

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	B lead chloride		(1)

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	<p>An explanation linking two of</p> <ul style="list-style-type: none"> strong (electrostatic) forces of attraction between oppositely charged ions so requires lot of heat/energy to overcome forces/break bonds 	<p>Any reference to molecules/molecular/intermolecular/covalent scores 0 marks</p> <p>strong (ionic) bonds</p> <p>positive and negative ions reject charged atoms for this mark</p> <p>ignore hard to melt/high temperature needed</p>	(2)

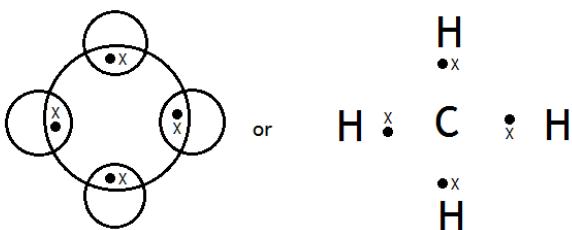
Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	<p>A description including</p> <ul style="list-style-type: none"> M1 add (dilute) nitric acid M2 add silver nitrate (solution) M3 forms white ppt/solid 	<p>Accept correct formulae</p> <p>If use any other acid can score M2 and M3</p> <p>dependent on use of silver nitrate</p> <p>Alternative method:</p> <p>Electrolyse (1)</p> <p>Chlorine formed (1)</p> <p>Bleaches litmus/pH paper (1)</p> <p>Ignore smell</p>	(3)

Question Number		Indicative Content	Mark
QWC	1(b)	<p>A description including some of the following points</p> <p>ion formation</p> <ul style="list-style-type: none"> • magnesium atoms lose electrons • each magnesium atom loses two electrons • to acquire full outer shell • magnesium (configuration) becomes 2.8 • forms Mg^{2+} ion • electrons transferred to oxygen atoms • oxygen atoms gain electrons • each oxygen atom gains two electrons • oxygen (configuration) becomes 2.8 • to acquire full outer shell • forms O^{2-} ion <p>structure</p> <ul style="list-style-type: none"> • magnesium ions attract oxide ions • due to opposite charges • ions pack close together • ratio of ions 1: 1 • ions arranged in lattice • giant (ionic) (structure) <p>diagram can be credited for any points</p>	(6)
Level	0	No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> • a limited description e.g. magnesium atoms lose electrons and oxygen atoms gain electrons e.g. magnesium oxide is a giant structure • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy 	
2	3 - 4	<ul style="list-style-type: none"> • a simple description e.g. magnesium atoms lose two electrons to form positive ions and oxygen atoms gain two electrons to form negative ions • e.g. magnesium atoms lose electrons and oxygen atoms gain electrons and magnesium oxide is a giant structure • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy 	
3	5 - 6	<ul style="list-style-type: none"> • a detailed description e.g. each magnesium atom transfers two electrons to an oxygen atom and the opposite charged ions (Mg^{2+} / O^{2-}) formed attract each other to form a giant (ionic) lattice • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors 	

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	4		(1)

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	D they both have high melting points		(1)

Question Number	Answer	Acceptable answers	Mark
2(a)(iii)	<p>An explanation linking</p> <ul style="list-style-type: none"> layers can slide / move/slip (over each other) (1) (because) weak forces between layers (of atoms) (1) 	<p>Any mention of ions (0)</p> <p>Ignore can be rubbed off</p> <p>Accept weak bonds for weak forces</p> <p>Accept sheets for layers</p> <p>Ignore mention of {intermolecular /intramolecular} forces/bonds</p> <p>Ignore weak forces between molecules</p>	(2)

Question Number	Answer	Acceptable answers	Mark
2(b)	<p>Diagram showing</p>  <p>or</p> <p> $\begin{array}{cccc} & & \text{H} & \\ & & \bullet \times & \\ \text{H} & \times & \text{C} & \bullet \times & \text{H} \\ & & \bullet \times & \\ & & \text{H} & \\ \end{array}$ </p> <ul style="list-style-type: none"> 1 shared pair between C and H (1) rest of diagram correct (1) 	<p>Ignore inner electrons, even if incorrect</p> <p>Accept electrons on/in ring (if ring drawn)</p> <p>Accept all dots or all crosses</p> <p>Accept circles touching and electrons shown where they touch</p>	(2)

Question Number	Indicative Content	Mark
QWC	<p data-bbox="284 323 379 355">*2(c)</p> <p data-bbox="411 323 1209 355">An explanation including some of the following points</p> <p data-bbox="411 395 683 428">Sodium chloride</p> <ul data-bbox="459 432 1348 858" style="list-style-type: none"> • contains {charged particles/ ions} • contains Na⁺ and Cl⁻ • (regular) giant structure/lattice (hence crystalline) • strong (electrostatic) forces (of attraction) between {ions/particles}/ strong bonds between {ions/particles}/strong ionic bonds • a lot of (heat) energy is needed to separate the {ions/particles}/ a lot of (heat) energy is needed to {overcome/ break } the {forces/ bonds/ lattice} (hence high melting point) • {ions/ charged particles} free to move (so it conducts electricity) when molten/ dissolved in water <p data-bbox="411 897 515 930">Water</p> <ul data-bbox="459 934 1393 1393" style="list-style-type: none"> • covalent bonds between (hydrogen and oxygen) atoms/ (pair of) electrons shared between atoms • contains molecules • H₂O • simple molecular/ simple covalent • weak intermolecular forces/ weak {forces/ bonds} between {molecules/ particles} • not much energy needed to separate the {molecules/ particles}/ not much energy is needed to break the {forces/ bonds between particles} (hence liquid at room temperature) • does not contain any charged particles/ ions/ {delocalised/ free} electrons (hence does not conduct electricity) 	(6)

Level	0	No rewardable content
1	1 - 2	<ul style="list-style-type: none"> • a limited explanation of one or two points e.g. water contains molecules. • the answer communicates ideas using simple language and uses limited scientific terminology. • spelling, punctuation and grammar are used with limited accuracy.
2	3 - 4	<ul style="list-style-type: none"> • a simple explanation of at least three points from sodium chloride or water OR a combination of three or four points from sodium chloride and water e.g. sodium chloride contains ions and water contains H₂O molecules. • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately. • spelling, punctuation and grammar are used with some accuracy.
3	5 - 6	<ul style="list-style-type: none"> • a detailed explanation of at least five points, including at least one point from sodium chloride and at least one point from water e.g. sodium chloride contains ions held together by strong forces and it has a high melting point as lot of energy is needed to separate the ions, water contains molecules and has a low melting point as there are weak forces between the molecules • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately. • spelling, punctuation and grammar are used with few errors.

Question Number	Answer	Acceptable answers	Mark
3(a)(i)	fractional distillation		(1)

Question Number	Answer	Acceptable answers	Mark
3(a)(ii)	to make it liquid	liquefy/condense to remove water (vapour) to remove carbon dioxide	(1)

Question Number	Answer	Acceptable answers	Mark
3(b)	D weak forces of attraction between the oxygen molecules		(1)

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	An description including <ul style="list-style-type: none"> shared (electrons) (1) pair(s) of electrons (between atoms) (1) 	Ignore reference to complete/full shells Ignore reference to between two metals Ignore reference to between metal and non-metal Ignore reference to between molecules Any reference to between ions scores 0	(2)

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	2.4		(1)

Question Number	Answer	Acceptable answers	Mark
3(c)(iii)	diagram showing <ul style="list-style-type: none"> any shared pair of electrons between a carbon and oxygen atom in CO₂ molecule (1) rest of molecule correct (1) 	Must have O C O arrangement If any atom labelled must be correct Ignore inner electrons even if wrong electrons can be on/in ring or no ring Ignore intersecting circles Accept all permutations of dots and crosses	(2)