AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 5.8.2.1

Test for hydrogen

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**3**
Available paper years	**2020–2025**

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.

5.8.2.1 Test for hydrogen

Answer 01 · Mark scheme November 2020 | 8464/C/2F | Original Q6

06.1	$C_3H_8 + 5\ O_2 \rightarrow 3\ CO_2 + 4\ H_2O$	allow multiples	1	AO2 5.1.1.1 5.7.1.3
06.2	(bubble gas through) lime water turns milky / cloudy / white **or** white precipitate forms	MP2 is dependent upon correct response in MP1 allow (bubble gas through) calcium hydroxide (solution)	 1 1	AO1.2 5.8.2.3
06.3	C_3H_6		1	AO2 5.1.1.1 5.7.1.4
06.4	burning / lit splint burns with a (squeaky) pop sound	MP2 is dependent upon correct response in MP1 allow flame do **not** accept glowing splint allow pops	 1 1	AO1 5.8.2.1
06.5	bromine (water) (colour change) orange (to) colourless	do **not** accept bromide allow 1 mark for colourless (to) orange ignore clear	1 1 1	AO1 5.7.1.4
Total			**9**	

5.8.2.1 Test for hydrogen

Answer 01 · Mark scheme

November 2020 | 8464/C/2F | Original Q6

5.8.2.1 Test for hydrogen

Answer 02 · Mark scheme

June 2023 | 8464/C/2F | Original Q1

Question 1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.1	a limited resource		1	AO1 5.7.1.1 5.10.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.2	plankton		1	AO1 5.7.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.3	mixture		1	AO1 5.7.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.4	evaporate condense		1 1	AO1 5.2.2.1 5.7.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.5	fuels		1	AO1 5.7.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.6	burning splint		1	AO1 5.8.2.1

5.8.2.1 Test for hydrogen

Answer 02 · Mark scheme

June 2023 | 8464/C/2F | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
01.7	(percentage =) $\frac{1.53 \times 100}{5.20}$ = 29.42 = 29.4 (%)	 allow a correctly calculated answer to 3 significant figures from an incorrect calculation which uses values given in the question	1 1 1	AO2 5.7.1.2

Total Question 1	10

5.8.2.1 Test for hydrogen

Answer 03 · Mark scheme

June 2025 | 8464/C/2F | Original Q3

Question 3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	formulation		1	AO1 5.8.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.2	14		1	AO2 5.1.1.1 5.8.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.3	carbon monoxide is a toxic gas		1	AO1 5.9.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.4	$2\,CH_4O + 3\,O_2 \rightarrow 2CO_2 + 4\,H_2O$	allow multiples	1	AO2 5.1.1.1 5.3.1.1 5.7.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.5	(test) add a burning splint (result) (hydrogen burns with) a pop sound	do **not** accept glowing splint MP2 is dependent on MP1 being awarded	1 1	AO1 5.8.2.1

5.8.2.1 Test for hydrogen

Answer 03 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.6	any **two** from: • melting ice caps • rising sea levels • more flooding • extremes of weather • increase in droughts • increase in wildfires • loss of habitats • reduction in biodiversity • change in migration patterns	allow increase in frequency of storms allow desertification ignore global warming do **not** accept acid rain do **not** accept global dimming do **not** accept deforestation do **not** accept natural disasters do **not** accept references to ozone	2	AO1 5.9.2.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.7	colour change (from blue to pink)		1	AO2 5.6.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.8	endothermic	allow (thermal) decomposition	1	AO2 5.6.2.2

Total Question 3	10

5.8.2.1 Test for hydrogen

Answer 02 · Examiner comments June 2023 | 8464/C/2F | Original Q1

Question 1

01.1 Nearly three quarters of students were able to identify that a finite resource was a limited resource.

01.2 Around two thirds of students knew that coal came from plankton.

01.3 Just over half of students identified crude oil as a mixture.

01.4 Nearly four in ten students successfully identified both changes of state during fractional distillation. Three quarters of students gained at least one mark. There were few patterns in incorrect responses, however, the most common was evaporate and condense in the wrong order.

01.5 Just over half of students identified fuels, with a similar number choosing either of the two distractors.

01.6 Gas tests are not well known by students. Under half were able to identify the burning splint as a test for hydrogen.

01.7 Around a quarter of students gained all three marks for this percentage calculation. Fewer than one in ten correctly calculated the percentage without going on to expressing it to three significant figures. The remaining students attempted to calculate a percentage, frequently missing multiplying by 100, or getting the expression upside down. One in ten of students gained a mark for giving the answer to the calculation they had done to three significant figures.

Answer 03 · Examiner comments June 2025 | 8464/C/2F | Original Q3

Question 3 (Low and Standard demand)

03.1 Well over half of all students recognised screenwash as a formulation.

03.2 Nearly three quarters of students were able to work out the number of atoms in one molecule of glycerol correctly as 14.

03.3 Most students could state that carbon monoxide is a toxic gas. The most common incorrect response was that carbon monoxide is a greenhouse gas.

03.4 Many students were able to correctly balance the equation. A significant number however incorrectly added an H or CH in front of the CO_2
There was clear evidence of many pupils working out the numbers of individual atoms to correctly balance the equation.

03.5 Many students remembered that hydrogen burns with a pop or squeaky pop however far fewer identified that a burning/lit splint was needed in order for that to happen, therefore neither mark could be awarded.

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5.8.2.1 Test for hydrogen

Answer 03 · Examiner comments June 2025 | 8464/C/2F | Original Q3

The most common incorrect response referred to using a glowing splint, confusing the test for oxygen and hydrogen.
When students correctly identified a burning/lit splint as the correct test, most also then went on to state the correct result and gained both marks.

03.6 Many students were able to correctly give one effect of global climate change, but fewer were able to correctly give two. The most common creditworthy responses were for identifying 'melting ice caps' and 'rising sea levels'.
Many responses referring to floods, storms and wildfires but could not gain credit as they were not comparative. The question was looking for the idea that there would be '*more* floods' for example, as floods happen without climate change.
Very few students answered in terms of a reduction in biodiversity or changes to migration patterns.

03.7 Many students correctly recognised that the anhydrous cobalt chloride would change colour or described the correct colour change. Incorrect responses often referred to the water or solution changing colour, or included additional observations, such as 'fizzing' or 'bubbles'.

03.8 Many students correctly identified the type of reaction as being endothermic.