Question	Answer	Marks
1(a)	all temperatures completed and all temperatures and temperature changes recorded to the same precision	**1**
	all temperatures after 1 minute are lower than the starting temperatures.	**1**
	all temperature decreases calculated correctly	**1**
	temperature change for 3 g is comparable to supervisor	**1**
1(b)	suitable scale for *y*-axis	**1**
	plotting	**1**
	ruler straight line through first three points and line passes through (0,0)	**1**
	horizontal ruler drawn straight line drawn through last three points	**1**
	lines extended so that they meet / cross	**1**
1(c)(i)	indication at correct point on graph	**1**
	values read correctly from graph	**1**
	units (°C **and** g)	**1**
1(c)(ii)	(all) acid used up / sodium hydrogen carbonate in excess	**1**
1(d)	temperature change when line becomes horizontal is half of temperature change for experimental results	**1**
	the mass at which the line becomes horizontal is half of mass at which plotted line becomes horizontal	**1**
1(e)	change: use a pipette	**1**
	explanation: more accurate than a measuring cylinder	**1**
	change: use a polystyrene / Styrofoam cup	**1**
	explanation: insulator / reduces heat gain	**1**

Question	Answer	Marks
2(a)	any two from: • melts / forms a liquid • steam • condensation	**2**
2(b)	white precipitate	**1**
2(c)	white precipitate	**1**
2(d)	white precipitate	**1**
	dissolves / disappears	**1**
2(e)	(red) litmus turns blue	**1**
2(f)	ammonium / NH_4^+	**1**
	aluminium / Al^{3+}	**1**
	sulfate / SO_4^{2-}	**1**
2(g)	yellow	**1**
2(h)(i)	blue	**1**
2(h)(ii)	blue ppt	**1**
2(i)	sodium / Na^+	**1**
	hydroxide / OH^-	**1**

Question	Answer	Marks
3	any 6 from: • stated / set / same / measured volume of acid • stated / set / same / measured mass of calcium carbonate • add / combine / put together **and** start timing • Repeat (with acid) at higher / lower temperature **then:** graphical method: • measure / record mass at known / regular / specified times • plot graph • steepest line is fastest **OR** mass loss in a set time • measure / record mass at a specified time • calculate / measure mass lost • largest mass loss is fastest or calculates rate by mass loss ÷ time **OR** time to end of reaction • react until mass stops changing / reaction stops • record time • shortest time is fastest or calculates rate by mass loss ÷ time **OR** time to lose a set mass • react until it reaches / loses a certain mass • record time • shortest time is fastest or calculates rate by mass loss ÷ time **OR** mass of calcium carbonate left after a set time • filter after a set time • find mass of calcium carbonate left • lower mass of calcium carbonate is fastest or calculates rate by mass loss ÷ time	**6**