

Question number	Answer	Notes	Marks
1 (a) (i)	<p>Any two from:</p> <p>M1 calcium/solid/it disappears</p> <p>M2 bubbles (of gas) / fizzing / effervescence</p> <p>M3 <u>white</u> solid (forms) / <u>white</u> suspension (forms) / (liquid) turns milky / (liquid) turns cloudy / <u>white</u> trails forms</p> <p>M4 calcium moves (up and down)</p> <p>M5 water/solution/liquid gets warm</p>	<p>ACCEPT dissolves / gets smaller IGNORE mass decreases</p> <p>ACCEPT gas given off IGNORE hydrogen given off IGNORE incorrect gas / colour</p> <p>ACCEPT <u>white</u> precipitate forms</p> <p>IGNORE floats REJECT refs to moving <u>on the surface</u></p> <p>ACCEPT temperature of water/solution/liquid rises IGNORE refs to heat released</p>	2
(ii)	<p>M1 any value greater than 7</p> <p>M2 hydroxide <u>ions</u>/OH⁻ are present / calcium hydroxide/Ca(OH)₂ is an alkali / calcium hydroxide/Ca(OH)₂ is a base</p> <p>M2 dep on correct or missing M1</p>	<p>ACCEPT "greater than 7"</p> <p>ACCEPT metal hydroxides are alkalis/bases IGNORE hydroxides are alkalis/bases IGNORE calcium is an alkali metal</p>	2
(b)	<p>M1 (Solid X) – CaO / calcium oxide</p> <p>M2 (Solution Y) – CaCl₂ / calcium chloride</p> <p>M3 (Solid Z) – CaCO₃ / calcium carbonate</p>	<p>if both formula and name given both must be correct</p> <p>REJECT Ca(HCO₃)₂ / calcium hydrogencarbonate</p>	3

Question number	Expected Answer	Accept	Reject	Marks
2 (a) (i)	M1 calcium M2 magnesium	Ca Mg	any other answers	1 1
(ii)	iron / zinc	Fe / Zn	any other answers	1
(iii)	calcium magnesium zinc iron copper M1 for calcium as most reactive M2 for copper as least reactive M3 for remainder in correct order	Ca Mg Zn Fe Cu		3
(b) (i)	hydrogen / H ₂		H	1
(ii)	<u>all</u> the (sulfuric) acid has reacted / <u>all</u> hydrogen (ions) have been replaced (by magnesium (ions)) OR acid has been used up/been neutralised / acid has run out IGNORE the acid is saturated / excess magnesium has been added	sulphuric for sulfuric hydrogen ions / H ⁺ for acid	all the magnesium / reactants used up	1
(iii)	magnesium sulfate (solution) IGNORE incorrect formula	sulphate for sulfate MgSO ₄		1
(iv)	filtration / filter (it / magnesium / solution) / decantation / decant (off the water / solution) IGNORE references to distillation / centrifuging / washing / evaporation <u>after</u> filtration	description of filtration	sieve crystallisation	1

2	(c)	(i)	exothermic			1
		(ii)	magnesium oxide IGNORE incorrect formula	MgO		1

Question number	Answer	Notes	Marks
3 (a)	(i) silver chloride	Accept silver(I) chloride	1
	(ii) $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$	Reactants = 1 Products = 1 Award 1 mark if all formulae correct but equation unbalanced Accept a correct ionic equation for 2 marks - $\text{Ag}^+ + \text{Cl}^- \rightarrow \text{AgCl}$ $\text{Ag}^+ + \text{Cl}^- \rightarrow$ scores M1 (but only with arrow)	1 1
(b)	s for PbSO_4 and aq for other three species		1
(c)	(i) (dilute) nitric acid / HNO_3 sodium hydroxide / NaOH	Accept sodium carbonate / sodium hydrogencarbonate / sodium bicarbonate Award 1 mark if both substances correctly identified but written in the wrong order If name and formula given, both must be correct.	1 1
	(ii) 22.30 3.60 18.70	Penalise missing zeroes once only Award 1 for 2 correct readings in wrong order M3 CQ on M1 and M2	1 1 1
(d)	(i) ticks in boxes under columns 2 and 4		1
	(ii) $\frac{22.5(0) + 22.6(0)}{2}$ 22.55 (cm ³)	CQ on candidate's ticked results – if average of different results, then 0 If ticked results other than the correct ones, then final answer must be to 2 dp to score M2, but no penalty for missing trailing zeroes Average of 1 result scores 0 Correct answer with no working scores 2 marks	1

3 (e)	filter leave crystals to dry / dab crystals with filter paper/kitchen towel / warm (in oven)	Allow decant / pour off water Ignore washing Allow "leave to evaporate (rest of) water / leave to evaporate to dryness" for 2 marks If filter / decant / pour off water mark not scored, then marks can be awarded as follows: M1 leave in warm place/sun/on window ledge / heat or warm (in oven) M2 to evaporate/remove water/until dry No marks can be awarded if there is a statement about using strong heating or a bunsen burner	1 1
(f)	NaNO_2 $M_r = 69$ $n(\text{NaNO}_3 / \text{NaNO}_2) = 0.02$ OR $\frac{1.70 \times 69}{85} / \frac{1.70 \times 138}{170}$ 1.38 (g)	Award mark if 138 seen ecf for incorrect M_r Accept 2sf or better Correct answer with no working scores 3 marks	1 1 1

Total 17 marks