| Question | Marking Guidance | Mark | Comments |
|---|---|---|---|
| 2(a) | $MgCl_2(s) \rightarrow Mg^{2+}(g) + 2Cl^-(g)$ | 1 | |
| 2(b) | The magnesium <u>ion</u> is smaller / has a smaller radius / greater charge density (than the calcium ion)<br><br>Attraction between ions / to the chloride ion stronger | 1<br><br>1 | If not ionic or if molecules / IMF / metallic / covalent / bond pair / electronegativity mentioned, CE = 0<br><br>Allow ionic bonds stronger<br>Do not allow any reference to polarisation or covalent character<br>Mark independently |
| 2(c) | The oxide ion has a greater charge / charge density than the chloride ion<br><br>So it attracts the magnesium ion more strongly | 1<br><br>1 | If not ionic or if molecules / IMF / metallic / covalent / bond pair mentioned, CE = 0<br>Allow oxide ion smaller than chloride ion<br>Allow ionic bonds stronger<br>Mark independently |
| 2(d) | $\Delta H_{solution} = \Delta H_L + \Sigma\Delta H_{hyd}$ $Mg^{2+}$ ions + $\Sigma\Delta H_{hyd}$ $Cl^-$ ions<br><br>$-155 = 2493 + \Delta H_{hyd}$ $Mg^{2+}$ ions $- 2\times364$<br><br>$\Delta H_{hyd}$ $Mg^{2+}$ ions $= -155 - 2493 + 728$<br><br>$= -1920$ (kJ $mol^{-1}$) | 1<br><br><br><br>1<br><br>1 | Allow correct cycle<br><br><br><br><br>Ignore units<br>Allow max 1 for +1920<br>Answer of + or -1610, CE = 0<br>Answer of -2284, CE = 0 |

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| 2(e) | Water is polar / O on water has a delta negative charge<br><br>$Mg^{2+}$ ion / +ve ion / + charge attracts (negative) O on a water molecule | 1<br><br>1 | Allow <u>O</u> (not water) has lone pairs (can score on diagram)<br><br>Allow $Mg^{2+}$ attracts lone pair(s)<br>M2 must be stated in words (QoL)<br>Ignore mention of co-ordinate bonds<br>CE = 0 if $O^{2-}$ or water ionic or H bonding |

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| 2(f) | Magnesium oxide reacts with water / forms $Mg(OH)_2$ | 1 | Allow MgO does not dissolve in water / sparingly soluble / insoluble |