Question Number	Correct Answer	Reject	Mark
15(a)	**M1:** The salt dissolves in **the** water (of crystallization) / the salt dissolves in (its) water of crystallization **NOTE:** For M1 it needs to be clear that the water came from the initial solid **(1)** **M2:** Water boils/water evaporates **(1)** **M3:** (Anhydrous) magnesium nitrate / $Mg(NO_3)_2$ crystallizes **OR** (Anhydrous) magnesium nitrate / $Mg(NO_3)_2$ is formed **ALLOW for M3:** (White) solid formed as the concentration becomes too high / as water is driven off **OR** Solid reforms/forms **(1)**	Any mention of 'melt(s)'	**(3)**

Question Number	Correct Answer	Reject	Mark
15(b)(i)	**NOTE 1:** The chemicals identified MUST correspond to the correct **Stage number** **NOTE 2:** Award mark in each case for either the correct name or the correct formula. HOWEVER if both a name AND a formula are given, BOTH must be correct. **Stage 5**: Nitrogen dioxide / NO_2 / N_2O_4 (is the brown gas) **(1)** **Stage 6**: Oxygen / O_2 (relights a glowing splint) **(1)** **Stage 7**: Magnesium oxide / MgO (is the white solid) **(1)**	**Just** "O" for oxygen's formula	**(3)**

Question Number	Correct Answer	Reject	Mark
15(b)(ii)	$2Mg(NO_3)_2.6H_2O \rightarrow 2MgO + 4NO_2 + O_2 + 12H_2O$ Ignore state symbols even if incorrect **ALLOW** multiples **ALLOW** $2N_2O_4$ for $4NO_2$ **M1** Correct entities **(1)** **M2** Balancing **(1)** **M2 depends on M1** **Special case** If the anhydrous salt equation is given: $2Mg(NO_3)_2 \rightarrow 2MgO + 4NO_2 + O_2$ scores **1 max**		**(2)**

Question Number	Correct Answer	Reject	Mark
15(c)(i)	(Magnesium chloride) Colourless / no colour **(1)** (Calcium chloride) Yellow-red **OR** brick-red **OR** red **ALLOW** Orange-red **(1)**	UV/white/bright white Crimson **Just** 'orange' **Just** 'yellow'	**(2)**

Question Number	Correct Answer	Reject	Mark
***15(c)(ii)**	**M1 –** for idea of **electrons** being **promoted** (Heating) promotes **electrons** / excites **electrons** (to higher energy levels) **(1)** **M2 – for idea of electrons falling back down** Electrons fall back (to lower levels / ground states) **(1)** **M3 – for idea of emission of light** Emitting (visible) light / emitting photons **(1)**	**Just** molecules gain energy No M3 if mention of energy / light absorbed	**(3)**

Question Number	Correct Answer	Reject	Mark
15(c)(iii)	**M1:** EITHER In magnesium the energy levels are further apart / the energy levels are different OR In calcium the energy levels are closer / the energy levels are different **IGNORE** Any comparison of the relative numbers of energy levels **M2:** For magnesium, the energy released is outside the visible spectrum / visible region OR For calcium, the energy released is inside the visible spectrum / visible region OR the energy released is in the red region (of the spectrum) OR Different amounts of energy are released OR Different frequencies / wavelengths emitted **(1)** Mark these points independently	**Just** "no transitions for magnesium"	**(2)**

(Total for Question 15 = 15 marks)

Total for Section B = 41 marks