Do not write outside the box

0 6 This question is about the Earth's atmosphere.

0 6 . 1 Carbon dioxide is a greenhouse gas.

The greenhouse effect happens in four stages.

The four stages are:

Stage **A** Carbon dioxide stops longer wavelength radiation escaping

Stage **B** Radiation is absorbed by the Earth

Stage **C** Longer wavelength radiation is emitted

Stage **D** Shorter wavelength radiation enters the atmosphere

What is the correct order of stages **A**, **B**, **C** and **D**?

[1 mark]

Tick (✓) **one** box.

C, **A**, **B**, **D** ☐

C, **D**, **B**, **A** ☐

D, **B**, **C**, **A** ☐

D, **C**, **B**, **A** ☐

Question 6 continues on the next page

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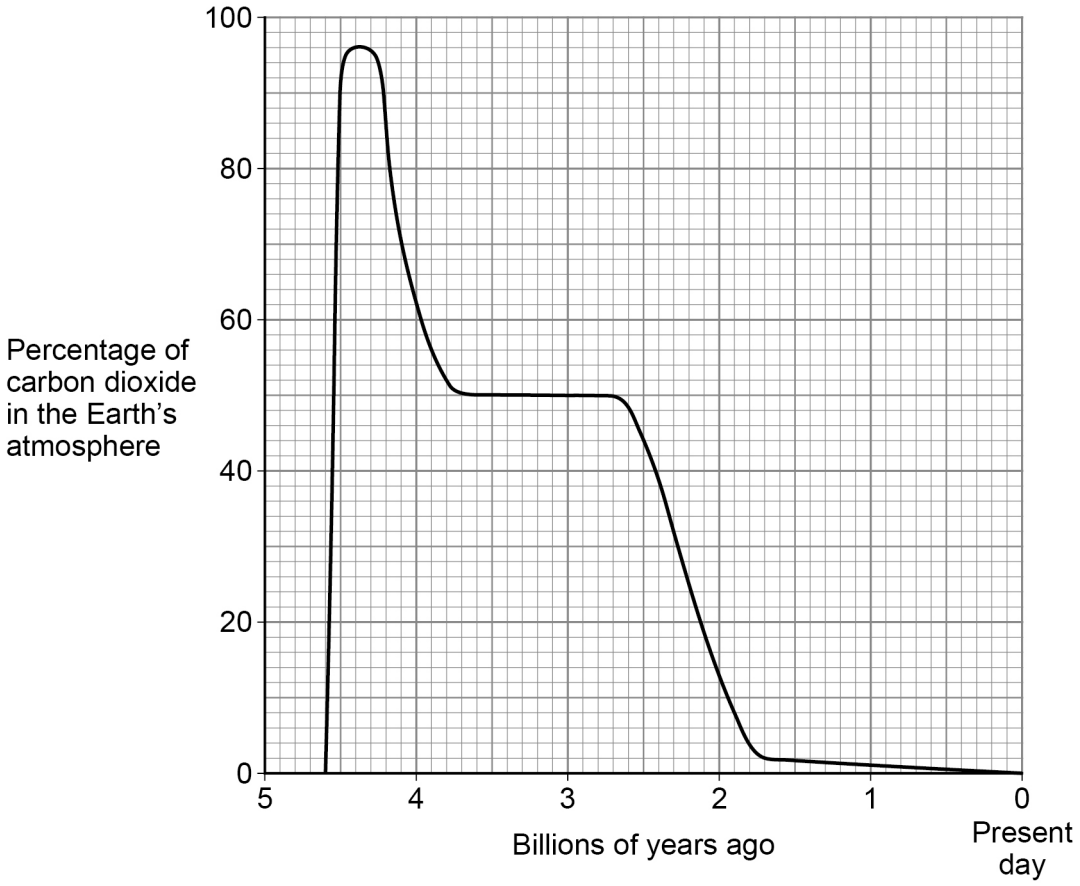
Figure 6 shows how the percentage of carbon dioxide in the Earth's atmosphere has changed over 4.6 billion years.

Figure 6



0 6 . 2 The mass of gas in Earth's atmosphere remains constant at 5.15×10^{18} kg

Determine the maximum mass of carbon dioxide that was in the Earth's atmosphere.

Use **Figure 6**.

[3 marks]

Mass of carbon dioxide = _____ kg

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0 6 . 3 Describe the processes that have caused the main **changes** in the percentage of carbon dioxide in the Earth's atmosphere over the last 4.6 billion years.

Use **Figure 6**.

[6 marks]

10

Turn over for the next question

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	**D B C A**		1	AO1 5.9.2.1
06.2	(maximum % =) 96 (%)	allow a value in the range 95 to 97 (%)	1	AO2 5.9.1.1 5.9.1.2 5.9.1.4 5.9.2.2
	(maximum mass =) $\frac{96}{100} \times 5.15 \times 10^{18}$	allow correct use of incorrectly determined percentage	1	
	$= 4.94 \times 10^{18}$ (kg)	allow 4.944×10^{18} (kg)	1	

Question	Answers	Mark	AO / Spec. Ref.
06.3	**Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.	4–6	AO1 5.9.1.1 5.9.1.2 5.9.1.3 5.9.1.4 5.9.2.2
	Level 1: Facts, events or processes are identified and simply stated but their relevance is not clear.	1–3	
	No relevant content	0	
	Indicative content: during the first billion years of the Earth's existence carbon dioxide levels increased due to • intense volcanic activity from 4.4 to 2.7 billion years ago carbon dioxide levels decreased as • water vapour condensed to form oceans • carbon dioxide dissolved in the oceans • carbonates precipitated • sedimentary rocks formed from 2.7 to 1.7 billion years ago carbon dioxide levels decreased as • algae appeared • plants evolved • algae and plants photosynthesised • sedimentary rocks formed • fossil fuels formed over the past 100-200 years carbon dioxide levels increased due to • the industrial revolution • human activity • the burning of fossil fuels		

Total			10