AQA GCSE Chemistry

Practice answers

OXFORD Revise

Question	Answers	Extra information	Mark	AO / Specification reference
01.1	high melting point—strong covalent bonds does not conduct electricity—there are no charged particles free to move		1 1	AO1 4.2.2.6
01.2	C		1	AO1 4.2.2.6
01.3	oxygen: small molecule/simple molecular silicon: giant covalent structure		1 1	AO2 4.2.2.6 4.1.1.3
02.1	phosphorous: five dots/crosses in total, three should be inside the overlap between the phosphorous and hydrogen molecules hydrogen: three crosses/dots (one per hydrogen), which should be in the overlap between the phosphorous and hydrogen molecules		2	AO2 4.2.1.4
02.2	intermolecular		1	AO1 4.2.2.4
02.3	gas		1	AO1 4.2.2.1
02.4	as radius of central atom increases, boiling point increases because strength of intermolecular forces increases with increasing size of molecule/because there are more electrons		1 1	AO2 4.2.2.4
03.1	there are no gaps/sticks between the atoms		1	AO1 4.2.1.4

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03.2	some of its electrons are free to move		1	AO1 4.2.3.2
03.3	$\frac{0.24}{1.99\times10^{23}}$ $= 1.206\times10^{-24}$ $= 1.21\times10^{-24}$		1 1 1	AO2
04	**Level 3:** A detailed and coherent explanation is given, demonstrating a sound knowledge of the differences in properties and the reasons for them.		5–6	AO1 4.2.3.1 4.2.3.2
	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	
	Indicative content • graphite conducts electricity, but diamond does not • because graphite includes delocalised electrons, but diamond does not • graphite is soft, 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			
05.1	Z		1	AO2 4.2.3.2

Question	Answers	Extra information	Mark	AO / Specification reference
05.2	each chlorine should have seven dots/crosses, with one electron shared from each (one pair shared in total)	allow only one mark if both chlorines have dots or crosses	2	AO2 4.2.1.4
05.3	each oxygen should have six dots/crosses, with two electrons shared from each (two pairs shared in total)	allow 1 mark if only one shared pair of electrons (single bond), but a total of 8 electrons around each atom	2	AO2 4.2.1.4
05.4	Y chlorine has a higher melting point because it has more electrons/stronger intermolecular forces		1 1	AO3 4.2.2.4
06.1	low melting point because compound X consists of small molecules does not conduct electricity because compound X does not include charged particles that are free to move	accept soluble in water with correct explanation of hydrogen bonding. ignore the name of the compound/ethanol	1 1 1 1	AO1×2 AO2×2 4.2.2.4
06.2	C_2H_5OH/C_2H_6O		1	AO1 4.1.1.4
06.3	there are 6 hydrogen atoms: $6 \times 6.02 \times 10^{23} = 3.61 \times 10^{24}$ atoms		1	AO2
06.4	liquid		1	AO2 4.2.2.1
07.1	Z		1	AO3 4.2.3.3

Question	Answers	Extra information	Mark	AO / Specification reference
07.2	high (tensile) strength		1	AO1 4.2.2.3
07.3	electronics, because nanotubes conduct electricity reinforcing composite materials, because nanotubes have high tensile strength.	both the use and the reason are required for each mark	1 1	AO1 4.2.2.3
08.1	C_6H_{14}		1	AO2 4.2.1.4
08.2	carbon: four dots/crosses in total, one should be in the overlap of each hydrogen hydrogen: four molecules with one electron each (shown as a cross/dot), each electron should be within the overlap of carbon and hydrogen	one mark for carbon one mark for hydrogen	2	AO1 4.2.1.4
08.3	one carbon with 4 hydrogens surrounding it, which are each joined to the carbon by one stick		1	AO1 4.2.1.4
08.4	**Level 3:** A detailed and coherent comparison is given, demonstrating a sound understanding of the properties of liquids and gases.		5–6	AO1×4 AO3×2 4.2.2.1
	Level 2: Correct comparisons are made, showing some understanding of the properties of liquids and gases. The answer is not clearly articulated.		3–4	
	Level 1: Some correct points are made about the properties of liquids and/or gases.		1–2	
	No relevant content		0	

Question	Answers	Extra information	Mark	AO / Specification reference
	Indicative content • methane is a gas at room temperature • but hexane is in the liquid state • both substances can be poured/both substances have no fixed shape/both substances take the shape of the bottom of their containers • hexane has a greater density than methane (at room temperature) • because both include strong covalent bonds between their atoms			
08.5	hexane has stronger forces between its particles than methane so more energy is required to separate the particles in hexane than in methane		1 1	AO2 4.2.2.1
09.1	**Level 3:** A detailed and coherent answer is given.		5–6	AO2×3 AO3×3 4.2.2.4
	Level 2: The explanation is correct, but the answer is not clearly articulated.		3–4	
	Level 1: Some correct points are made, but the answer is not clearly articulated.		1–2	
	No relevant content		0	
	Indicative content • fluoroethene, chloroethene and bromoethane are compared since they only differ by one atom • number of electron energy levels/shells increases from fluorine to chlorine to bromine • boiling point increases from fluoroethene to chloroethene to bromoethene • indicating that the strength of intermolecular force also increases from fluoroethene to chloroethene to bromoethane			
09.2	fluoroethene		1	AO3 4.2.2.5

Question	Answers	Extra information	Mark	AO / Specification reference
09.3	this should match figure 5, but only a single bond joins the two carbons this polymer should be enclosed in brackets, with the extra bond from each carbon extending out of the brackets (as in figure 4) there should be a subscript n after the brackets		1	AO2 4.2.2.5
09.4	bromoethene is a gas at room temperature so it has no fixed shape/can be poured/ takes the volume of its container poly(bromoethene) is solid at room temperature (because it is a polymer) so it has a fixed shape/cannot be poured/ has a fixed volume		1 1 1 1	AO2 4.2.2.1
10.1	carbon with four electrons, sharing two electrons with each oxygen each oxygen has six electrons, sharing two electrons with each carbon	allow 1 mark if only one shared pair of electrons (single bond), but a total of 8 electrons around each atom	2	AO2 4.2.1.4
10.2	silicon dioxide, SiO_2, has a higher boiling point/carbon dioxide, CO_2, has a lower sublimation point boiling silicon dioxide involve breaking strong covalent bonds subliming carbon dioxide involves breaking weak intermolecular forces		1 1 1	AO1 4.2.2.4 4.2.2.6

Question	Answers	Extra information	Mark	AO / Specification reference
11.1	bond strengths decrease as number of electron energy levels/shells increase as you go down the group because the bonding electrons are less attracted to the nucleus		1 1	AO3 4.2.2.4
11.2	N_2 – five electrons per outer shell, three electrons shared per nitrogen (three pairs shared in total) O_2 – six electrons per outer shell, two electrons shared per oxygen (two pairs shared in total) H_2 – one electron per outer shell, one electron shared per shell (one pair shared in total) Triple bonds are stronger than double bonds and double bonds are stronger than single bonds.		1 1 1	AO2 4.2.1.4
12.1	mass = $7 \times 1.7\times10^{-27}$ kg = 1.19×10^{-26} kg volume = $\frac{4}{3}\pi \times (1\text{x}10^{-14})^3 = 4.19\times10^{-42}$ m^3 density = $\frac{\text{mass}}{\text{volume}}$ density = $\frac{1.19\times10^{-26}}{4.19\times10^{-42}} = 3\times10^{15}$ kg/m^3 to 1 significant figure		1 1 1 1	AO2
12.2	All matter is spread evenly throughout nucleus.		1	AO3

Question	Answers	Extra information	Mark	AO / Specification reference
12.3	no because the mass of the atom is concentrated in the nucleus/the density of the atom is not the same throughout the atom	accept an explanation that relates to 13.2 if the assumption given in 13.2 was valid.	1 1	AO3
12.4	assumes that there are no forces between the spheres forces between the particles affect the physical properties of the substance OR assumes that spheres are solid most of an atom is empty space with a solid nucleus OR assumes atoms do not contain subatomic particles/atoms do contain electrons, neutrons and protons/atoms do contain subatomic particles		2	AO1 4.2.2.1
13.1	$^{14}_{7}N$		1	AO2 4.1.1.5
13.2	E $^{15}_{7}N$		1 1	AO2
13.3	D $^{24}_{12}Mg^{2+}$		1 1	AO2 4.1.1.5

Question	Answers	Extra information	Mark	AO / Specification reference
13.4	Mg or $^{25}_{12}Mg$ mass = 25 atomic number = 12		1 1	AO2 4.1.1.5
14	**Level 3:** A detailed and coherent answer is given. All equipment is correctly identified.		5–6	AO1 AO3 4.1.1.2
	Level 2: An explanation is given with two or three pieces of equipment correctly identified.		3–4	
	Level 1: An explanation is given, but it lacks structure. Only some equipment is named.		1–2	
	No relevant content		0	
	Indicative content • filter paper is placed into funnel • funnel is placed into a conical flask/beaker • pour reaction mixture into filter paper • solution will collect in the conical flask/beaker • magnesium will collect in the filter paper • wear safety glasses when working with acid			