THE ATMOSPHERE 2

MARK SCHEME

Q1.

Question	Answer	Extra information	Marks
(a)(i)	(thermal) decomposition	allow it breaks down accept symbol equation or in words allow reaction with SO_2 (to form CO_2)	1
(ii)	calcium carbonate / calcium oxide / limestone / quicklime / it reacts with sulfur dioxide / forms calcium sulfate	accept it neutralises sulfur dioxide / neutralisation ignore references to sulfur do not accept 'calcium reacts with…'	1
(b)	by incomplete / partial combustion (of the fuel) insufficient oxygen / air (to burn fuel)	 accept insufficient oxygen / air to burn fuel completely for 2 marks if no other marks awarded accept $C + CO_2 \rightarrow 2CO$ or $2C + O_2 \rightarrow 2CO$ or in words for 1 mark	1 1
(c)(i)	any two from: • (CO_2) from the atmosphere • (CO_2) taken in millions of years ago or early (atmosphere) • (CO_2) was used to form the shells / skeletons of marine organisms / fossil fuels	 allow thousands / billions allow rocks formed millions of years ago accept sedimentary rocks allow used to form correct named fossil fuel ignore limestone	2
(ii)	any one from: • (increases / enhances) global warming	 allow greenhouse gas / effect do not accept ozone layer / acid rain / global dimming ignore consequences of global	1

	• is additional carbon dioxide or not able to be absorbed by oceans / seas or used by (green) plants • acidification of sea water	warming	
Total marks			7

Q2.

Question	Answer	Extra information	Marks
(i)	(carbon dioxide in the Earth's early) atmosphere	accept from volcanoes (millions of years ago) or from dead plants / animals allow dead sea creatures ignore shells	1
(ii)	increase in burning / use of fossil fuels locked up carbon (carbon dioxide) is released	 allow carbon / carbon dioxide from millions of years ago is released accept extra carbon dioxide is not 'absorbed' (by the carbon cycle)	1 1
Total marks			3

Q3.

Question	Answer	Extra information	Marks
(a)	any **two** from: • sulfur dioxide • causes acid rain • consequence of acid rain e.g. kills fish / plants	 accept sulphur dioxide / sulphur oxide / SO_2 ignore other comments eg global warming / ozone / global dimming / greenhouse effect	2
(b)	any **three** explanations from: <u>for recycling</u> • less acid rain (pollution) • copper reserves last longer / conserved or do not run out • energy for extraction (saved)		3

	or less energy required • less mining / quarrying • less waste (copper) / electrical appliances dumped or less landfill <u>against recycling</u> • collection problems • transport problems • difficult to separate copper from appliances • energy used to melt the collected copper	ignore electrolysis / pollution ignore ideas about less machinery / plant ignore idea of cost	
Total marks			5

Q4.

Question	Answer	Extra information	Marks
(a)	any **two** from: **carbon dioxide has decreased due to:** • plants / micro-organisms / bacteria / vegetation / trees • photosynthesis • 'locked up' in (sedimentary) rocks / carbonates / fossil fuels • dissolved in oceans **oxygen has increased due to:** • plants / bacteria / micro organisms / vegetation / trees • photosynthesis **nitrogen increased due to:** • ammonia reacted with oxygen • bacteria / micro organisms	asks for cause therefore no marks for just describing the change must link reason to a correct change in a gas accept idea of 'used' to indicate a decrease ignore respiration ignore volcanoes accept idea of 'given out / produced' ignore respiration accept idea of 'given out / produced'	2

		ignore (increase in) use of fossil fuels / deforestation	
(b)	(because methane's) boiling point is greater than the average / surface temperature or Titan's (average / surface) temperature is below methane's boiling point any methane that evaporates will condense	ignore references to nitrogen or water accept boils for evaporates accept cooling and produce rain for condensing	1 1
Total marks			4

Q5.

Question	Answer			Marks
	A	nitrogen dioxide	4	1
	B	carbon monoxide	3	1
	C	carbon dioxide	2	1
	D	soot (carbon)	1	1
Total marks				4

Q6.

Question	Answer	Extra information	Marks
(a)	1		1
(b)	2		1
(c)	3		1
(d)	4		1
Total marks			4

Q7.

Question	Answer	Extra information	Marks
(a)	2		1
(b)	3		1
(c)	3		1
(d)	1		1
Total marks			4

Q8.

Question	Answer			Marks
	A	Carbon dioxide	3	1
	B	Carbon monoxide	2	1
	C	Sulfur dioxide	1	1
	D	Water vapour	4	1
Total marks				4

Q9.

Question	Answer			Marks
	A	will benefit the quarry owners	4	1
	B	will benefit people living close to the quarry	1	1
	C	will cause problems for the quarry owners	3	1
	D	will cause problems for local people	2	1
Total marks				4