Question	Marking Guidance	Mark	Comments
1(a)	Enthalpy change for the formation of 1 mol of gaseous atoms From the element (in its standard state) Enthalpy change to separate 1 mol of an ionic lattice/solid/compound Into (its component) gaseous ions	1 1 1 1	allow heat energy change for enthalpy change ignore reference to conditions enthalpy change not required but penalise energy mark all points independently
1(b)	$\Delta H_L = {}^{-}\Delta H_f + \Delta H_a$ + I.E. + 1/2E(Cl-Cl) + EA = +411 + 109 + 494 + 121 – 364 = +771 (kJ mol $^{-1}$)	1 1 1	Or correct Born-Haber cycle drawn out –771 scores 2/3 +892 scores 1/3 –51 scores 1/3 –892 scores zero +51 scores zero ignore units
1(c)(i)	Ions are perfect spheres (or point charges) Only electrostatic attraction/no covalent interaction	1 1	mention of molecules/intermolecular forces/covalent bonds CE = 0 allow ionic bonding only If mention of atoms CE = 0 for M2
1(c)(ii)	Ionic	1	Allow no covalent character/bonding

1(c)(iii)	Ionic with additional covalent bonding	1	Or has covalent character/partially covalent Allow mention of polarisation of ions or description of polarisation