AQA GCSE Chemistry | 8462

SPECIFICATION POINT 4.9.1.3

How oxygen increased

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**10**
Available paper years	**2008–2025**

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.

4.9.1.3 How oxygen increased

Answer 01 · Mark scheme January 2008 | CHY3F | Original Q6 | Legacy

Question 6

question	answers	extra information	mark
(a)(i)	smooth curve through all points over full range finishing between 6.4 and 5.4 at 50°C		1
(a)(ii)	5.6 **or** from their graph		1
(a)(iii)	10 – 5.6 = 4.4	their reading at 15° - their a(ii) answer from their figures	1 1
(a)(iv)	yes: the value at 15°C because have values either side owtte **or** no: more error in a smaller number owtte	accept converse answers based on 50°C accept converse answers based on 50°C	1
(b)(i)	balanced view / involving people / debate / gather information / democracy	owtte any sensible answer ignore 'trout might die'	1
(b)(ii)	undue weight / bias may be given to high status and very experienced people less experienced / lower status may reduce status of enquiry	owtte any sensible answer	1

continued…

4.9.1.3 How oxygen increased

CHY3F

Question 6 continued…

question	answers	extra information	mark
(b)(iii)	(A) Management: any **one** from: • small amounts may be fine • can cope for short periods • could spread throughout the day • fish still getting (enough) oxygen • rate of photosynthesis could be increased to balance loss of oxygen • water will cool down (quickly)	any sensible answer	1
	(B) Council: any **one** from: • any rise in temperature would reduce / affect (dissolved) oxygen • water will still be too hot • trout will die above 26°C	any sensible answer	1
total			9

4.9.1.3 How oxygen increased

Answer 02 · Mark scheme March 2008 | CHY1BP | Original Q1 | Legacy

One	**A**	argon (noble gas)	**2**
	B	carbon dioxide	**3**
	C	nitrogen	**1**
	D	oxygen	**4**

Answer 03 · Mark scheme June 2008 | CHY1BP | Original Q3 | Legacy

Three	**A**	Carbon dioxide	**2**
	B	Nitrogen	**1**
	C	Oxygen	**3**
	D	Water vapour	**4**

Answer 04 · Mark scheme June 2011 | CHY1BP | Original Q8 | Legacy

Eight	**3**	**3**	**3**	**2**

4.9.1.3 How oxygen increased

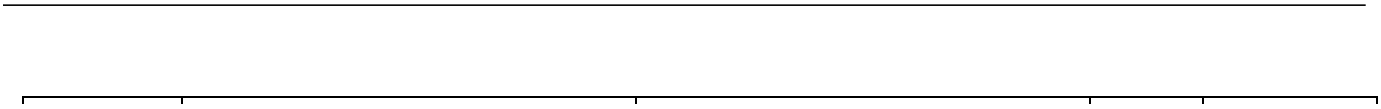
Answer 05 · Mark scheme June 2017 | CH1FP | Original Q1 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	dissolved locked up		1 1	**AO1** 1.7.2g;h
1(a)(ii)	photosynthesis		1	**AO1** 1.7.2f
1(b)(i)	argon - 1 nitrogen - 80 oxygen - 20	each mark is awarded for <u>one</u> line from each gas to the correct percentage	1 1 1	**AO1** **AO3** 1.7.2a
1(b)(ii)	(burning) fossil fuels	allow deforestation **or** a description allow (increase in) transport / factories ignore more people **or** population (increase)	1	**AO1** 1.7.2i
Total			**7**	

4.9.1.3 How oxygen increased

Answer 05 · Mark scheme

June 2017 | CH1FP | Original Q1 | Legacy

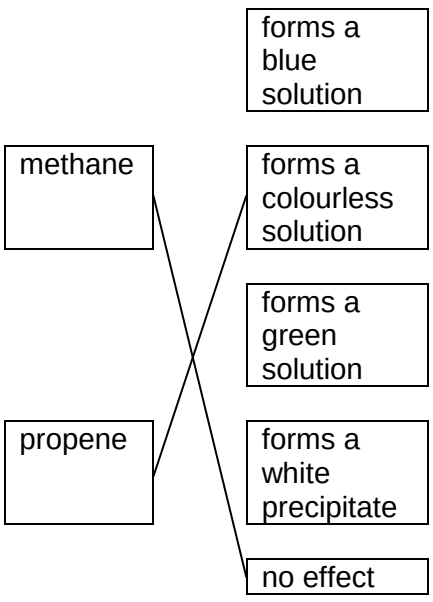


4.9.1.3 How oxygen increased

Answer 06 · Mark scheme

June 2019 | 8462/2F | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	nitrogen **and** methane	in either order, both required for mark allow phonetic spellings allow N_2 for nitrogen allow CH_4 for methane	1	AO2 4.9.1.1
04.2	nitrogen bar to 78% oxygen bar to 21%	ignore width of bars ignore additional bars	1 1	AO2 4.9.2.2
04.3	Titan's atmosphere contains too little carbon dioxide.		1	AO3 4.9.1.3
04.4	long wavelength radiation is reflected back to the surface of Titan.		1	AO1 4.9.2.1
04.5		an extra line from a gas to an effect on bromine water negates that mark	1 1	AO1 4.7.1.4

4.9.1.3 How oxygen increased

Answer 06 · Mark scheme

04.6	$\frac{7 \times 21}{3}$ = 49 (g)	an answer of 49 (g) scores **2** marks.	1 1	AO2 4.7.2.2
Total			**9**	

4.9.1.3 How oxygen increased

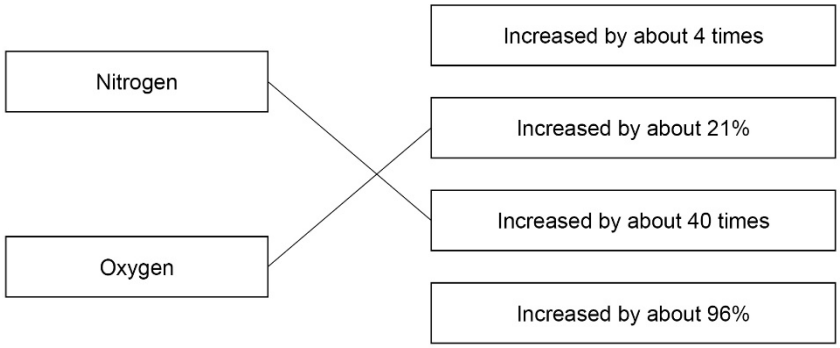
Answer 07 · Mark scheme

November 2021 | 8462/2F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	4.6 billion years ago		1	AO1 4.9.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	0.92 (%)		1	AO2 4.9.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	 do **not** accept more than one line from a box on the left		1 1	AO1 AO2 4.9.1.1 4.9.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	carbon dioxide dissolving in sea water formation of sedimentary rocks		1 1	AO1 4.9.1.2 4.9.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	carbon dioxide (+ water →) (→ glucose +) oxygen	allow CO_2 allow O_2	1 1	AO1 4.9.1.3

4.9.1.3 How oxygen increased

Question 1 continued

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	evidence / proof		1	AO1 4.9.1.2

Total			**9**

4.9.1.3 How oxygen increased

Answer 08 · Mark scheme

June 2023 | 8462/2F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	Mars		1	AO1 4.9.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	20%		1	AO1 4.9.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	algae and plants evolved photosynthesis took place		1 1	AO1 4.9.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	(*y*-axis labelled) 5, 10, 15, (20) oxygen bar drawn to 16%	allow (*y*-axis labelled) 4, 8, 12, 16, (20) ignore correct intermediate values allow a tolerance of ± ½ a small square	1 1	AO2 4.9.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	test tube **A**		1	AO2 4.6.1.2

4.9.1.3 How oxygen increased

Answer 08 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	a glowing splint		1	AO1 4.8.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.7	manganese dioxide is a catalyst in this reaction		1	AO2 4.6.1.4

Total Question 1	9

4.9.1.3 How oxygen increased

Answer 09 · Mark scheme

June 2024 | 8462/2F | Original Q4

Question 4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	percentage of nitrogen increases until 2.3 billion years then remains constant	 allow a value in the range 2.1 to 2.4 billion years allow until 80%	1 1 1	AO2 4.9.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.2	the percentage of carbon dioxide decreased		1	AO1 4.9.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.3	light		1	AO1 4.9.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.4	algae plants		1 1	AO1 4.9.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.5	cellulose starch		1 1	AO1 4.7.3.4

4.9.1.3 How oxygen increased

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.6	1.4×10^{11}		1	AO2 4.3.1.2 4.7.3.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.7	70 000 000 000		1	AO2 4.7.3.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.8	helix		1	AO1 4.7.3.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.9	4		1	AO1 4.7.3.4

Total Question 4	**13**

4.9.1.3 How oxygen increased

Answer 10 · Mark scheme

June 2025 | 8462/2F | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	line of best fit		1	AO2 4.9.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	40 (%)		1	AO2 4.9.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	carbon dioxide was dissolved in oceans		1	AO3 4.9.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.4	nitrogen was released during volcanic activity		1	AO3 4.9.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.5	2.5 billion years ago		1	AO3 4.9.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.6	ammonia methane		1 1	AO1 4.9.1.2

4.9.1.3 How oxygen increased

Answer 10 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.7	photosynthesis		1	AO1 4.9.1.3

Total Question 6	**8**

4.9.1.3 How oxygen increased

Answer 08 · Examiner comments — June 2023 | 8462/2F | Original Q1

Question 1 (Low demand)

01.1 Just over three quarters of students identified the correct planet, with the other distractors being roughly equally selected.

01.2 Just over half of the students correctly identified the percentage of oxygen in the atmosphere. 80% was the most common incorrect response.

01.3 Around half of the students gained two marks. 'Carbonate sediments formed in oceans' was the most common distractor. Some students did not read the rubric correctly and only ticked one box.

01.4 More than a half of the students gained 2 marks for correctly completing the scale on the *y*- axis and drawing a correct bar. The most common incorrect response was to omit the scale on the *y*-axis. A minority of students achieved no marks for the bar chart as they had included a non-linear scale.

Answer 08 · Examiner comments — June 2023 | 8462/2F | Original Q1

01.5 This question was answered very well with more than 90% of students correctly identifying which test tube was at the highest temperature. A small minority chose test tube B, which produced the fewest bubbles.

01.6 This was also very well answered, with more than two thirds of students correctly identifying the test for oxygen. 'Bromine water' was the most common distractor.

01.7 Just over 50% of students recognised that a catalyst does not appear in a chemical reaction. 'Manganese dioxide is used up during this reaction' was a powerful distractor.

4.9.1.3 How oxygen increased

Answer 09 · Examiner comments June 2024 | 8462/2F | Original Q4

Question 4 (low and standard demand)

04.1 One in four students obtained all three marks in this question with two out of five obtaining two marks. The most frequently seen reason for not obtaining full marks was to incorrectly determine the date in billions of years at which the percentage of nitrogen in the atmosphere became constant. Students need to be exposed to as many examples as possible of explaining trends as some struggled to express the percentage of nitrogen becoming constant, describing the line as becoming, steady, calm, stable, stopping or going at a constant speed or using vague statements about 'it.'

04.2 Almost 80% of students correctly identified that the percentage of carbon dioxide decreased.

04.3 Well over 80% of students correctly identified light as being the energy source for photosynthesis.

04.4 Nearly 80% of students identified the two organisms that produce oxygen. A further 15% correctly identified one organism, usually plants.

04.5 Less than 30% of students could correctly identify the two natural polymers produced from glucose. It is important that students read the question carefully as there was a significant number of students who ticked only one box rather than the two requested.

04.6 Well over 75% of students correctly expressed the relative formula mass of DNA in standard form.

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Answer 09 · Examiner comments June 2024 | 8462/2F | Original Q4

04.7 Only one in two students were able to correctly calculate the relative formula mass of each polymer chain in DNA. The most popular incorrect distractor was 140 000 000 000 where the student had failed to realise that the DNA molecule was comprised of two chains.

04.8 Just under 75% of students correctly described the shape of a DNA molecule as a double helix. The most common incorrect response was double bond.

04.9 Less than 35% of students were able to correctly identify the number of different nucleotides present in a molecule of DNA.

4.9.1.3 How oxygen increased

Answer 10 · Examiner comments June 2025 | 8462/2F | Original Q6

Question 6

06.1 Nearly 80% of students completed the line of best fit.

06.2 Two thirds of students correctly read 40% from the graph. The most common incorrect response was 24%, which corresponds to 3.25 billion years ago.

06.3 3 in 5 students correctly identified that carbon dioxide dissolving in water caused the concentration to drop initially.

06.4 Over half of students knew that the percentage of nitrogen increasing in the atmosphere was caused by volcanic action.

06.5 Knowledge of the changes of the atmosphere over time was known by fewer than half of the students.

06.6 Fewer than 20% of students identified both gases in the Earth's early atmosphere. Hydrogen and helium were the two distractors that were seen most.

06.7 Over half of students correctly identified the process as photosynthesis. Respiration and combustion were the two most common incorrect answers.