AQA GCSE Chemistry | 8462

SPECIFICATION POINT 4.9.2.3

Global climate change

Past-paper questions

Tier	**Foundation**
Question groups	**17**
Available paper years	**2007–2024**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.9.2.3 Global climate change

Question 01

June 2007 | CHY1F | Original Q3 | Legacy

3 Crude oil is a natural resource from which useful fuels can be separated.

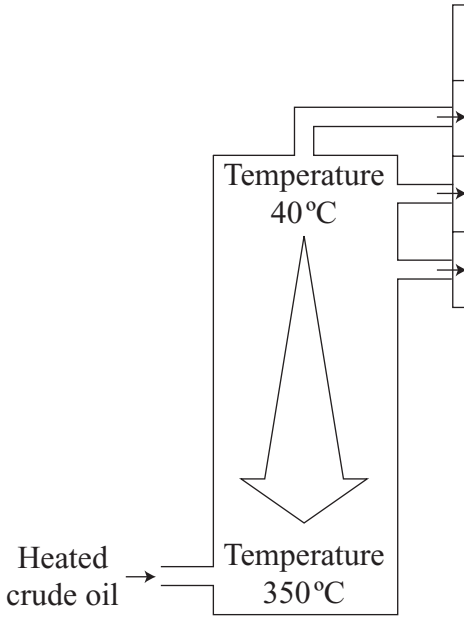
(a) Crude oil is a mixture of hydrocarbons.

Complete the sentence about a hydrocarbon molecule.

A hydrocarbon molecule is made up of ..... and carbon atoms only.

(1 mark)

(b) Many fuels come from crude oil. Some of these fuels are shown in the diagram.



Fraction	Number of carbon atoms in each molecule
gases	1–4
petrol	5–12
diesel	15–25

Suggest **two** properties of these fuels that allow them to be separated from crude oil.

.....

.....

.....

.....

(2 marks)

4.9.2.3 Global climate change

Question 01 · continued

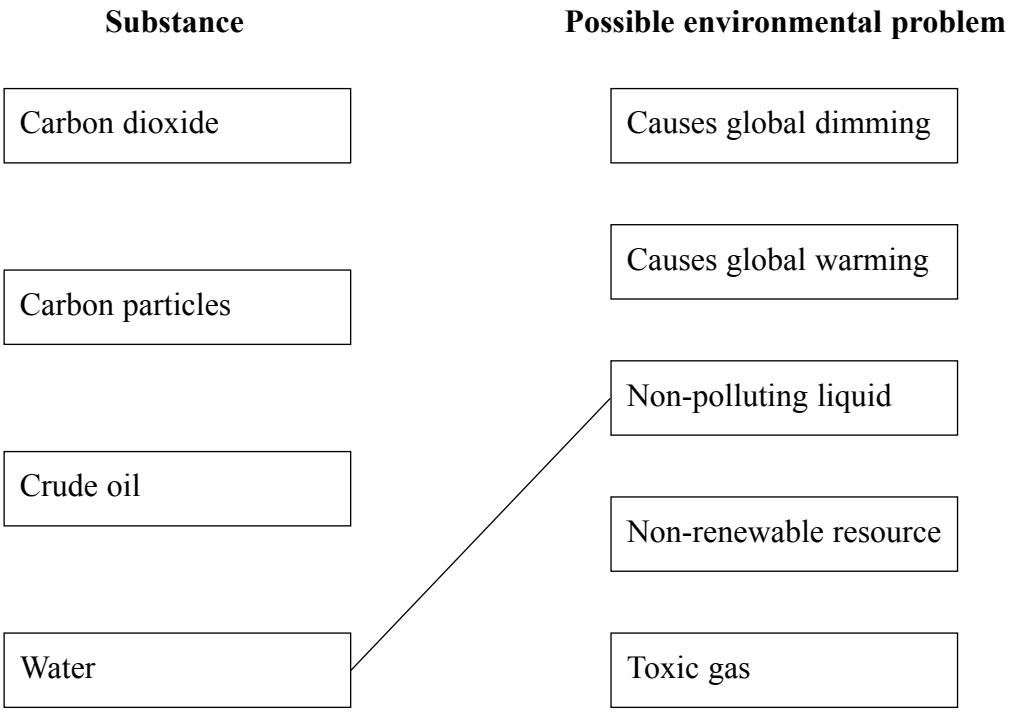
BLANK

(c) Fuels from crude oil burn to provide heat energy.

When a fuel burns, it combines with oxygen in the air and produces carbon dioxide and water. When there is not enough oxygen, the fuel burns and also produces carbon monoxide and carbon particles.

Draw a straight line from each substance that links it to a possible environmental problem.

One has been done for you.



(3 marks)

6

4.9.2.3 Global climate change

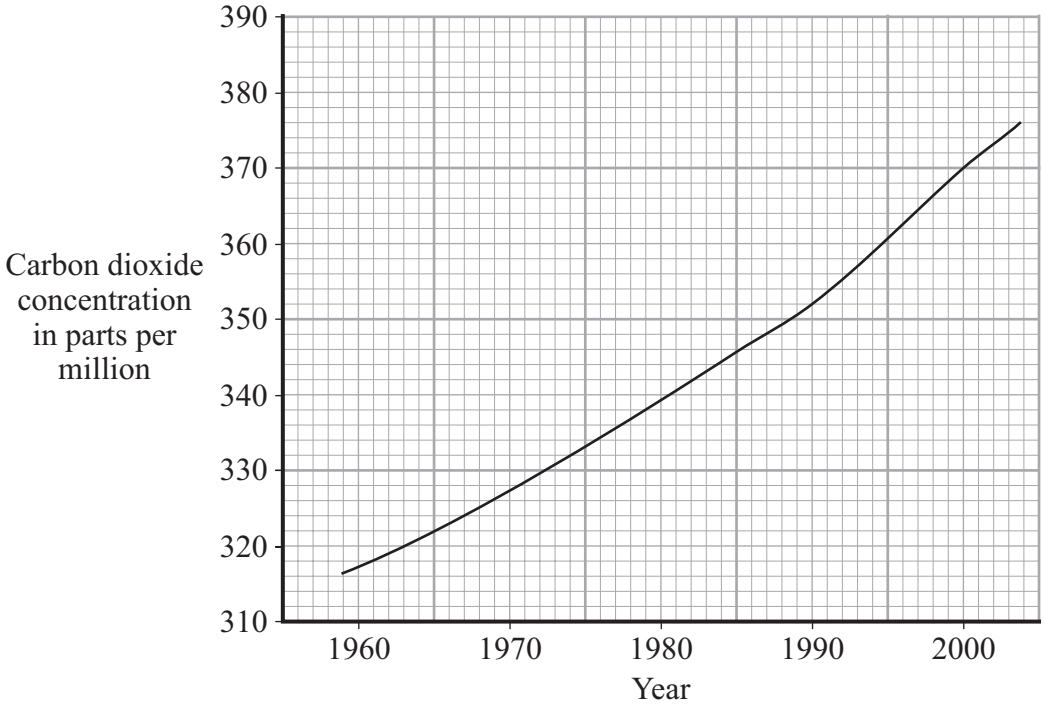
Question 02

November 2007 | CHY1B | Original Q9 | Legacy

QUESTION NINE

Measurements of carbon dioxide in the atmosphere have been made continuously for almost 50 years at the Mauna Loa Observatory, 4000 metres up a mountain in Hawaii.
This site is far enough away from any large carbon dioxide source to be a reliable measuring point.

Atmospheric carbon dioxide levels measured at Mauna Loa, Hawaii



9A What is the mean (average) rate of increase per year of carbon dioxide (in parts per million) in the atmosphere at Mauna Loa between 1990 and 2000?

1 1.8

2 18.0

3 352.0

4 370.0

9B The change in carbon dioxide concentration over the past 50 years is thought to be a result of . . .

1 increased volcanic activity.

2 an increase in the use of fossil fuels.

3 variations in the Sun's energy output.

4 an increase in ocean temperatures.

4.9.2.3 Global climate change

9C Many scientists think that there is a close link between atmospheric carbon dioxide levels and global warming.
Some political leaders have taken no action to reduce carbon dioxide emissions.

One possible reason is that . . .

1 restrictions on industrial development might result.

2 their countries have few oil reserves.

3 they do not think that scientists are qualified to make important judgements.

4 they do not think that global warming will affect their country.

9D Concerns about carbon dioxide levels and global warming have increased research and technical development in some areas.

Which of these has **not** been part of this development?

1 the use of ethanol as a fuel in cars

2 the use of diesel oil instead of petrol in cars

3 the use of vegetable oils as a fuel in cars

4 the development of electric cars

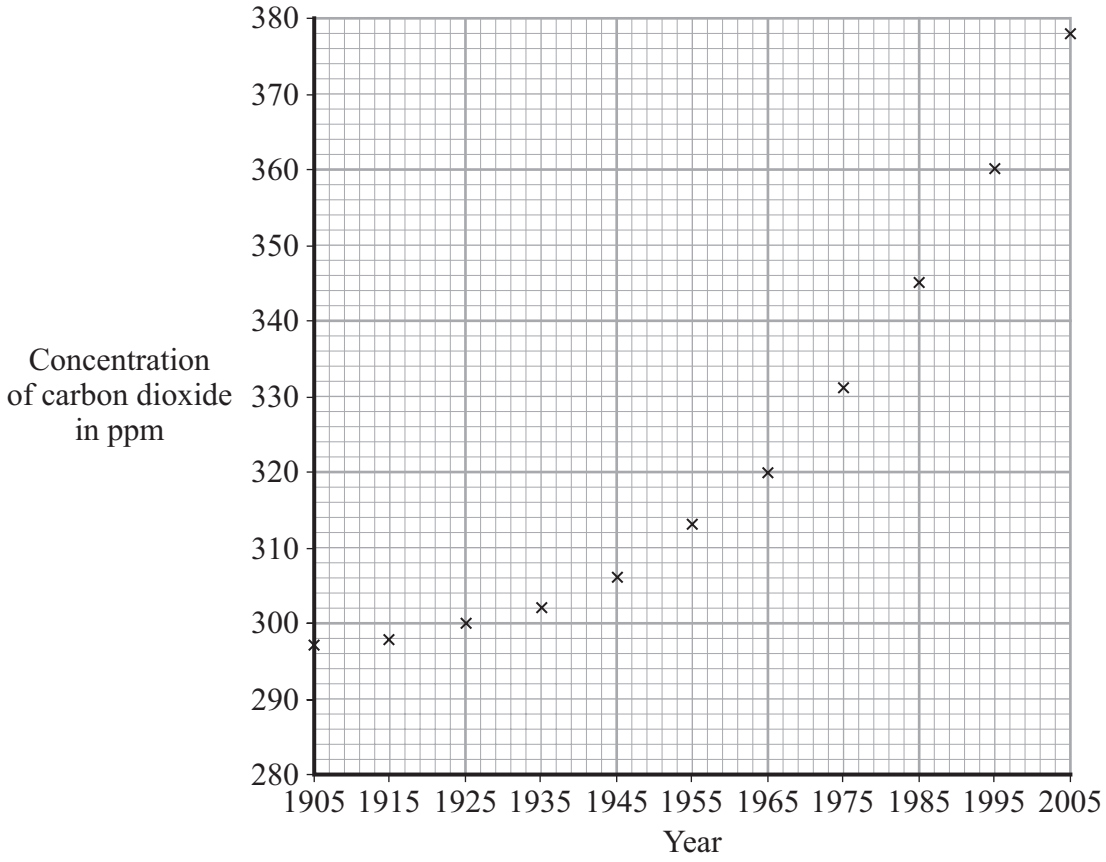
END OF TEST

4.9.2.3 Global climate change

Question 03

January 2008 | CHY1F | Original Q5 | Legacy

5 Global warming is thought to be happening because of the increased burning of fossil fuels. The concentration of carbon dioxide in the air from 1905 to 2005 has been calculated.



(a) Draw a line of best fit for these points. *(1 mark)*

(b) (i) What was the concentration of carbon dioxide in 1955?

..... ppm *(1 mark)*

(ii) In what year did the concentration of carbon dioxide reach 350 ppm?

.....

(1 mark)

4.9.2.3 Global climate change

Question 03 · continued

BLANK

(c) Use the graph to describe, in as much detail as you can, what happened to the concentration of carbon dioxide from 1905 to 2005.

.....

.....

.....

.....

(2 marks)

5

4.9.2.3 Global climate change

Question 04

March 2008 | CHY1AP | Original Q1 | Legacy

QUESTION ONE

This question is about substances that are released into the air when fuels burn.

Match substances, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A sulfur dioxide

B carbon dioxide

C carbon monoxide

D particles

	What we can say about the substance
1	It is a cause of global warming.
2	It is the main cause of acid rain.
3	It is a gas formed by incomplete combustion.
4	It is a cause of global dimming.

4.9.2.3 Global climate change

Question 05

June 2008 | CHY1AP | Original Q2 | Legacy

QUESTION TWO

This question is about environmental problems caused by burning fuels.

Match combustion products, **A**, **B**, **C**, and **D**, with the numbers **1–4** in the table.

A carbon dioxide

B smoke particles

C sulfur dioxide

D water vapour

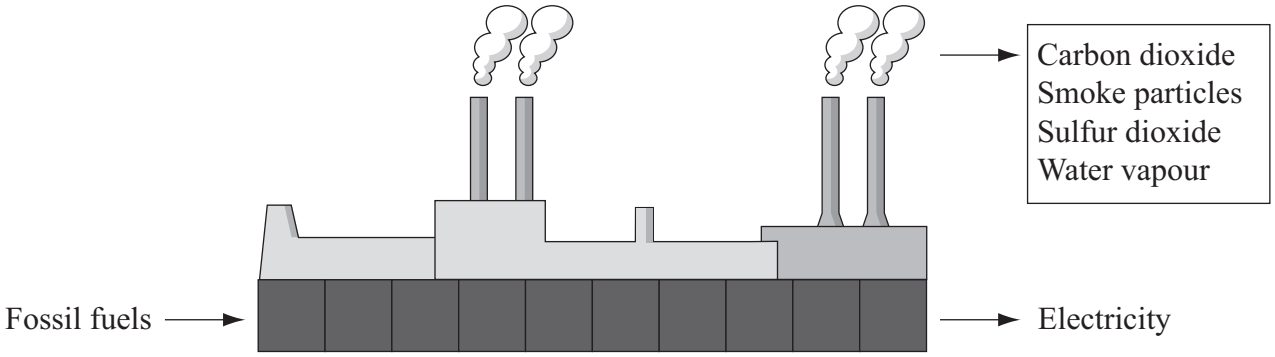
	Environmental problem
1	acid rain
2	global dimming
3	global warming
4	no problems

4.9.2.3 Global climate change

Question 06

June 2008 | CHY1F | Original Q2 | Legacy

2 Most electricity in the UK is generated in power stations that burn fossil fuels.
The diagram lists some of the substances released into the air when fossil fuels are burned.



Power station

2 (a) (i) Which **one** of the substances released into the air causes acid rain?

.....

(1 mark)

2 (a) (ii) In the sentence below, draw a ring around the correct answer.

The type of environmental pollution caused by

smoke particles is

global dimming
global warming
rising sea levels

.

(1 mark)

2 (a) (iii) Suggest how the burning of fossil fuels may cause climate change.

.....

.....

.....

.....

(2 marks)

4.9.2.3 Global climate change

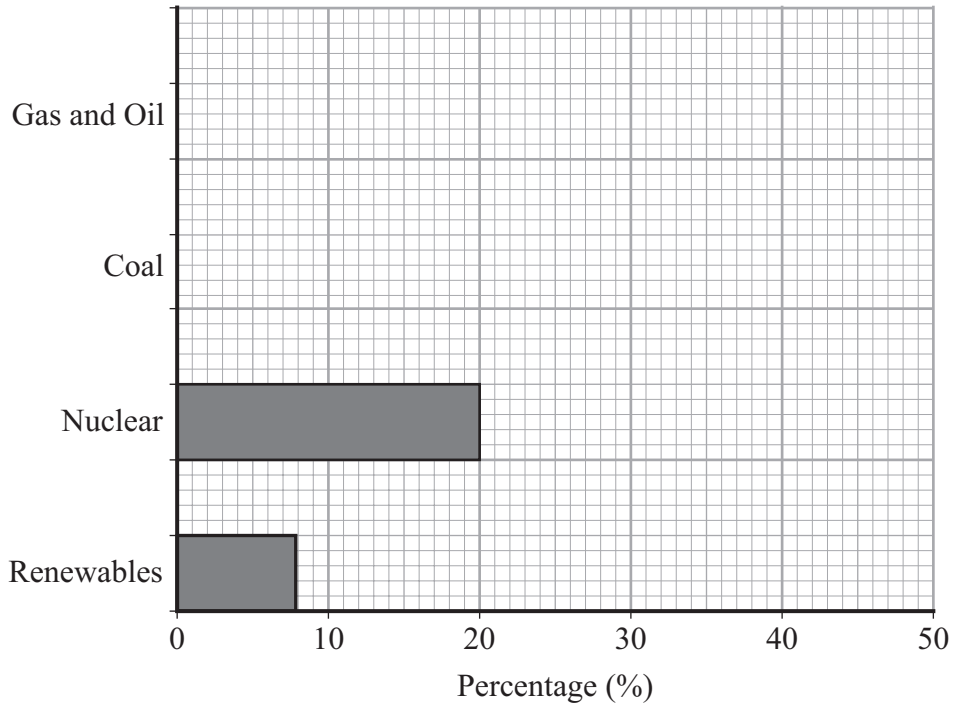
Question 06 · continued

for mark

2 (b) The table shows the percentage of electricity generated by different energy sources.

Energy sources	Renewables	Nuclear	Coal	Gas and Oil
Percentage (%)	8	20	32	40

Complete the bar chart to show the percentage of electricity generated by coal and by gas and oil.



(2 marks)

6

4.9.2.3 Global climate change

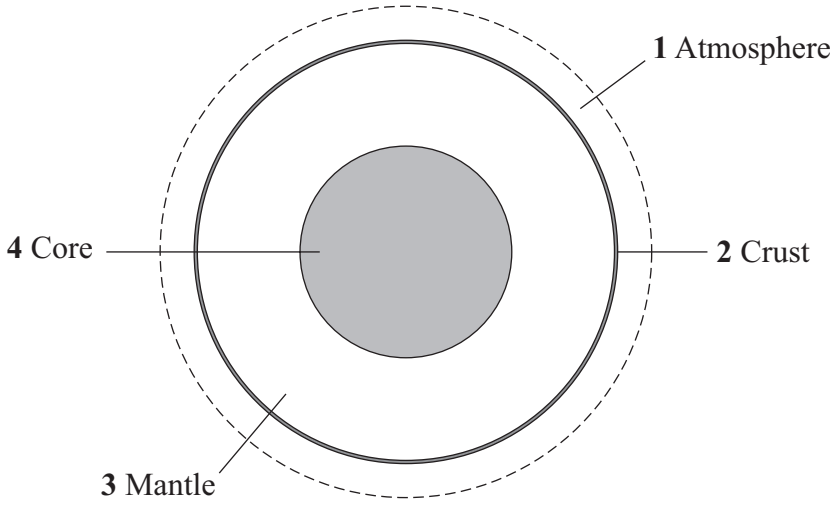
Question 07

March 2009 | CHY1BP | Original Q3 | Legacy

QUESTION THREE

This question is about the structure of the Earth.

The diagram below shows the layers in and around the Earth.



The Earth's magnetism is thought to be due to the presence of metallic iron and nickel in the centre of the Earth.

Match statements, **A**, **B**, **C** and **D**, with the numbers **1–4** in the diagram.

A where the plates drift apart

B where convection currents occur, creating plate movements

C where global warming occurs

D where iron and nickel are found as metals

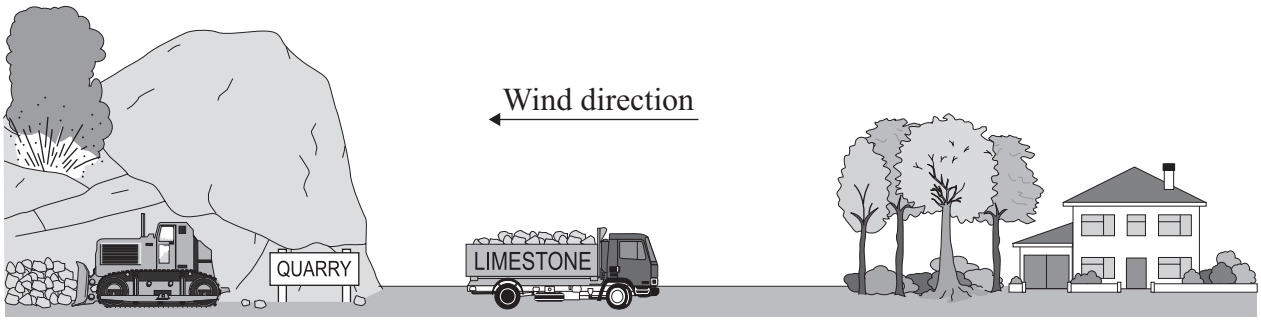
4.9.2.3 Global climate change

Question 08

November 2009 | CHY1AP | Original Q1 | Legacy

QUESTION ONE

The drawing shows a house near a limestone quarry.



Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** in the sentences.

A trees

B vehicle exhaust gases

C vehicle movements

D wind

Visual pollution for the people in the house is reduced by the . . . **1** . . . .

Noise pollution is caused by the . . . **2** . . . .

Dust is carried away from the house by the . . . **3** . . . .

Global warming might be increased by the . . . **4** . . . .

4.9.2.3 Global climate change

Question 09

January 2010 | CHY1F | Original Q3 | Legacy

3 In 1980 Mount St Helens suddenly exploded. This volcanic eruption was so violent that it blew off the top of the mountain. Ash particles and volcanic gases spread throughout the Earth's atmosphere.



3 (a) Mount St Helens is on a boundary between two of the Earth's tectonic plates.

Draw a ring around the correct word to complete the sentences.

3 (a) (i) The Earth's tectonic plates are made up of the upper part of the mantle

and the

atmosphere.
core.
crust.

(1 mark)

3 (a) (ii) The movement of the Earth's tectonic plates is caused by convection currents within the mantle. These convection currents are driven by heat released by

natural

combustion
radioactive
shrinking

processes.

(1 mark)

4.9.2.3 Global climate change

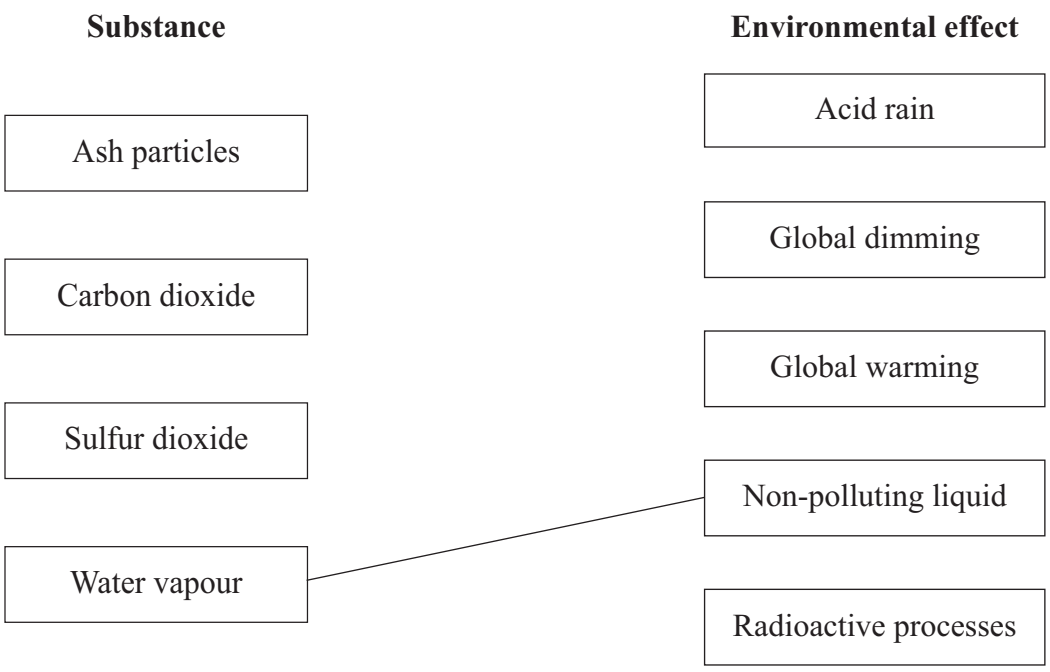
Question 09 · continued

for mark

3 (b) The volcano released large amounts of ash particles, carbon dioxide, sulfur dioxide and water vapour.

Draw **one** straight line from each substance to an environmental effect that it causes.

One has been done for you.



(3 marks)

3 (c) Why do volcanic eruptions and earthquakes happen?

.....

.....

(1 mark)

6

4.9.2.3 Global climate change

Question 10

March 2010 | CHY1AP | Original Q1 | Legacy

QUESTION ONE

New substances are formed when fuels are burned. Some of these substances affect the environment.

Match substances, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A carbon dioxide

B particles

C sulfur dioxide

D water vapour

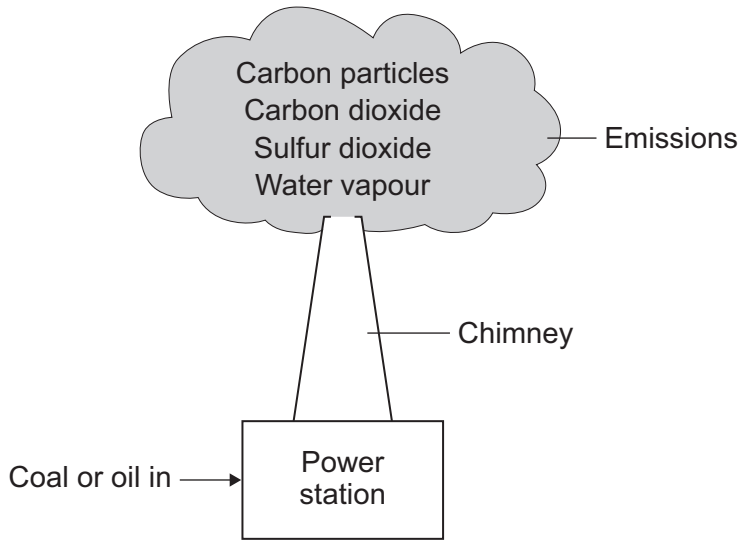
	Environmental effect
1	acid rain
2	global dimming
3	global warming
4	non-polluting

4.9.2.3 Global climate change

Question 11

June 2019 | CHY1F | Original Q3 | Legacy

3 In the future more coal-fired and fewer oil-fired power stations will be used to generate electricity.
When coal and oil are burned they produce the same types of emissions which can cause environmental problems.



3 (a) Emissions from the chimney can cause acid rain, global dimming and global warming.
Draw **one** straight line from each possible environmental problem to the emission that causes it.

Possible environmental problem	Emission that causes it
acid rain	carbon particles
global warming	carbon dioxide
global dimming	sulfur dioxide
	water vapour

(3 marks)

3 (b) Draw a ring around the correct word in the box to complete each sentence.

3 (b) (i) Incomplete combustion of coal or oil is caused by too little

carbon dioxide.
nitrogen.
oxygen.

(1 mark)

4.9.2.3 Global climate change

Question 11 · continued

3 (b) (ii) A gas formed by the incomplete combustion of coal or oil is

carbon monoxide.

hydrogen.

oxygen.

(1 mark)

3 (c) The table shows the world production for both coal and oil in 2000.
The world production figures after 2000 are predicted.

Year	World production of coal (billions of tonnes per year)	World production of oil (billions of barrels per year)
2000	3.5	12.5
2050	4.5	5.6
2100	5.0	1.7
2150	5.5	0.5
2200	6.0	0.0

3 (c) (i) How is the world production of oil predicted to change from 2000 to 2200?

.....

.....

(1 mark)

3 (c) (ii) Suggest **two** reasons why the world production of coal is predicted to increase.

1 .....

.....

2 .....

.....

(2 marks)

8

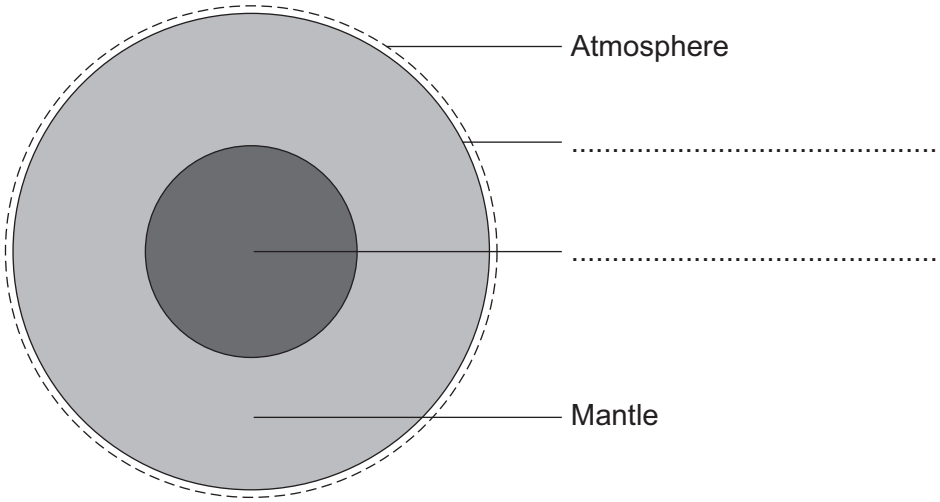
4.9.2.3 Global climate change

Question 12

3 The Earth has a layered structure and is surrounded by an atmosphere.

3 (a) The diagram shows the layers of the Earth.

Complete the labels on the diagram.



(2 marks)

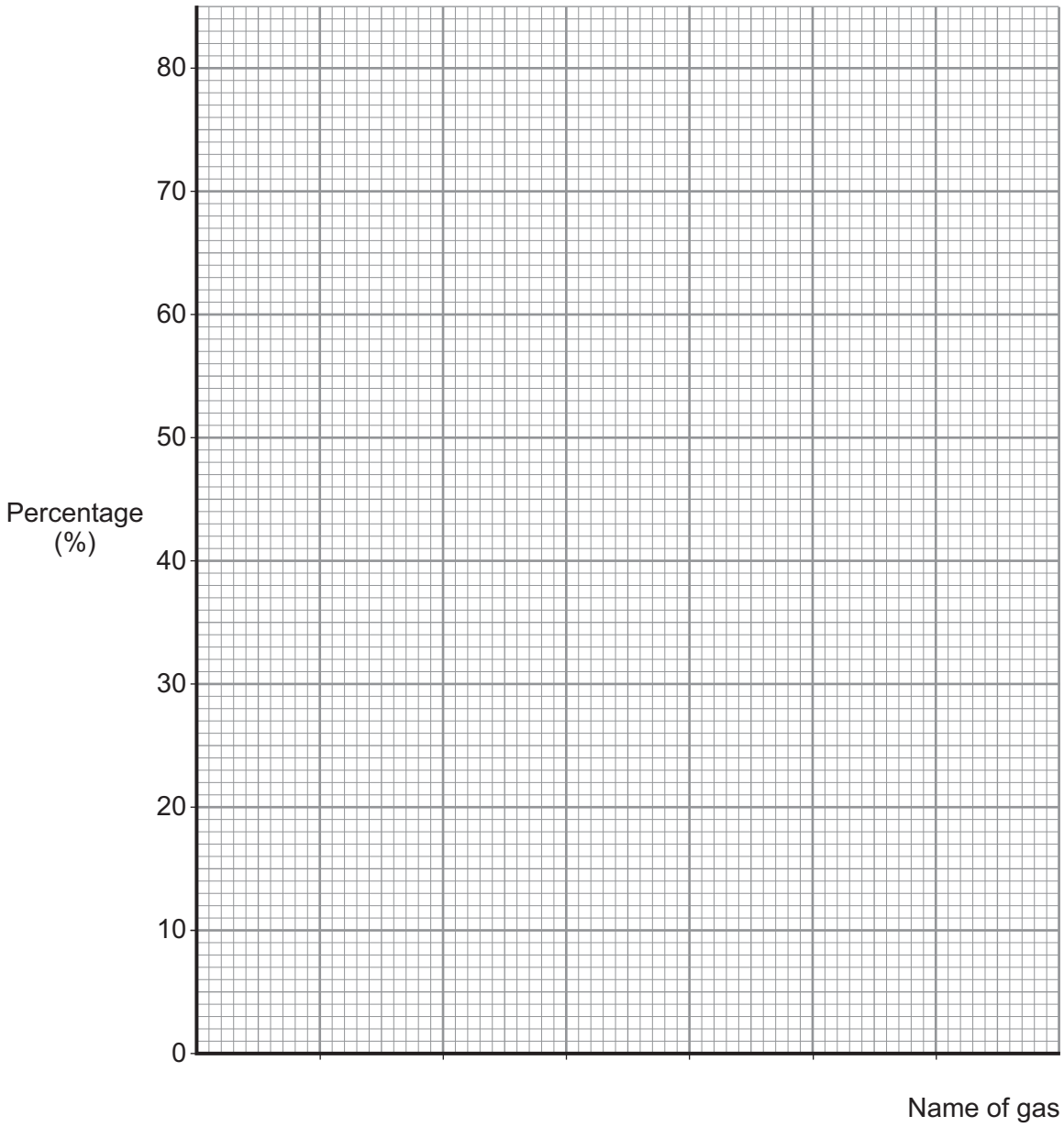
3 (b) The data in the table shows the percentages of the gases in the Earth's atmosphere.

Name of gas	Percentage (%) of gas
Nitrogen	78
Oxygen	21
Other gases	1

4.9.2.3 Global climate change

Question 12 · continued

Present the data in the table on the grid below.



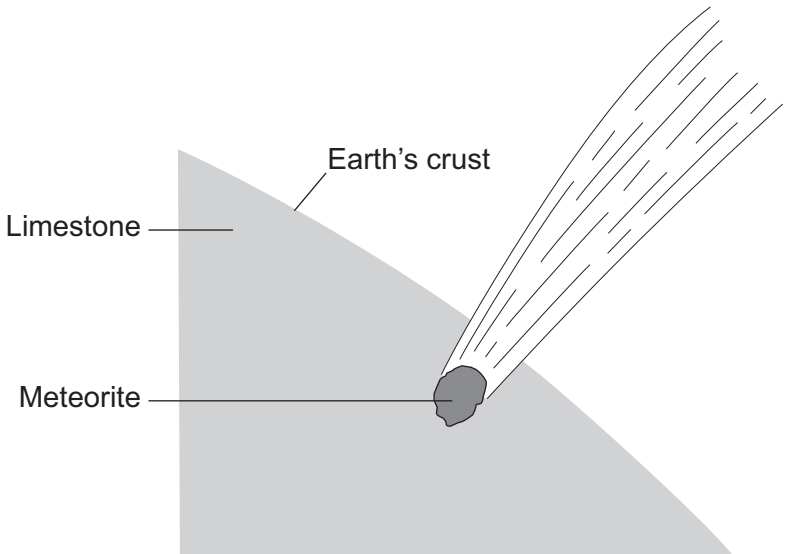
(3 marks)

Question 3 continues on the next page

4.9.2.3 Global climate change

Question 12 · continued

3 (c) Millions of years ago a large meteorite hit the Earth.
The meteorite heated limestone in the Earth's crust to a very high temperature.
The heat caused calcium carbonate in the limestone to release large amounts of carbon dioxide.



Draw a ring round the correct answer to complete each sentence.

3 (c) (i) Carbon dioxide was released because the calcium carbonate was

decomposed.
evaporated.
reduced.

(1 mark)

3 (c) (ii) More carbon dioxide in the Earth's atmosphere causes

acid rain.
global dimming.
global warming.

(1 mark)

7

4.9.2.3 Global climate change

Question 13

June 2011 | CHY1AP | Original Q1 | Legacy

QUESTION ONE

This question is about gases produced when a fuel burns.

Match gases, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A carbon dioxide

B carbon monoxide

C sulfur dioxide

D water vapour

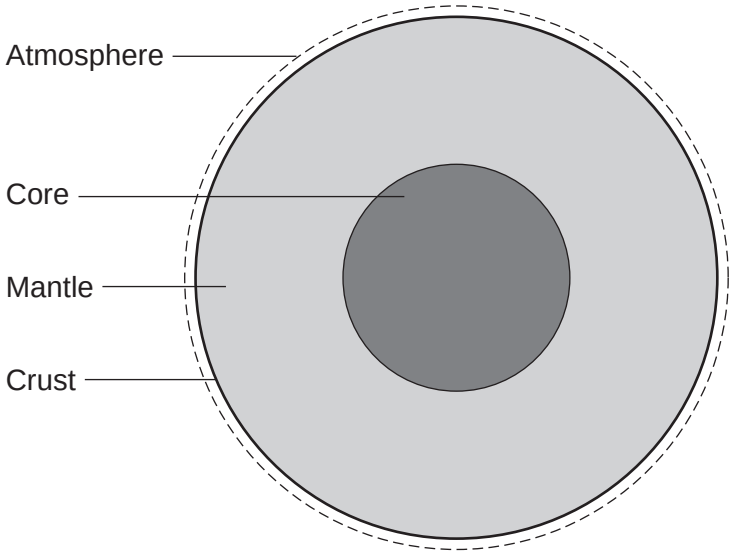
1	It is the main cause of acid rain.
2	It is only produced by incomplete combustion of the fuel.
3	It is a cause of global warming.
4	It is produced from hydrogen in the fuel.

4.9.2.3 Global climate change

Question 14

January 2013 | CH1FP | Original Q2 | Legacy

2 The diagram shows the layers in and around the Earth.



2 (a) Use the diagram above to help you to answer this question.

Draw **one** line from each statement to its correct layer.

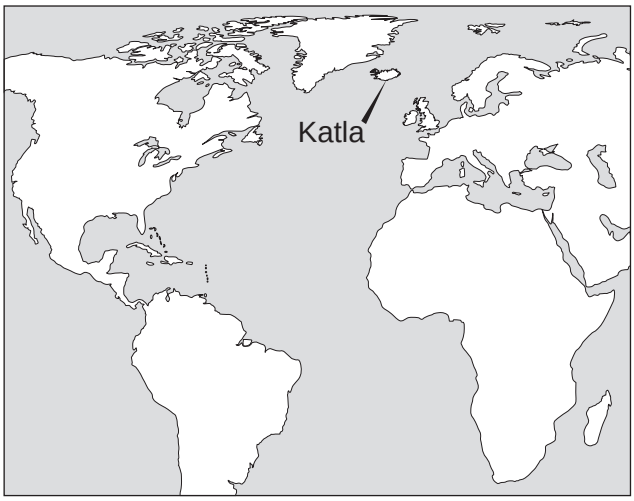
Statement	Layer
There are mountain ranges.	atmosphere
There are convection currents that cause earthquakes.	core
There is a mixture of gases.	crust
	mantle

(3 marks)

4.9.2.3 Global climate change

Question 14 · continued

2 (b) Iceland has many volcanoes.
Scientists are monitoring a volcano in Iceland, called Katla.



There has been an increase in the number of small earthquakes (tremors) around Katla.

2 (b) (i) Draw a ring around the correct answer to complete the sentence.

Iceland has volcanoes because it

- has low temperatures.
- is an island.
- is on a tectonic plate boundary.

(1 mark)

2 (b) (ii) People do not know when Katla will next erupt.

Tick (✓) the correct reason why.

Reason	Tick (✓)
Small earthquakes (tremors) near the volcano are happening more often.	
The last two eruptions happened a long time ago in October 1918 and in May 1860.	
Scientists cannot accurately predict when volcanic eruptions will occur.	

(1 mark)

Question 2 continues on the next page

4.9.2.3 Global climate change

Question 14 · continued

2 (c) Previous eruptions of Katla produced large amounts of solid ash particles and sulfur dioxide.

Use the correct answer to complete each sentence.

acid rain	**earthquakes**	**global dimming**	**global warming**

An environmental impact caused by solid ash particles is ..... .

An environmental impact caused by sulfur dioxide is ..... .

(2 marks)

7

4.9.2.3 Global climate change

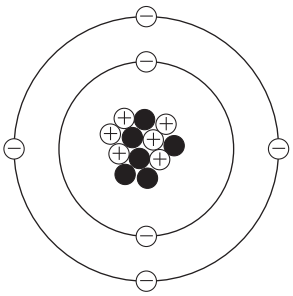
Question 15

June 2014 | CH1FP | Original Q1 | Legacy

1 Fossil fuels contain carbon.

1 (a) **Figure 1** represents a carbon atom.

Figure 1



Draw a ring around the correct answer to complete each sentence.

1 (a) (i) The name of the particle with a positive charge is

an electron.
a neutron.
a proton.

[1 mark]

1 (a) (ii) The centre of the atom is called the

energy level.
molecule.
nucleus.

[1 mark]

1 (a) (iii) Use the Chemistry Data Sheet to help you to answer this question.

Use the correct number from the box to complete each sentence.

[2 marks]

4	6	8	10	12

The mass number of this carbon atom is ☐

In the periodic table, carbon is in Group ☐

4.9.2.3 Global climate change

Question 15 · continued

1 (b) Coal is a fossil fuel.

A piece of coal contains:

- 80% carbon
- 9% oxygen
- 1% sulfur
- 5% hydrogen.

The rest of the coal is other elements.

1 (b) (i) What is the percentage of other elements in this piece of coal?

[1 mark]

..... %

1 (b) (ii) Coal burns in air to produce carbon dioxide, sulfur dioxide and water.

Draw **one** line from each product to the type of pollution caused by each product.

[3 marks]

Product	Type of pollution
Carbon dioxide	Acid rain
Sulfur dioxide	Global dimming
Water	Global warming
	No pollution

8

4.9.2.3 Global climate change

Question 16

June 2023 | 8462/2F | Original Q5

0 5 This question is about greenhouse gases and climate change.

0 5 . 1 Which **two** gases are greenhouse gases?

[2 marks]

Tick (✓) **two** boxes.

- Argon ☐
- Carbon dioxide ☐
- Nitrogen ☐
- Methane ☐
- Oxygen ☐

0 5 . 2 Why are greenhouse gases essential for supporting life on Earth?

[1 mark]

_____

_____

The percentage of greenhouse gases in the Earth's atmosphere today is increasing.

Many scientists think that this increase is causing global climate change.

0 5 . 3 What is a cause of the greenhouse effect?

Complete the sentence.

[1 mark]

Greenhouse gases absorb long wavelength _____.

4.9.2.3 Global climate change

Question 16 · continued

0 5 . 4 Which **two** are potential effects of global climate change?

[2 marks]

Tick (✓) **two** boxes.

- Fewer droughts ☐
- Fewer storms ☐
- Higher sea levels ☐
- Less coastal flooding ☐
- Melting polar ice ☐

0 5 . 5 Water vapour is a greenhouse gas.

The percentage by mass of water vapour in the Earth's atmosphere is 0.25%.

Calculate the mass of water vapour in 350 kg of the Earth's atmosphere.

Give your answer in grams.

[3 marks]

Mass = _____ g

9

4.9.2.3 Global climate change

Question 17

0 2 This question is about burning coal.

A power station has four coal-burning furnaces.

Each furnace burns 3000 kg of coal per minute.

Table 1 shows some information about this coal burning power station

Table 1

Number of furnaces in use	Mass of coal burned per minute in kilograms	Mass of sulfur dioxide produced per minute in kilograms	Mass of carbon dioxide produced per minute in kilograms
0	0	0	0
1	3000	100	7000
2	6000	200	14 000
3	9000	300	21 000
4	12 000	400	28 000

0 2 . 1 Carbon dioxide is a greenhouse gas.

What is the effect on the rate of global climate change of using more furnaces in this power station?

Complete the sentence.

Choose the answer from the box.

[1 mark]

decreases	**stays the same**	**increases**

Use **Table 1**.

The rate of global climate change _____.

4.9.2.3 Global climate change

Question 17 · continued

0 2 . 2 7000 kg of carbon dioxide are produced when 3000 kg of coal are burned.

Calculate the mass of carbon dioxide produced when 1 kilogram of coal is burned.

[2 marks]

Mass of carbon dioxide = _____ kg

0 2 . 3 Complete the sentence.

[1 mark]

Sulfur dioxide causes an environmental effect called acid _____ .

Question 2 continues on the next page

4.9.2.3 Global climate change

Question 17 · continued

Table 1 is repeated below.

Table 1

Number of furnaces in use	Mass of coal burned per minute in kilograms	Mass of sulfur dioxide produced per minute in kilograms	Mass of carbon dioxide produced per minute in kilograms
0	0	0	0
1	3000	100	7000
2	6000	200	14 000
3	9000	300	21 000
4	12 000	400	28 000

0 2 . 4 **Figure 3** shows how the mass of sulfur dioxide produced per minute varies with the mass of coal burned per minute.

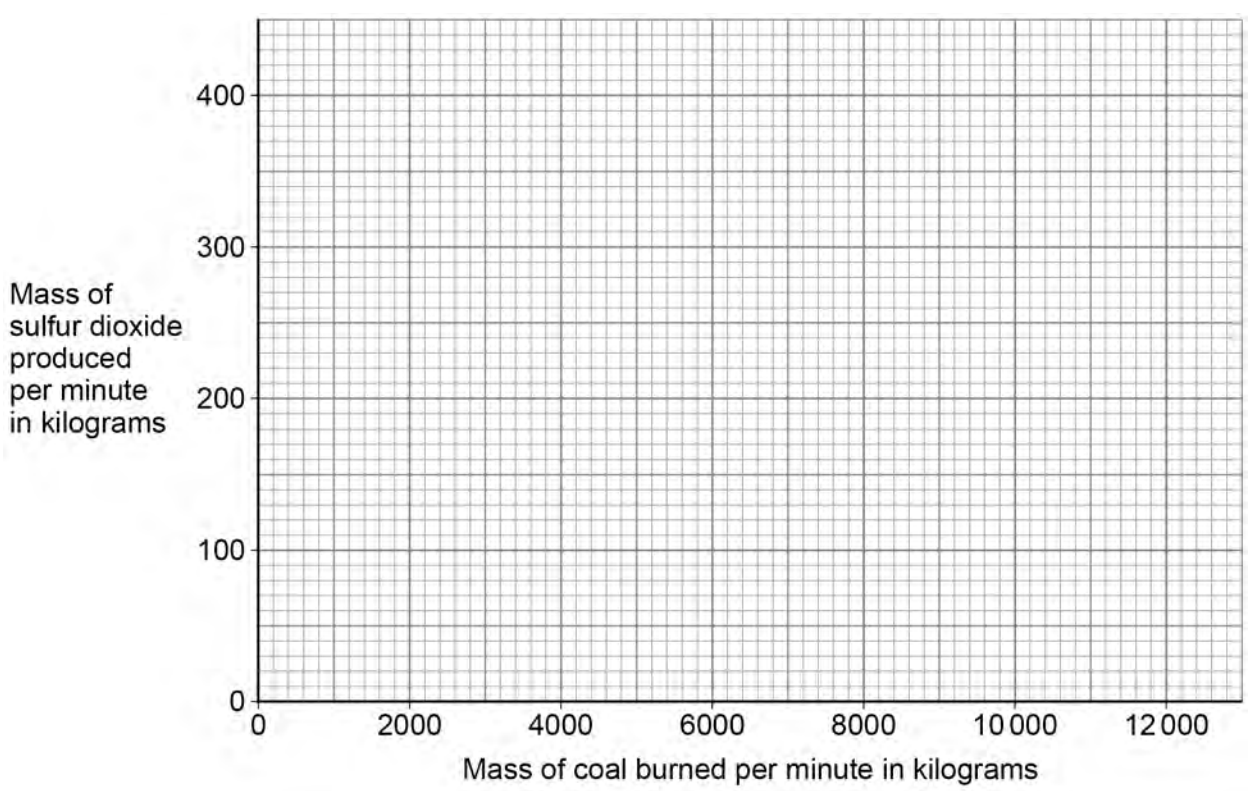
Complete **Figure 3**.

You should:

- plot data from **Table 1** on **Figure 3**
- draw a line of best fit.

[3 marks]

Figure 3



4.9.2.3 Global climate change

Question 17 · continued

0 2 . 5 Complete the sentence.

Use **Table 1** and **Figure 3**.

[1 mark]

As the mass of coal burned per minute increases, the mass of sulfur dioxide produced per minute _____ .

0 2 . 6 This power station also releases particulates into the air.

Complete the sentence.

[1 mark]

The release of particulates into the air causes global _____ .

9

Turn over for the next question