Assessment Schedule – 2006

Chemistry: Describe chemical reactions (90171)

Evidence Statement

Q	Evidence	Achievement	Merit	Excellence
1	(a) P (b) T (c) P (d) O (e) O	Four correct.		
2(a)	(i) no precipitate (ii) lead chloride (iii) magnesium hydroxide	Two correct answers.		
2(b)	$Pb(NO_3)_2(aq) + 2KCl(aq) \rightarrow 2KNO_3(aq) + PbCl_2(s)$ OR $Pb^{2+}(aq) + 2Cl^-(aq) \rightarrow PbCl_2(s)$ OR $2KOH(aq) + MgSO_4(aq) \rightarrow K_2SO_4(aq) + Mg(OH)_2(s)$ OR $Mg^{2+}(aq) + 2OH^-(aq) \rightarrow Mg(OH)_2(s)$	Correct formulae of reactants and products for one reaction.	One correctly balanced equation. Precipitate must be identified either in 2(a) or 2(b). (In the equation (s) or ↓ could be used.	
3	(a) barium chloride + magnesium sulfate → barium sulfate + magnesium chloride (b) sodium hydrogen carbonate → sodium carbonate + water + carbon dioxide (c) iron + copper sulfate → iron (II) sulfate + copper	Two correct answers. If symbols are used, formulae must be correct.		
4(a)	(i) Sodium carbonate : white powder (ii) Calcium carbonate : white powder (iii) Copper carbonate : green powder	Two linked observations from each of (a) and (b). For instance, (a)(i) and (b)(i) is one linked observation.		
4(b)	(i) Sodium carbonate: no reaction / still a white powder. (ii) Calcium carbonate: gas given off / no apparent change (iii) Copper carbonate: gas given off / powder turns black. (If CO_2 gas = accept. Do not accept CO_2 on its own – this is an inference not an observation.) (Accept effervescence.)			
4(c)	$CuCO_3(s) \rightarrow CuO(s) + CO_2(g)$	Correctly balanced equation.		
4(d)(i)	This is an oxidation-reduction reaction.	Identifies the reaction as an oxidation-reduction reaction or a displacement reaction.		

4(d)(ii)	The magnesium loses 2 electrons to the Fe^{2+} in solution forming Mg^{2+} which is soluble, so the grey powder disappears. The Fe^{2+} gains 2 electrons from the Mg forming Fe metal, so the green colour of the solution caused by Fe^{2+} fades and the new dark grey solid forms at the bottom of the beaker. Half equations: $Mg(s) \rightarrow Mg^{2+}(aq) + 2e^-$ $Fe^{2+}(aq) + 2e^- \rightarrow Fe(s)$ Overall equations: $Mg(s) + Fe^{2+}(aq) \rightarrow Mg^{2+}(aq) + Fe(s)$ OR $Mg(s) + FeSO_4(aq) \rightarrow MgSO_4(aq) + Fe(s)$ **OR** According to the reactivity series, magnesium is more reactive than iron. This means magnesium will replace the iron (II) ions in solution, causing the green solution to fade, since magnesium sulfate solution is colourless. The iron (II) ions will form iron metal, this is the 'new dark grey solid' that forms on the bottom of the beaker. $Mg(s) + FeSO_4(aq) \rightarrow Fe(s) + MgSO_4(aq)$ OR $Mg(s) + Fe^{2+}(aq) \rightarrow Fe(s) + Mg^{2+}(aq)$	Describes the chemistry relevant to the observations for the reacting magnesium **OR** Iron sulfate, **AND** Recognises that electron transfer is required. Describes the chemistry relevant to the observations for the reacting magnesium or iron sulfate, in terms of displacement according to the reactivity series.	Uses the relevant chemistry and electron transfer to explain changes in both Mg and Fe or of one with the correct and relevant half equation. Explains observations for the magnesium and iron sulfate in terms of displacement according to the reactivity series.	Explains the chemistry relevant to the observations for the reacting magnesium **AND** iron sulfate, including the correct electron transfer **AND** Writes a correctly balanced overall equation, or two correct half equations. Explains observations for the magnesium **AND** iron sulfate in terms of displacement according to the reactivity series **AND** a correctly balanced equation is written.
5	(a) 100.1 (or 100) (b) 102 (c) 132.1 (132)	Two correct answers		
6	$\frac{2.14\ g}{2 \times 53.5} = \frac{x}{74.1}$ x = 1.48 g (3sf)	Evidence of correct calculation of Molar mass could be used here if needed for overall achievement	Evidence of correct use of (2:1) ratio of molecular masses.	Correct answer and working. Unit must be included.

7	Total mass = 3.55g + 5.60g = 9.15g Cl: $\frac{3.55}{9.15} \times 183 = 71.0$ $\frac{71.0}{35.5} = 2$ O: $\frac{5.60}{9.15} \times 183 = 112.0$ $\frac{112.0}{16.0} = 7$ Formula = Cl_2O_7	One calculation process must be correct. Total mass of the compound calculated **OR** Molar masses used to calculate formula.	Two calculation processes must be correct. 2Cl: 7O ratio calculated correctly. (or 1:3.5)	Correct answer. Working must be complete with no errors. Clear evidence of ratio doubled should be shown.

Judgement Statement

Chemistry: Describe chemical reactions (90171)

Achievement	Achievement with Merit	Achievement with Excellence
SEVEN questions answered correctly. Minimum of 7 × A	EIGHT questions answered correctly, including at least THREE at Merit level. Minimum of 3 × M + 5 × A	NINE questions answered correctly, including at least TWO at Merit level and at least TWO at Excellence level. Minimum of 2 × E + 2 × M + 5 × A