

Please write clearly in block capitals.

Centre number

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Candidate number

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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.

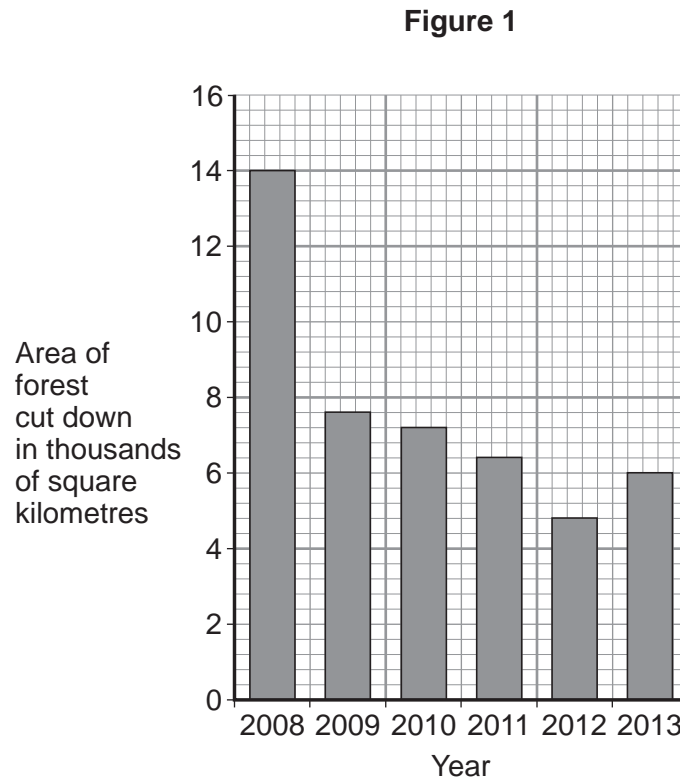
For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	



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.



- 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

Turn over ►



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.

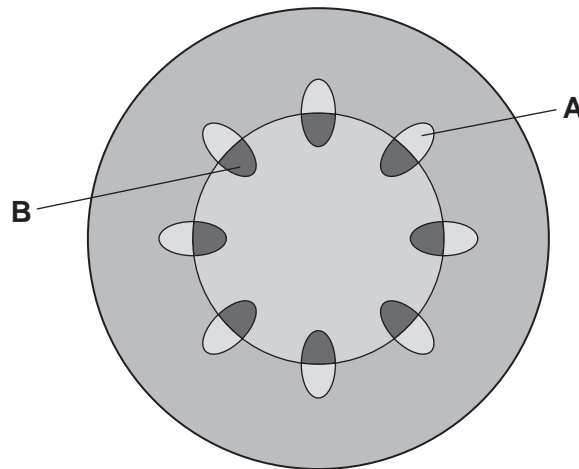
The movement of water from a concentrated solution to a more dilute solution through a partially permeable membrane.

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

Turn over ►



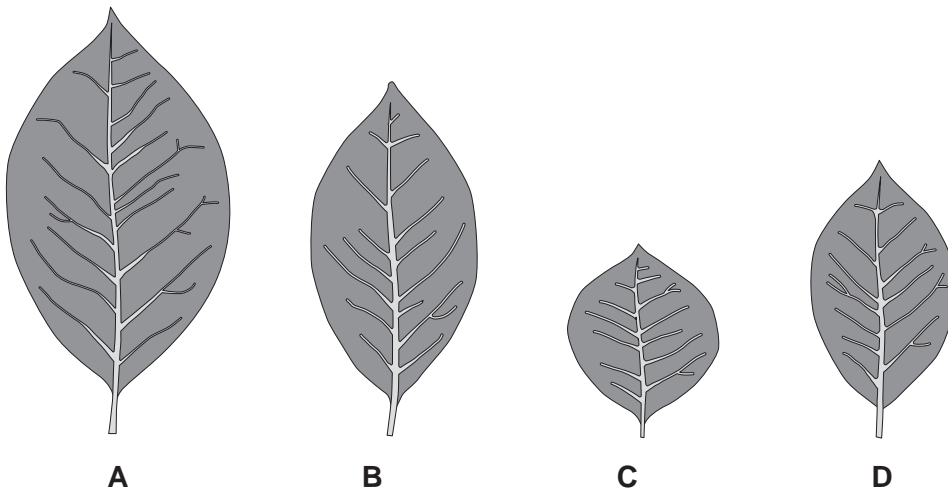
2 (d) The student investigated the rate of water loss from leaves.

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 \div mass before

mass after \times 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

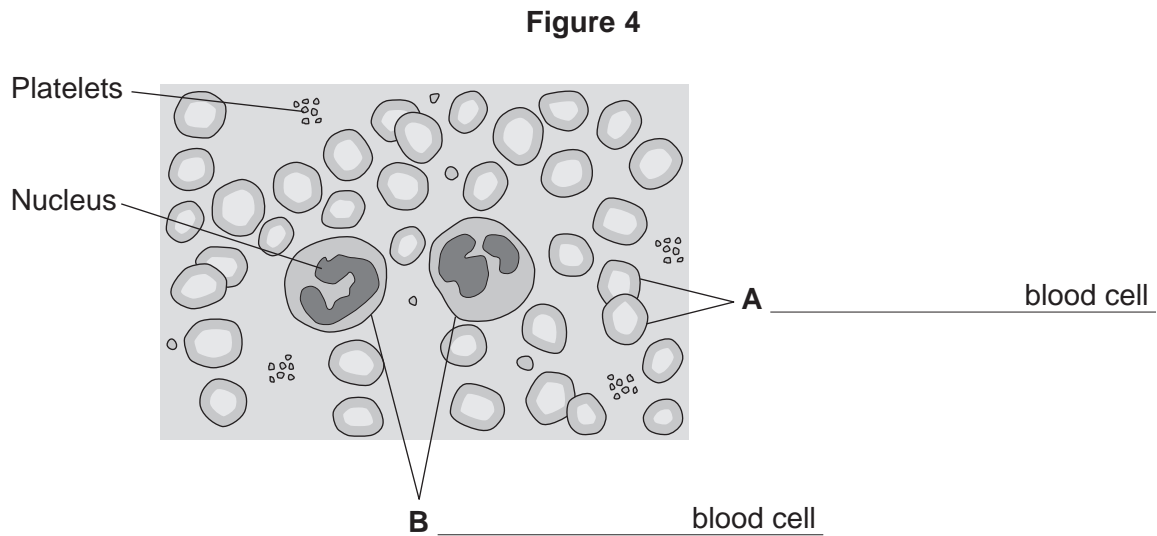
Turn over for the next question

Turn over ►



3 Blood is a tissue.

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



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

Turn over ►



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

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

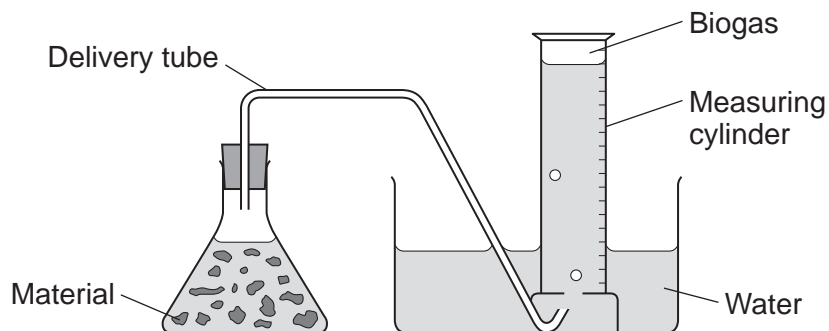
[1 mark]

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 cm³ 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

Turn over ►



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



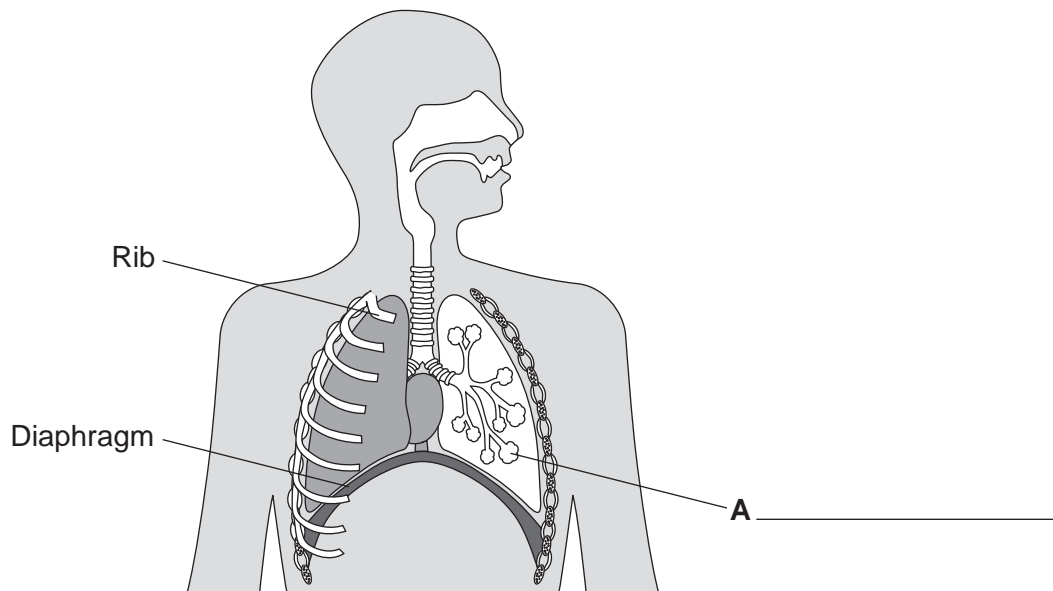
5 Some organs in the human body are adapted to exchange materials.

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

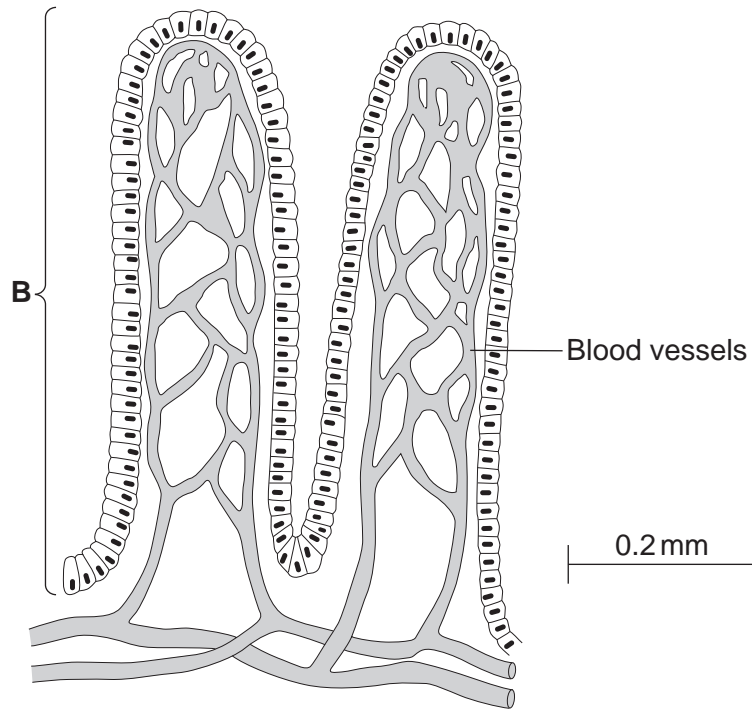
Turn over ►



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 _____

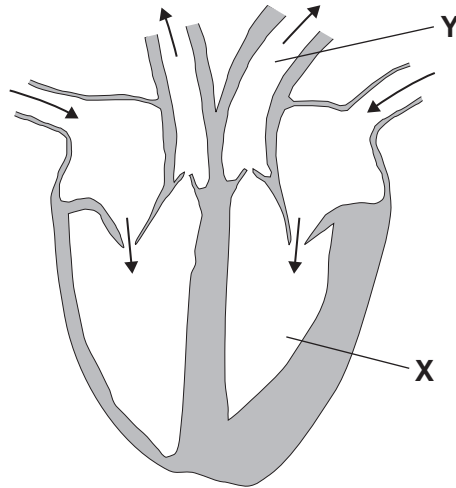
2 _____



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

Turn over ►



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

Turn over ►



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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

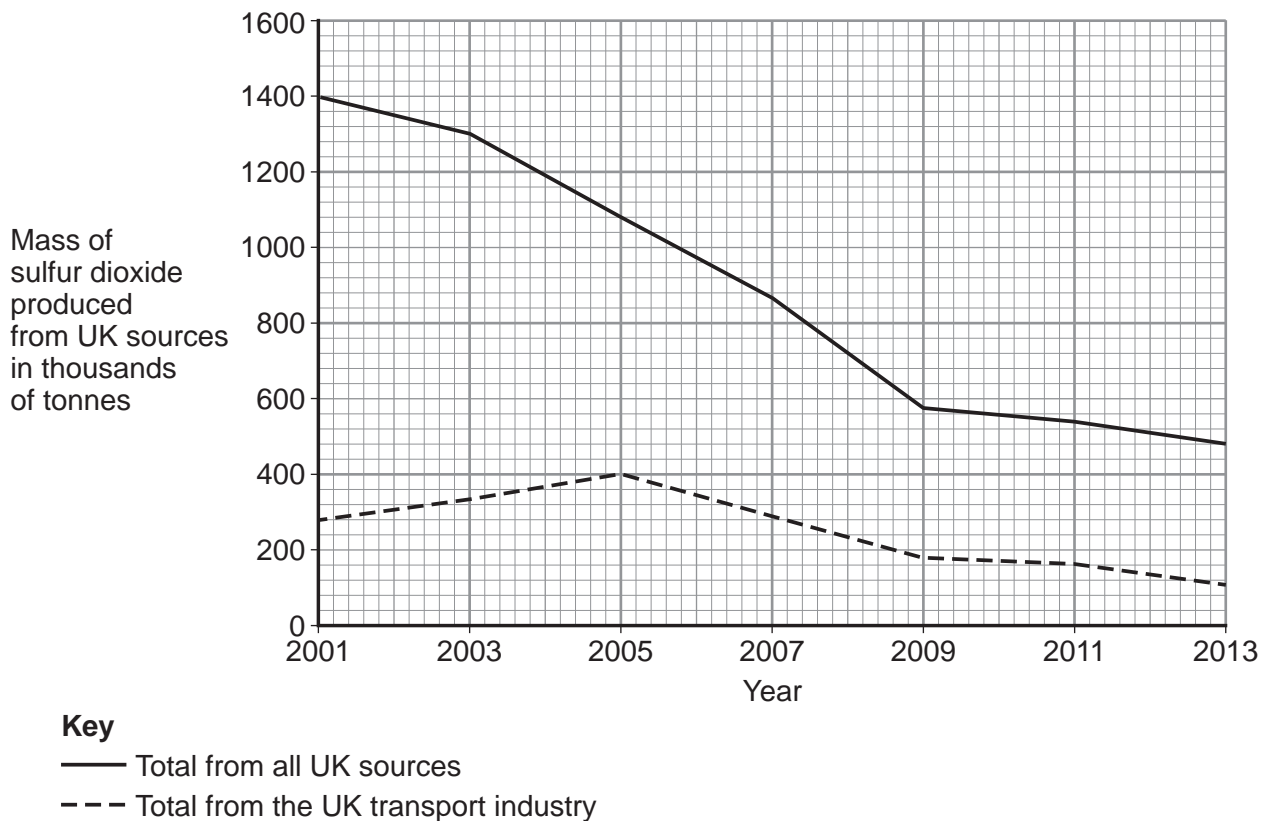
Causes global warming

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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