AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
01.1	they conduct electricity in the solid and liquid states		1	AO1 – 1 4.2.2.8
01.2	giant structure atoms arrange in a regular pattern electrons in outer shells/outermost electrons delocalised		1 1 1	AO1 4.2.1.5
01.3	atoms arranged in layers that can slide over each other		1 1	AO1 4.2.2.7
01.4	most metals have high melting points/most metals are solid at room temperature		1	AO3 4.2.27
02.1	the atoms are arranged in layers that can slide over each other		1 1	AO1 – 2 4.2.2.7
02.2	strong metallic bonding because shared delocalised electrons can move through the whole structure large amounts of energy are needed to overcome the strong metallic bonds		1 1 1	AO1 – 3 4.2.2.7
02.3	(harder) so less likely to be damaged by scratching		1	AO2 – 1 4.2.2.7
02.4	rhodium atoms different size from platinum so layers of atoms are distorted they cannot slide over each other so easily		1 1 1	AO1 – 2 4.2.2.3

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
03.1	350	allow between 352-358	1	AO 4.2.2.3
03.2	X		1	AO2 – 1 4.2.2.7
03.3	X: ethanol, Z: hexanol Hexanol is a larger molecule than ethanol So will have a higher boiling point		1 1 1	AO3 4.2.2.4
04.1	each circle has 2+ charge 16 minus charges/electrons/e^- around the circles	Accept a + charge put in every circle and any number of minus charges put around the circles for one mark	1 1	AO1 4.2.1.5
04.2	Mg ion is drawn with 1 shell only and 8 dots, inside square brackets with a superscript 2+ to the right O ion is drawn with 1 shell only and 6 crosses and 2 dots, inside square brackets with a superscript 2- to the right	one mark for correct magnesium ion one mark for correct oxygen ion	2	AO2 4.2.1.2
04.3	magnesium oxide – conducts electricity in the liquid state only because its ions are then free to move magnesium – conducts electricity in the solid and liquid states because its delocalised electrons are free to move		1 1	AO1 – 1 AO2 – 1 4.2.2.3 4.2.2.8
04.4	$2Mg(s) + O_2(g) \rightarrow 2MgO(s)$		3	AO2 4.1.1.1 4.2.2.2
04.5	allow is harder than pure metal so will be more durable/last longer		1 1	AO2 4.2.2.8

Question	Answers	Extra information	Mark	AO / Specification reference
05.1	metal atoms/ions arranged in a regular structure surrounded by delocalised electrons from outer electron shells		1 1	AO1 4.2.1.5
05.2	**Level 3:** A detailed and coherent answer is given, including points that support and do not support the statement that are clearly linked to the data in the table. A conclusion is provided and justified using the data.		5-6	AO2 – 2 AO3 – 4 4.2.2.8
	Level 2: Points that support and do not support the statement are made, but these are not always clearly linked to the data in the table. A conclusion may be provided, but it is not justified.		3-4	
	Level 1: Some correct points are made that support and do not support the conclusion		1-2	
	No relevant comment.		0	
	Indicative content: • for the elements in period 2, conductivity increases from Li (one delocalised electron per atom) to Be (two delocalised electrons per atom) • for the elements in period 3, conductivity increases from Na (one delocalised electron per atom) to Mg (two delocalised electrons per atom) to Al (three delocalised electrons per atom) • Zn has two delocalised electrons per atom, but its conductivity is less than those of Li and Na (one delocalised electron per atom each) • the first two pieces of evidence above support the statement, but the third does not. • reasoned decision, drawing on all evidence above			

Question	Answers	Extra information	Mark	AO / Specification reference
06.1	**Level 3:** A detailed and coherent answer is given, using suitable examples and the data in the table. A conclusion is provided and justified using the data.		5-6	AO1 – 1 AO3 – 3 4.2.2.3
	Level 2: A detailed and coherent answer is given, using suitable examples and the data in the table. Some electron configurations maybe be incorrect. A conclusion is provided and justified using the data.		3-4	
	Level 1: Some correct points are made that support the conclusion		1-2	
	No relevant comment.		0	
	Indicative content: • calcium and magnesium are in Group 2 so form ions with +2 charge • oxygen and sulfur are in Group 6, so form ions with −2 charge • bromine is in Group 7, so form ions with −1 charge • sodium is in Group 1 and forms ions with +1 charge • compounds with two ions with double charges have higher melting points than those with single charges • compounds with +1 and -2 ions have higher melting points than compounds with +2 and -1 ions. • compounds with two ions with single charges have higher melting points that those with +2 and -1 ions			

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
06.2	(in general) the greater the charge of the ions of a compound, the higher the melting point because there is a greater electrostatic attraction between the ions **or** more energy is needed to break the bonds		1 1	AO3 4.2.2.3
07.1	electrons transferred from magnesium to bromide magnesium atom loses two electrons two bromine atoms each gain one electron		1 1 1	AO1 4.2.1.2
07.2	Mg^{2+} ions Br^- ions		1 1	AO2 4.2.1.2
07.3	$MgBr_2$		1	AO1 4.2.1.2
07.4	**three** from: • solid at room temperature • high melting and boiling point • will conduct electricity when molten or in solution • soluble in water	one for each correct answer up to three marks	3	4.4.2.3
08.1	ionic compound conducts in the liquid state but not the solid state high melting point		1 1 1	AO1 – 1 AO2 – 1 4.2.2.3

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
08.2	B and D both can conduct electricity in the solid and liquid states		1 1	AO1 – 1 AO2 – 1 4.2.2.8
08.2	melting point is low metals have giant structures of atoms bonded with strong metallic bonding therefore, normally lots of energy needed to separate the atoms/most metals have a high melting point		1 1 1	AO2 4.2.2.7
09.1	2 Cl atoms and 1 O atom is drawn O atom has 6 crosses and 2 dots, each Cl atom has 7 dots and 1 cross each Cl atom shares 1 dot and 1 cross		2	AO2 4.2.1.4
09.2	in dichlorine monoxide, an electron from each chlorine atom joins with an electron the the oxygen atom to form two shared pairs of electrons or two covalent bonds in caesium oxide, the one electron from the outermost shell of two caesium atoms is transferred to the oxygen atom strong eelctrostatic attraction between the two ions		1 1 1 1 1	AO1 4.2.1.3 4.2.1.4

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
09.3	• CsO has high melting and boiling points • because large amounts of energy are needed to break the many strong ionic bonds. • Cl_2O has low melting and boiling points • because only weak intermolecular forces must be overcome when the substance melts or boils, so little energy is required. **or** • CsO conducts electricity in the liquid state and when dissolved in water • because its charged particles / ions are then free to move. • Cl_2O does not conduct electricity in any state • because the molecules do not have an overall electric charge	one mark for each point	4	AO2 – 4 4.2.2.3 4.2.2.4
09.4	barium ions have a larger charge/double charge/are 2+ ions therefore, greater attraction between Ba^{2+} ions and O^{2-} than Cs^{+} and O^{2-} ions		1 1	AO3 4.2.1.2
10.1	2K ions are drawn with no shell, inside square brackets with a superscript + to the right and a 2 before the brackets. O ion is drawn with 1 shell with 6 crosses and 2 dots, inside square brackets with a superscript 2- to the right.		2	AO2 – 3 4.2.1.2
10.2	regular structure (giant ionic lattice) strong electrostatic forces of attraction in all directions between oppositely charged potassium and oxygen ions		1 1 1	AO1 -3 4.2.1.3

AQA GCSE Science Combined Higher

Practice answers

Question	Answers	Extra information	Mark	AO / Specification reference
10.3	oxygen is a simple molecule molecules held together by weak intermolecular forces lower amount of energy needed to separate potassium oxide ions are held together by strong electrostatic forces greater amount of energy needed to separate the ions		1 1 1 1 1	AO1 4.2.2.3 4.2.2.4
10.4	metallic bonds are weaker than ionic bonds		1	AO3