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

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	An explanation linking two of • strong (electrostatic) forces of attraction • between oppositely charged ions • so requires lot of heat/energy to overcome forces/break bonds	Any reference to molecules/molecular/intermolecular/covalent scores 0 marks strong (ionic) bonds positive and negative ions reject charged atoms for this mark ignore hard to melt/high temperature needed	**(2)**

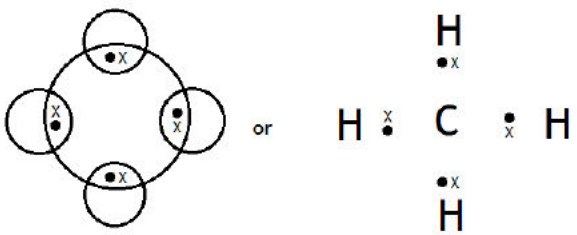
Question Number	Answer	Acceptable answers	Mark
1(a)(iii)	A description including • M1 add (dilute) nitric acid • M2 add silver nitrate (solution) • M3 forms white ppt/solid	Accept correct formulae If use any other acid can score M2 and M3 dependent on use of silver nitrate Alternative method: Electrolyse (1) Chlorine formed (1) Bleaches litmus/pH paper (1) Ignore smell	**(3)**

Question Number		Indicative Content	Mark
QWC	**1(b)**	A description including some of the following points **ion formation** • 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 **structure** • 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) diagram can be credited for any points	**(6)**
Level	**0**	No rewardable content	
1	**1 - 2**	• 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**	• 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**	• 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)	An explanation linking • layers can slide / move/slip (over each other) **(1)** • (because)weak forces between layers (of atoms) **(1)**	Any mention of ions (0) Ignore can be rubbed off Accept weak bonds for weak forces Accept sheets for layers Ignore mention of {intermolecular /intramolecular} forces/bonds Ignore weak forces between molecules	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(b)	Diagram showing  • 1 shared pair between C and H **(1)** • rest of diagram correct **(1)**	Ignore inner electrons, even if incorrect Accept electrons on/in ring (if ring drawn) Accept all dots or all crosses Accept circles touching and electrons shown where they touch	**(2)**

Question Number		Indicative Content	Mark
QWC	***2(c)**	An explanation including some of the following points **Sodium chloride** • 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 **Water** • covalent bonds between (hydrogen and oxygen) atoms/ (pair of) electrons shared between atoms • contains molecules • H_2O • 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	• 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	• 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 H_2O 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	• 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 • 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 • any shared pair of electrons between a carbon and oxygen atom in CO_2 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)**