AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 5.2.3.1

Diamond

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**2**
Available paper years	**2018–2020**

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.

5.2.3.1 Diamond

Answer 01 · Mark scheme

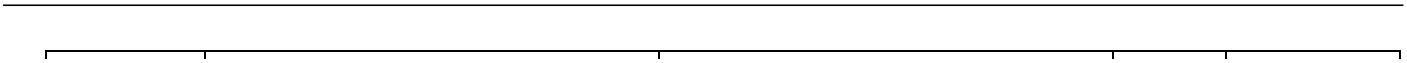
June 2018 | 8464/C/1H | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1		**max 2** for incorrect reference to particles or bonds		AO1 5.2.3.1
	covalent bonds		1	
	giant structure / macromolecule	allow each C has 4 bonds allow giant covalent structure for **2** marks allow giant ionic / lattice structure for **1** mark ignore lattice	1	
	lots of energy needed to break / overcome	allow disrupt structure ignore heat and high temperature	1	
		if no other marks awarded allow **1** mark for strong / many bonds		
05.2		**max 2** for incorrect reference to particles or bonds		AO1 5.2.2.3
	dissolved (in water) **or** aqueous	allow in solution	1	
	molten / liquid		1	
	so ions are mobile **or** free moving		1	
05.3		**max 2** for incorrect reference to particles or bonds		AO1 5.2.1.5 5.2.2.8
	delocalised electrons (from outer shell)		1	
	(free to) move		1	
	energy transferred (through structure)	ignore conducts thermal energy ignore electricity	1	
		if no other mark awarded allow **1** mark for ions / atoms vibrate		
Total			**9**	

5.2.3.1 Diamond

Answer 01 · Mark scheme

June 2018 | 8464/C/1H | Original Q5



5.2.3.1 Diamond

Answer 02 · Mark scheme

November 2020 | 8464/C/1H | Original Q2

02.1	any **one** from: • not to scale • not 3 dimensional / D • incorrect arrangement in space • electrons / shells not shown	allow size of atoms incorrect allow atoms are separated ignore properties of water	1	AO2 5.2.1.4
02.2	weak	allow weaker	1	AO1 5.2.2.4
02.3	CH_4O	allow CH_3OH	1	AO2 5.2.1.4
02.4	4		1	AO1 5.2.3.1
02.5	any **two** from: • (very) hard • (very) high melting point • does not conduct electricity	allow strong allow high thermal conductivity ignore shiny	2	AO1 5.2.3.1

5.2.3.1 Diamond

Answer 02 · Mark scheme

02.6	graphite silicon dioxide	allow graphene allow silica allow silicon allow polymer(s) **or** allow (named) polymer(s) allow fullerene **or** allow carbon nanotubes ignore buckminsterfullerene	1 1	AO1 5.2.2.6
Total			**8**	

5.2.3.1 Diamond

Answer 02 · Mark scheme

November 2020 | 8464/C/1H | Original Q2

Question	Answers	Mark	AO/ Spec. Ref

5.2.3.1 Diamond

Answer 01 · Examiner comments

June 2018 | 8464/C/1H | Original Q5

Question 5 (standard / high & high demand)

05.1 The question was well attempted with 80% of students achieving at least one mark. The marks awarded were fairly evenly distributed between the three marking points.

Students rarely achieved full marks (14%), often because they confused the type of particles or bonding involved. While many could identify that covalent bonds were used and lots of energy was needed to break these bonds, they found it difficult to describe the structure involved.

A common response was that diamond contains four carbon atoms rather than each carbon atom having four bonds, which would have been sufficient to be awarded the second marking point.

05.2 The diagram showed a structure made up of ions. These have to be free moving to conduct electricity.

7% of students achieved full marks. Generally students missed out on full marks because they only included one way to produce ions, dissolving or melting. There was confusion among students between the terms liquid and solution. Many said that sodium chloride needs to be ‘molten’ or ‘liquid’, presumably often meaning molten or dissolved (in water).

The most common mistake in responses was that students thought that electrons were involved in the conduction of electricity in this situation.

05.3 49% of students achieved at least one mark, usually for marking points one or two. Higher attaining-students frequently achieved two marks for ‘delocalised electrons free to move’.

Marking point three was rare and was often poorly expressed. Lots of responses repeated the question stem with phrases such as ‘so it conducts thermal energy’ or ‘thermal energy passes between the particles’. Very few students mentioned energy being transferred. A common statement was that ‘delocalised electrons carry electric charge’ but not (thermal) energy.