OCR AS/A-level Year 1 Chemistry A exam practice answers

2 Atoms and reactions

**1 (a)** Mg(s) + ½O2(g) → MgO(s) *or* 2Mg(s) + O2(g) → 2MgO(s)

and

S(s) + O2(g) → SO2(g)

Both equations are needed for the mark.**✓**

The state symbols are not asked for so 2Mg + O2 → 2MgO and S + O2 → SO2 would get the mark.

**(b)** Initial oxidation state of S is 0 and the final oxidation state of S is +4 **✓**,hence sulfur has undergone oxidation **✓**.

**(c)** MgO(s) + H2O(l) → Mg(OH)2(aq) **✓**

Mg(OH)2 is almost insoluble so Mg(OH)2(s) would also be accepted.

SO2(g) + H2O(l) → H2SO3(aq) **✓**

**2 (a)** mols of HCl = 1.75 × 10−3 mols **✓**

**(b)** mole ratio Na2CO3 : HCl is 1 : 2 **✓**; therefore mols of Na2CO3 = 8.75 × 10−4 mols

**(c)** mols of Na2CO3 in 1.0 dm3 = (8.75 × 10−4) × (1000/25) = 0.035 mols **✓** = 3.71 g **✓**

**(d)** 10.0 – 3.71 = 6.29 g H2O**✓**

**(e)** mols of H2O = (6.29/18) = 0.35 mols; hence the formula is Na2CO3.10H2O **✓**