AQA GCSE Chemistry | 8462

SPECIFICATION POINT 4.9.2.3

Global climate change

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**7**
Available paper years	**2007–2023**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.9.2.3 Global climate change

Answer 01 · Mark scheme

November 2007 | CHY1B | Original Q4 | Legacy

Four	**1**	**2**	**1**	**2**

Answer 02 · Mark scheme

January 2008 | CHY1H | Original Q5 | Legacy

No matching mark scheme was available in the supplied archive for this question.

Answer 03 · Mark scheme

March 2009 | CHY1AP | Original Q7 | Legacy

Seven	**3**	**3**	**4**	**4**

Answer 04 · Mark scheme

June 2009 | CHY1AP | Original Q6 | Legacy

Six	**2**	**4**	**2**	**3**

Answer 05 · Mark scheme

November 2009 | CHY1AP | Original Q5 | Legacy

Five	**2**	**4**	**4**	**1**

4.9.2.3 Global climate change

Answer 06 · Mark scheme

June 2016 | CH1HP | Original Q5 | Legacy

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
5(a)	vegetable oils / biofuels combust/burn releasing carbon dioxide	ignore crops burn releasing carbon dioxide do **not** allow fuel/oil does not release CO_2/releases very little CO_2 when burned	1	AO2 1.4.3 b; 1.6
	the growing plants (from which the vegetable oil is extracted) absorb / take in carbon dioxide		1	
	so there is no net increase in the percentage of carbon dioxide in the atmosphere/air	allow carbon instead of carbon dioxide award **3** marks for "plants take in CO_2 when they are growing and the fuel/oil only releases this CO_2 when it is burned". if no other mark awarded allow **1** mark for stating that carbon dioxide causes global warming or that vegetable oils are carbon neutral	1	
5(b)		ignore health issues		AO1
	react with hydrogen or hydrogenation	allow adding hydrogen do **not** allow use of water/hydration	1	1.6.3 b
	in the presence of a nickel catalyst		1	
	at 60 ^{o}C	allow 50-150 ^{o}C	1	
	because vegetable oils are unsaturated or have carbon-carbon double bonds	allow to make them saturated	1	
	(vegetable oils are hardened) to make them solid at room temperature **or** to make them useful as spreads/spreadable	allow to give higher melting point allow to make margarine do **not** allow to make butter allow reverse argument, vegetable oils are liquid/runny or not spreadable	1	
Total			**8**	

4.9.2.3 Global climate change

Answer 07 · Mark scheme

June 2023 | 8462/2H | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	water vapour		1	AO1 4.9.2.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2	(increased population so) more energy required (so) more (fossil) fuels burned **OR** (increased population so) more farmland required (1) (so) more deforestation (1)	allow (increased population so) more transport required allow a named fossil fuel	1 1	AO3 4.9.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	(increased population so) more food required (so) more methane-producing food production **OR** (increased population so) more waste produced (1) (which) produces more methane on decomposition (1)	 allow more use of beef cattle (in food production) allow more rice grown	1 1	AO3 4.9.2.2

4.9.2.3 Global climate change

Answer 07 · Mark scheme

June 2023 | 8462/2H | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	any **two** from: • melting ice • rising sea levels • flooding • extremes of weather • loss of habitats	ignore global warming do **not** accept acid rain do **not** accept global dimming do **not** accept references to ozone	2	AO1 4.9.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	there may be other reasons for changes in the (mean) temperature (of the atmosphere at the Earth's surface)	allow difficult to model allow the earth goes through cycles of temperature change	1	AO3 4.9.2.2

Total Question 4	8

4.9.2.3 Global climate change

Answer 07 · Examiner comments

June 2023 | 8462/2H | Original Q4

Question 4 (standard and standard / high demand)

04.1 Around three-quarters of students knew that water vapour is a greenhouse gas. Nitrogen was the most popular distractor.

04.2 Students who gained credit, usually did so by identifying that an increase in population creates an increased demand for energy. There were many references to the increase in the need for transportation in its various (specified) forms, which was creditworthy. However, students often did not gain the second mark as they failed to link the need for more energy to the outcome, that more (fossil) fuels are burned. Some students incorrectly stated that increased respiration by humans has caused the increase in the concentration of atmospheric carbon dioxide. Around 30% of students scored both marks.

04.3 Over half of the students scored both marks. Students who gained only one mark usually did so because they simply stated that more cattle farming causes an increase in methane concentration, but did not explain that this was a result of an increased demand for food.

04.4 This question was answered well, with more than 70% of students giving two effects. Students who did not gain credit often referred to climate change / the greenhouse effect / global warming, without describing the effect.

04.5 Many students gave answers that were too vague, such as there is insufficient data or evidence. The usual creditworthy answers were in terms of previous cooling / warming cycles in the Earth's past. Only around one-quarter of students gained a mark here.