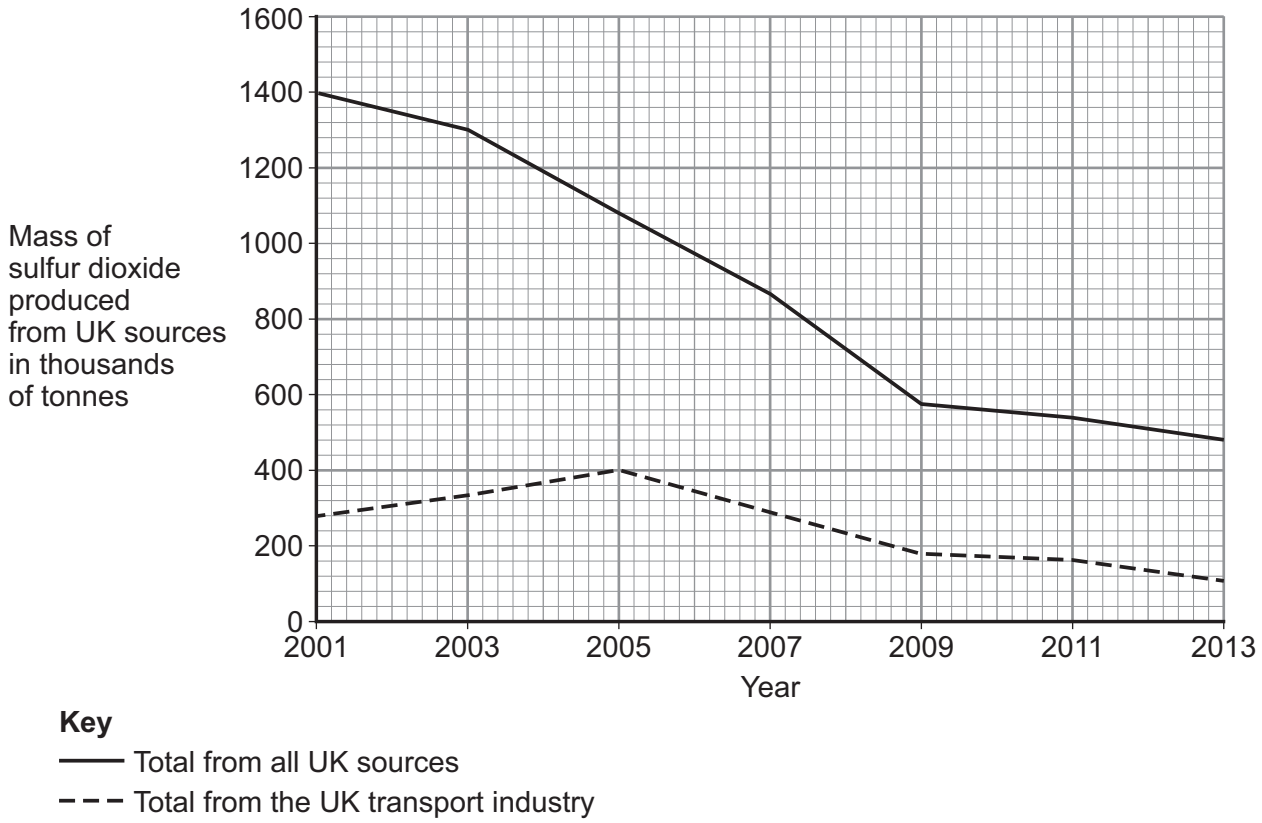
Causes global warming ☐

Causes more carbon sequestering ☐

Causes sea levels to rise ☐

8 (b) **Figure 9** shows how the mass of sulfur dioxide produced from UK sources changed from 2001 to 2013.

Figure 9



8 (b) (i) The mass of sulfur dioxide produced from all UK sources has decreased.

Use information from **Figure 9** to complete the following calculation of the percentage decrease in the mass of sulfur dioxide produced.

[2 marks]

Total mass of sulfur dioxide produced in 2001 = _____ thousand tonnes

Total mass of sulfur dioxide produced in 2013 = 480 thousand tonnes

Decrease in mass of sulfur dioxide produced = _____ thousand tonnes

Percentage decrease working out: _____

_____

_____

Percentage decrease = _____

8 (b) (ii) Use data from **Figure 9** to describe the pattern in the mass of sulfur dioxide produced from the UK transport industry from 2001 to 2013.

[2 marks]

_____

_____

_____

_____

5

END OF QUESTIONS

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