AQA GCSE Science Combined Foundation

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
01.1	nitrogen		1	AO1 5.1.1.1
01.2	covalent		1	AO1 5.2.1.1
01.3	one dot and one cross in each of the overlaps between H and N		1	AO2 5.2.1.4
01.4	low melting point		1	AO1 5.2.2.4
02	**Level 3:** A detailed and coherent comparison is given, demonstrating a sound knowledge of the differences in properties and the reasons for them.		5-6	AO1 5.2.3.1 5.2.3.2
	Level 2: A correct description is given of the properties of each allotrope. Some reasons are given, but are not clearly articulated / not clearly linked to the property.		3-4	
	Level 1: Some correct points are made about each structure. Comparisons and reasons are not included.		1-2	
	No relevant content.		0	

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	Indicative content: • graphite conducts electricity but diamond does not • because graphite includes delocalised electrons but diamond does not • graphite is soft/slippery but diamond is hard • because the layers in the structure of graphite can slide over each other, but there are no such layers in diamond/diamond has lots of strong bonds • both have high melting and boiling points • because both include strong covalent bonds between their atoms.			
03.1	long lots of strong		1 1 1	AO1 5.2.2.5
03.2	propene		1	AO2 5.2.2.5
03.3	diagram should match polyethene as shown in Figure 1, but replace one H with Cl carbon-carbon bond must be single, not double		2	AO3 5.2.2.5
03.3	$(C_2H_3Cl)_n$		1	AO2 5.2.2.5
04.1	electrons are shared		1	AO1 5.2.1.4

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04.2	carbon dioxide – simple molecule silicon dioxide – giant polythene – polymer		2	AO2 5.2.1.4
04.3	lower intermolecular forces		1	AO1 5.2.2.4
05.1	no charged atoms/ions/particles to carry charge	one mark for each correct bullet point up to a maximum of two marks	1 1	AO1 5.2.2.4
05.2	graphite/graphene delocalised electrons that can move		1 1	AO1 5.2.2.6
05.3	**Level 3:** A full description of the method provided, with at least two pieces of equipment named.		5-6	AO1 AO2 5.2.2.1 5.2.2.4 5.2.2.6
	Level 2: Basic method provided, identifying that a higher boiling point is needed to break the covalent bonds than the intermolecular bonds. At least one piece of equipment identified.		3-4	
	Level 1: Method identifies that a high boiling point is needed to break the covalent bonds. No equipment named.		1-2	
	No relevant content.		0	

Question	Answers	Extra information	Mark	AO / Specification reference
	Indicative content: • to boil silicon dioxide must break strong covalent bonds • requires lots of energy, therefore very high boiling point • to boil octane and hydrogen fluoride, need to break weaker intermolecular forces • less energy needed to break intermolecular forces than covalent bonds, therefore, much lower boiling points than silicon dioxide • octane is a larger molecule than hydrogen fluoride so has stronger intermolecular forces • therefore, more energy needed to break the intermolecular forces in nonane, therefore higher boiling point than hydrogen flouride			
05.4	accept any answer between 125.6 and 2230 intermolecular forces need to be broken, not covalent bonds but much higher boiling point than octane as much larger molecule		1 1 1	AO3 5.2.2.1 5.2.3.3
06.1	**one** from: • only shows a small number of the atom in silicon dioxide • atoms are not spheres/bonds are not sticks • does not show the electrons being shared	accept any other sensible answer	1	AO3 5.2.1.4
06.1	four		1	AO2

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06.2	carbon + oxygen → carbon dioxide			AO1
06.3	simple molecule		1	AO1
06.4	C		1	AO1
06.5	**one** from: • diamond is a solid • diamond is hard • diamond has a high melting point/boiling point	accept reverse for carbon dioxide	1	AO1
06.6	CH_4		1	AO2
07.1	four high hard/strong		1 1 1	AO1 5.2.3.1
07.2	delocalised electron means it can conduct electricity		1 1	AO1 5.2.3.2
08.1	black white covalent		1 1 1	AO1 5.2.1.4
08.2	liquid		1	AO2 5.2.2.1
08.3	B		1	AO1 5.2.2.1

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08.4	one cross and one dot should be placed within the overlap between each O and H molecule		1	AO2 5.2.1.4
09.1	carbon		1	AO1 5.2.3.3
09.2	top – buckminster fullerene middle – carbon nanotube bottom - graphene		1 1 1	AO1 5.2.3.3
09.3	conductor electronics/wire		1 1	AO1 5.2.3.3
09.4	lubricants/catalysts/drug delivery/nanotechnology		1	AO1 5.2.3.3
10.1	Z		1	AO3 5.2.3.3
10.2	high (tensile) strength		1	AO1 5.2.2.3
10.3	electronics – because of electricity conduction reinforcing composite materials – because of high tensile strength	both the use and reason required for each mark	1 1	AO1 5.2.2.3