AQA GCSE Chemistry | 8462

SPECIFICATION POINT 4.2.3.1

Diamond

Mark schemes and examiner comments

Tier	**Foundation**
Question groups	**8**
Available paper years	**2008–2024**

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.

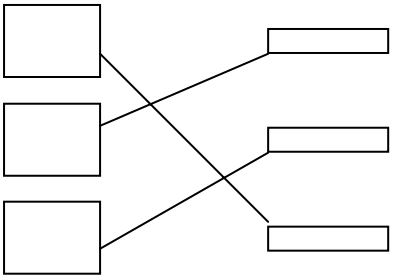
Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.2.3.1 Diamond

Answer 01 · Mark scheme

Question 2

question	answers	extra information	mark
(a)		all three lines correct gains **2** mark one or two correct gains **1** mark if there are more than 3 lines then lose mark for each extra line	2
(b)(i)	covalent		1
(b)(ii)	four		1
(b)(iii)	hard		1
(b)(iv)	three		1
(b)(v)	soft		1
(c)	carbon	accept C	1
total			8

4.2.3.1 Diamond

Answer 01 · Mark scheme

January 2008 | CHY2F | Original Q2 | Legacy

CHY2F

4.2.3.1 Diamond

Answer 02 · Mark scheme

June 2010 | CHY2F | Original Q4 | Legacy

Question 4

question	answers	extra information	mark
4(a)	carbon		1
4(b)	all		1
4(c)	covalent		1
4(d)	four		1
4(e)	hard		1
Total			**5**

4.2.3.1 Diamond

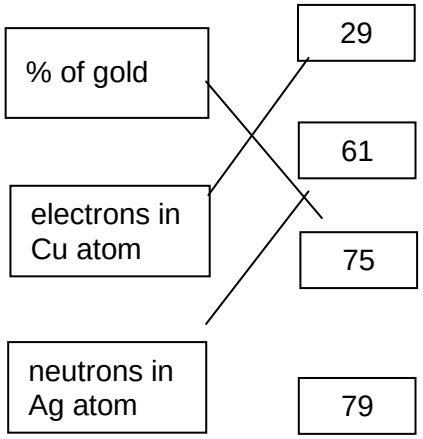
Answer 02 · Mark scheme June 2010 | CHY2F | Original Q4 | Legacy

CHY2F

4.2.3.1 Diamond

Answer 03 · Mark scheme January 2012 | CH1FP | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)	+1/+ electron	do **not** accept 1 without the + allow phonetic spelling	1 1
1(b)(i)	elements		1
1(b)(ii)	non-metal		1
1(c)	soft an alloy		1 1
1(d)		**one** mark for each correct link extra lines lose the mark	3
Total			9

4.2.3.1 Diamond

Answer 03 · Mark scheme

January 2012 | CH1FP | Original Q1 | Legacy

CH1FP

4.2.3.1 Diamond

Answer 04 · Mark scheme

Question 3

question	answers	extra information	Mark
3(a)	(alloy) atoms / ions / particles not in layers	accept layers are distorted accept different (size) particles / atoms	1
	so, (alloy) layers / atoms / ions / particles can't slide	if no other mark awarded allow (an alloy) is a mixture of metals for **1** mark	1
3(b)	diamonds have a giant covalent structure		1
	diamonds have strong bonds between carbon atoms		1
3(c)(i)	a compound		1
3(c)(ii)	CH_4		1
3(c)(iii)	covalent		1
3(d)	methane has a low boiling point or boiling point less than 20°C		1
	because it has small molecules	accept it has forces between molecules accept weak forces between molecules for **2** marks	1
Total			**9**

4.2.3.1 Diamond

Answer 05 · Mark scheme

June 2014 | CH2FP | Original Q1 | Legacy

Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
1(a)(i)	high		1	1 / 2.2.3a	A
1(a)(ii)	hundred		1	1 / 2.2.6a	A
1(b)	hard		1	1 / 2.2.3b	A
1(c)(i)	carbon		1	1 / 2.2.3a	A
1(c)(ii)	four		1	1 / 2.2.3b	A
1(c)(iii)	covalent		1	1 / 2.2.3a/b	A
1(c)(iv)	all		1	1 / 2.2.3a	A
Total			7		

4.2.3.1 Diamond

Answer 05 · Mark scheme

June 2014 | CH2FP | Original Q1 | Legacy



4.2.3.1 Diamond

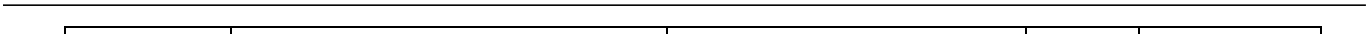
Answer 06 · Mark scheme

Question	Answers	Extra information	Mark	AO / SpecRef
2(a)(i)	hard	ignore strong	1	AO2 2.2.3b
2(a)(ii)	hundred		1	AO1 2.2.6a
2(b)(i)	Covalent		1	AO1 2.2.3a
2(b)(ii)	3		1	AO1 2.2.3.c
2(b)(iii)	Soft and slippery		1	AO1 2.2.3a,c
2(c)(i)	cross-links	allow bonds ignore links do **not** accept intermolecular	1	AO1 2.2.5b
2(c)(ii)	melt		1	AO1 2.2.5b
2(c)(iii)	any **two** from: • temperature • pressure • catalyst	allow heat(ing)	2	AO1 / AO3 2.2.5a
2(d)(i)	CH_4		1	AO1 2.1.1g
2(d)(ii)	Small molecules		1	AO1 2.2.1a
Total			**11**	

4.2.3.1 Diamond

Answer 06 · Mark scheme

June 2016 | CH2FP | Original Q2 | Legacy



4.2.3.1 Diamond

Answer 07 · Mark scheme

June 2022 | 8462/1F | Original Q6

Question 6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.1	C		1	AO1 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.2	D		1	AO1 4.2.1.4 4.2.2.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.3	4 / four		1	AO1 4.2.3.1

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.4	very hard		1	AO1 4.2.2.6 4.2.3.1

4.2.3.1 Diamond

Answer 07 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.5	C_2H_6		1	AO2 4.2.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.6	H^+		1	AO1 4.4.2.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
06.7	(M_r =) (1 × 2) + 12 + (16 × 3) = 62	allow (M_r =) 2 + 12 + 48	1 1	AO2 4.3.1.2

Total Question 6		**8**

4.2.3.1 Diamond

Answer 08 · Mark scheme

June 2024 | 8462/1F | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	6		1	AO2 4.1.1.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	7		1	AO2 4.1.1.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	6		1	AO2 4.1.1.5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4	C_2F_6		1	AO2 4.2.1.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	only intermolecular forces are weak		1	AO1 4.2.2.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	spherical		1	AO1 4.2.3.3

4.2.3.1 Diamond

Answer 08 · Mark scheme

June 2024 | 8462/1F | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.7	3		1	AO1 4.2.3.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.8	giant structure	allow lattice	1	AO1 4.2.3.1
	(of atoms joined by) covalent bonds		1	
	each carbon / atom forms four bonds		1	

Total Question 5	**10**

4.2.3.1 Diamond

Answer 07 · Examiner comments June 2022 | 8462/1F | Original Q6

Question 6 (Low and standard demand)

06.1 Nearly two thirds of students could select the correct diagram to show graphite. The structures of the two fullerenes were popular distractors.

06.2 Fewer than half of students could identify **D** as representing poly(ethene). All three other diagrams were popular, with **B** attracting a quarter of the responses.

06.3 Although a diagram was provided, only just over a half of students gave 4 as their answer.

06.4 The great majority of students could identify that diamond is very hard.

06.5 Just over half of the students could count the atoms in the figure and then write the formula correctly. Many failed to gain credit because the numbers were not subscripts but the same size as the letters, or even larger.

06.6 Just over a third of students could demonstrate their knowledge and understanding of acids to choose the hydrogen ion, with the majority of students opting for the hydroxide ion.

06.7 Over a half of students got the correct answer. The most common error was to assume there were three atoms of carbon as well as oxygen, giving an answer of 86. Other common errors were to add 1, 12 and 16 together, or to multiply relative atomic masses together.

4.2.3.1 Diamond

Answer 08 · Examiner comments June 2024 | 8462/1F | Original Q5

Question 5 (low and standard demand)

05.1 Nearly four fifths of students identified the number of protons. 13 was the most common distractor.

05.1 Over a half of students identified the number of neutrons. 6 was the most common distractor.

05.1 Over a half of students identified the number of electrons. 13 was the most common distractor.

05.4 Nearly three fifths of students scored the mark. Although the vast majority counted 2 carbon and 6 fluorine atoms, many could not write the formula correctly, with numbers discernibly smaller than the letters.

05.5 Only about a third of students identified that only intermolecular forces are weak. The most popular response was that both covalent bonds and intermolecular forces are weak. The myth that covalent bonds are weak is a difficult one to dispel.

05.6 More than a half of students knew that Buckminsterfullerene is spherical. The most common distractor was cylindrical, with the students possibly thinking of nanotubes.

05.7 Just under three quarters of students identified the number of bonds formed by a carbon atom in graphite. The most common distractor was 4.

05.8 Students found this standard demand question difficult, with fewer than one in twenty scoring all three marks, although more than a half did score one mark. Many did not mention the giant structure, or did not state that each carbon atom forms 4 bonds (despite having counted the bonds per atom in graphite in the previous question). Many did mention covalent bonds but then contradicted themselves by referring to intermolecular forces; these are not present, so the type of bonding mark could not be awarded. Many students gave properties of diamond, which were not asked for and gained no credit.