AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 5.8.1.1

Pure substances

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**2**
Available paper years	**2023–2024**

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.

5.8.1.1 Pure substances

Answer 01 · Mark scheme

June 2023 | 8464/C/2F | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	$CH_4 + \mathbf{2}\,O_2 \rightarrow CO_2 + \mathbf{2}\,H_2O$		1	AO2 5.7.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	hydrocarbon molecules in petrol have fewer carbon atoms than those in diesel petrol has a lower boiling point (range) than diesel	allow converse throughout allow petrol is more flammable than diesel allow petrol is less viscous than diesel	1 1	AO3 5.7.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	oxygen		1	AO1 5.8.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4	air	allow the atmosphere allow from volcanoes	1	AO1 5.9.1.1 5.9.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	global dimming		1	AO2 5.9.3.1

5.8.1.1 Pure substances

Answer 01 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	(carbon monoxide is) colourless **or** (carbon monoxide is) odourless	ignore clear	1	AO1 5.9.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.7	(diesel) burns at a high temperature **or** (diesel) burns at a temperature greater than 100 °C		1	AO2
	(which is) above the boiling point of water		1	AO3 5.2.2.1 5.9.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.8	sulfur dioxide (is produced when diesel is burnt)		1	AO1 5.9.3.1 5.9.3.2
	(which causes) acid rain		1	
	(which results in) any **one** from: • damage to buildings / statues / bridges • damage to trees / plants • damage to aquatic life • acidification of lakes / rivers / soil • respiratory problems	allow (which affects) asthma	1	

Total Question 5	12

5.8.1.1 Pure substances

Answer 02 · Mark scheme

June 2024 | 8464/C/2F | Original Q2

Question 2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.1	(substance) **B** (**B**) has a specific melting point	allow 61 (°C) allow all the other substances melted over a range of temperatures MP2 is dependent on MP1 being awarded	1 1	AO3 5.8.1.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.2	(from) white (to) blue	 allow **1** mark from blue to white	1 1	AO1 5.6.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.3	(the symbol / sign) ⇌	allow the symbol with arrows both ways	1	AO2 5.6.2.1 5.6.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.4	6		1	AO2 5.1.1.1 5.6.2.2

5.8.1.1 Pure substances

Answer 02 · Mark scheme

June 2024 | 8464/C/2F | Original Q2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
02.5	(test) damp (blue / red) litmus paper (result) (litmus paper) is bleached **or** (litmus paper) turns white	 ignore paper turns red	1 1	AO1 5.8.2.4

Total Question 2	8

5.8.1.1 Pure substances

Answer 01 · Examiner comments

June 2023 | 8464/C/2F | Original Q5

Question 5

05.1 Around a third of students successfully balanced the equation. Having to balance two numbers in the equation led to many students trying to add other atoms, usually C and/or H to the equation.

05.2 One in five students gained both marks for comparing petrol and diesel. A further third gained one mark. On this occasion, students needed to interpret what the table headings meant, so many were not able to gain credit as they referred to the range of numbers of carbons, rather than the number of carbons and similarly, though more infrequent, for the boiling points.

05.3 Three in five students identified oxygen as the common element in the compounds released from a car engine.

05.4 Only 15% of students were able to identify that nitrogen came from the air. Much more common suggestions were from the engine or the diesel fuel.

05.5 This question tested a little known part of the specification, with fewer than one in twenty identifying global dimming as a consequence of particulates in the atmosphere. By far the most common incorrect response was for global warming.

05.6 Just below half of students could answer that carbon monoxide is either colourless or odourless. Many students gave both, despite being asked for one.

05.7 Fewer than one in ten gained any marks on this question, which was applying ideas from across the specification. Just a statement that water evaporates was insufficient for credit, as there needed to be a realisation that water is produced as a vapour, rather than turning into a vapour during the process.

Answer 01 · Examiner comments

June 2023 | 8464/C/2F | Original Q5

05.8 Around one in ten students gained at least one mark on this question, usually for recognising that sulfur is responsible for acid rain. The consequences of acid rain were not well known, and even fewer knew that sulfur enters the atmosphere as sulfur dioxide. Global warming was the most common incorrect response.

Answer 02 · Examiner comments

June 2024 | 8464/C/2F | Original Q2

Question 2 (low demand)

02.1 Just over half of students correctly identified the pure substance in this AO3 question for 1 mark. Three-quarters of those students went on to give the reason. We were looking for the idea that B did not have a range of melting points or that it was a specific value. Where students did not achieve this mark, it was due to reasons not being clear enough.

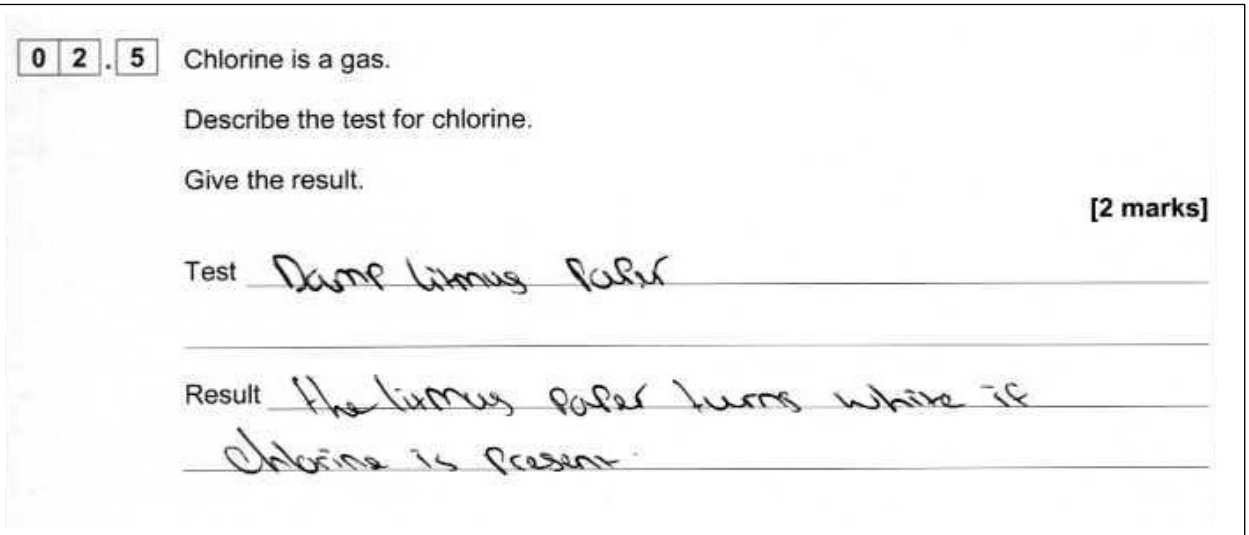
The most common wrong answer was D, with the main reason being that it had the highest melting point, followed by C because it had the lowest melting point or because it was closest to room temperature. The response of A was very rare.

02.2 Both marking points were not scored very often. White was the colour seen as one of the answers the greatest number of times, either correctly or incorrectly, but every combination of colours possible was seen with roughly equal regularity.

02.3 Most students gained the mark for this AO2 question. The most common incorrect responses simply stated 'the reversible symbol' without drawing or describing the symbol or copying out the symbol given in the question.

02.4 Just under half of all students gave the correct answer for this application question.

02.5 Very few responses showed knowledge of the test for chlorine, with nearly 80% of students not gaining any marks. Of the few that gained 1 mark many scored marking point 2 but did not describe the litmus paper as 'damp'. The tests for other gases such as hydrogen, oxygen, carbon dioxide and ammonia were all seen many times, with the 'squeaky pop test' being the most common.


0 2 . 5 Chlorine is a gas.

Describe the test for chlorine.

Give the result.

[2 marks]

Test Damp litmus paper

Result the litmus paper turns white if chlorine is present

This student has given the all the points required for both marks.

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