AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 5.2.3.2

Graphite

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**2**
Available paper years	**2020–2021**

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.

5.2.3.2 Graphite

Answer 01 · Mark scheme November 2020 | 8464/C/1H | Original Q1

01.1	13 14	this order only	1 1	AO2 5.1.1.4 5.1.1.5

01.2	loss of oxygen	allow (Al^{3+}) gain of electrons allow aluminium oxide loses oxygen	1	AO1 5.4.1.1 5.4.1.3

01.3	 (at high temperature) oxygen reacts with carbon / electrode (so the positive) electrode burns / wears away to produce carbon dioxide	allow anode for (positive) electrode $C + O_2 \rightarrow CO_2$ scores MP1 and MP3	 1 1 1	 AO1 5.4.3.1 5.4.3.2 5.4.3.3

01.4	(delocalised) electron(s) ion(s) (delocalised) electron(s)		1 1 1	AO1 AO2 AO1 5.2.2.3 5.2.2.8 5.2.3.2

Total			**9**

5.2.3.2 Graphite

Answer 01 · Mark scheme

November 2020 | 8464/C/1H | Original Q1

Question	Answers	Extra information	Mark	AO / Spec. Ref.

5.2.3.2 Graphite

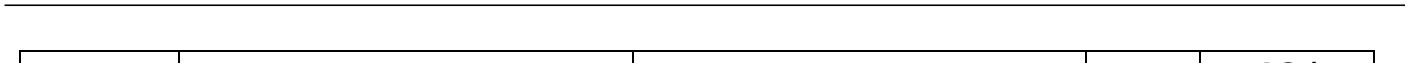
Answer 02 · Mark scheme

November 2021 | 8464/C/1H | Original Q4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
04.1	C_{60}		1	AO1 5.2.3.3
04.2	(graphite has) delocalised electrons		1	AO1 5.2.3.2
	(so the delocalised electrons) carry electrical charge through the structure	allow (so the delocalised electrons) move through the structure	1	
04.3	carbon atoms have different sizes to iron atoms / ions		1	AO1 5.2.2.7
	(so carbon atoms) distort the layers of iron atoms / ions		1	
	(therefore) the layers cannot slide		1	
04.4	(percentage and mass of other elements) 28.08 (%) = 16.29 (g)		1	AO2 5.2.2.7
	(mass of fork) = $\frac{16.29}{28.08} \times 100$ (g)		1	
	= 58.01 (g)		1	
	(mass of iron = $\frac{71.92}{100} \times 58.01$) = 41.72 (g)	allow (mass of fork – mass of other elements) = 41.72 (g) allow 41.7 (g) allow correct use of incorrect calculation of mass and / or percentages	1	
Total			**10**	

5.2.3.2 Graphite

Answer 02 · Mark scheme November 2021 | 8464/C/1H | Original Q4



Answer 02 · Examiner comments November 2021 | 8464/C/1H | Original Q4

Question 4 (standard, standard / high and high demand)

04.1 The formula of Buckminsterfullerene was known by just over half of students.

04.2 Approximately one quarter of students gained one mark for delocalised electrons. Few gained the second mark for stating that these delocalised electrons carry electrical charge through the structure.

Answer 02 · Examiner comments November 2021 | 8464/C/1H | Original Q4

04.3 A small number of students knew that layers cannot slide in an alloy and understood that the carbon atoms distort the layers of iron atoms. Very few students recognised that carbon and iron atoms have different sizes.

04.4 Just under one fifth of students successfully completed this calculation. In calculations students must show all their working.