

Question number	Answer	Additional guidance	Mark
8(c)	<p>2.4/24 moles Mg = 0.1 mol (1)</p> <p>and 0.2 moles H₂O has mass 0.2 × formula mass H₂O = 3.6 g (1)</p> <p>total mass reactants = 2.4 + 3.6 = 6.0 g is the same as total mass products = 5.8 + 0.2 = 6.0 g (1)</p>	Award full marks for correct numerical answer without working.	(3)

Question number	Answer	Mark
9(a)(i)	<p>An explanation that makes reference to: identification – knowledge (1 mark) and reasoning /justification – knowledge (1 mark):</p> <ul style="list-style-type: none"> • a strong acid is completely ionised in solution/exists completely as ions (1) • but a weak acid is only partly ionised/exists mainly as molecules with very few ions present (1) 	(2)

Question number	Answer	Mark
9(a)(ii)	hydroxide ions react with hydrogen ions and reduce the hydrogen ion concentration therefore increase pH (1)	(1)

Question number	Answer	Mark
9(b)	<p>ZnO + 2HNO₃ → Zn(NO₃)₂ + 2H₂O</p> <ul style="list-style-type: none"> • zinc nitrate formula (1) • full, balanced equation (1) 	(2)

Question number	Answer	Additional guidance	Mark
9(c)	$\text{mass} = 50 \times \frac{40}{1000} (1) = 2 \text{ (g) (1)}$	Award full marks for correct numerical answer without working.	(2)

Question Number	Indicative content
9(d)	<p>Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme.</p> <p>The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant.</p> <p style="text-align: center;">AO2 (3 marks)</p> <ul style="list-style-type: none"> • suitable acid: sulfuric acid • suitable substance : magnesium oxide / magnesium carbonate / magnesium hydroxide / magnesium • equation for reaction: $MgO + H_2SO_4 \rightarrow MgSO_4 + H_2O/$ $Mg(OH)_2 + H_2SO_4 \rightarrow MgSO_4 + 2H_2O/$ $MgCO_3 + H_2SO_4 \rightarrow MgSO_4 + H_2O + CO_2/$ $Mg + H_2SO_4 \rightarrow MgSO_4 + H_2$ <p style="text-align: center;">AO3 (3 marks)</p> <ul style="list-style-type: none"> • add solid to warmed acid until in excess solid remains (oxide and hydroxide) / add solid a little at a time until no more bubbles (carbonate/metal) • filter off the excess solid, pour remaining solution into an evaporating basin • {heat solution / leave the water to evaporate} • until pure salt crystals form and then dry salt crystals with absorbent paper/leave to dry.

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	<ul style="list-style-type: none"> • The plan attempts to link and apply knowledge and understanding of scientific enquiry, techniques and procedures, flawed or simplistic connections made between elements in the context of the question. (AO2) • Analyses the scientific information but understanding and connections are flawed. An incomplete plan that provides limited synthesis of understanding. (AO3)
Level 2	3–4	<ul style="list-style-type: none"> • The explanation is mostly supported through linkage and application of knowledge and understanding of scientific enquiry, techniques and procedures, some logical connections made between elements in the context of the question. (AO2) • Analyses the scientific information and provides some logical connections between scientific enquiry, techniques and procedures. A partially completed plan that synthesises mostly relevant understanding, but not entirely coherently. (AO3)
Level 3	5–6	<ul style="list-style-type: none"> • The explanation is supported throughout by linkage and application of knowledge and understanding of scientific enquiry, techniques and procedures, logical connections made between elements in the context of the question. (AO2) • Analyses the scientific information and provide logical connections between scientific concepts throughout. A well-developed plan that synthesises relevant understanding coherently. (AO3)

Question Number	Answer	Acceptable answers	Mark
5(a)	magnesium nitrate water carbon dioxide all three correct (2) magnesium nitrate + one other correct (1)	allow correct formulae	(2)

Question Number	Answer	Acceptable answers	Mark
5(b)(i)	C – neutralisation		(1)

Question Number	Answer	Acceptable answers	Mark
5(b)(ii)	$\text{ZnO} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2\text{O}$ (3) LHS (1) RHS (1) balancing of correct formula (1)	correct multiples ignore state symbols	(3)