Question	Part	Step	Answer	Mark scheme
1	ai	7	**A**	**1 mark**
	aii	7	filtration	**1 mark**
	b	7	suspension – formed when an insoluble substance is added to a liquid solvent – a liquid that can dissolve another substance solute – the solid that is dissolved in a liquid solution – formed when a substance dissolves in liquid	**2 marks** 1 mark for 1 or 2 correct, 2 marks for all 4 correct
2	ai	7	**D**	**1 mark**
	aii	7	aluminium sodium	**2 marks** – 1 for each point
	bi	7	iron + oxygen → iron oxide	**1 mark**
	bii	7	**A** 0.3 g	**1 mark**
3	ai	7	**B** magnesium chloride	**1 mark**
	aii	7	lighted splint gives... ...squeaky pop	**2 marks** – 1 for each point
	bi	8	zinc + hydrochloric acid → zinc chloride + hydrogen	**2 marks** – 1 for reactant, 1 for product
	bii	8	120 + 3 – 121.5 = 1.5 g	**1 mark** for substitution **1 mark** for final answer Award 2 marks for a correct answer (number and unit) with no working shown
	c	8	zinc is more reactive/a reaction will occur zinc sulfate and copper will form	**2 marks** – 1 for each point
4	a	7	at least three points plotted correctly all points plotted correctly line through data (accept both a line connecting the points or a line of best fit)	**3 marks** – 1 for each point
	b	7	all the copper sulfate has reacted	**1 mark**
	c	9	the fuse supplies the activation energy… …to break bonds and start the reaction	**2 marks** – 1 for each point

Question	Part	Step	Answer	Mark scheme
5	a	7	Any three points from the following: ● formed from sediments/bits of weathered rock ● sediments deposited ● sediments are compacted (accept 'squashed') by more sediments accumulating above them ● water is squeezed out ● minerals dissolved in the water cement (accept 'glue') the grains together	**3 marks** – 1 for each point though must be in correct order Maximum of 2 marks if statements not in correct order.
	bi	8	the rocks had not absorbed as much water as they could in the first 10 minutes	**1 mark** – Accept equivalent answers
	bii	8	put the rocks back in water for (another 10 minutes) keep repeating this until the mass does not change any more	**2 marks** – 1 for each point
	ci	8	place the rock in the water and record the volume subtract 50 cm^3	**2 marks** – 1 for each point Accept equivalent answers
	cii	8	8.1 ÷ 3.0 = 2.7 g/cm^3	**1 mark** for substitution **1 mark** for final answer Award 2 marks for a correct answer (number and unit) with no working shown
	d	8	fewer air spaces/less able to absorb water	**1 mark**
6	ai	8	**C**	**1 mark**
	aii	8	litmus paper/solution	**1 mark** – Accept equivalent answers
	bi	7	**C**	**1 mark**
	bii	7	solution B, because it will neutralise the soil/is an alkaline solution	**1 mark**
7	ai	9	a metal with one or more other elements added	**1 mark**
	aii	9	a compound has a fixed composition/ratio between the different elements in an alloy, the different substances can be mixed in any proportions	**2 marks** – 1 for each point
	b	8	the alloy has different/better properties than the pure metal	**1 mark**

Question	Part	Step	Answer	Mark scheme
	c	9	Any two points from the following: ● the different elements in the alloy have different atom/particle sizes ● layers in a pure metal slide over each other fairly easily ● adding other elements makes it harder for the layers to slide… ● …so the alloy becomes harder/stronger	**2 marks** – 1 for each point
8	a	9	he put them in order of (atomic) mass however, he reordered a few elements to make sure elements in the same column had similar properties *or* he left gaps where he thought an element had not yet been discovered	**2 marks** – 1 for each point
	b	9	His understanding was that elements in the same group/vertical column have similar properties and/or the properties of elements change gradually going up/down a group.	**1 mark**
9	ai	9	same concentration of acid same temperature	**1 mark** – Both variables need to be correct for the mark
	aii	9	repeat the experiment several times, to see if the results are repeated (the rocks are still in same order of amount of gas given off)	**1 mark** – Accept equivalent answers
	aiii	9	the gas given off when sample C reacts is much less than for the other three samples	**1 mark**
	b	10	$CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$	**3 marks** – 1 for reactants, 1 for products, 1 for being balanced
10		**See below**	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. 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. ● burner heats the air in the balloon ● particles gain energy ● particles have more kinetic energy ● speed of the gas particles increases ● density of air inside the balloon decreases ● balloon rises.	**See marks below**

Marks	Step	Descriptor
1–2	4–5	Level 1 The explanation contains basic information with a limited attempt made to link knowledge and understanding to the given context. Flawed or simplistic connections are made between elements in the context of the question.
3–4	6–7	Level 2 The explanation is occasionally supported through linkage and application of knowledge and understanding of scientific ideas to the given context. The explanation shows some linkages and lines of scientific reasoning with some structure.
5–6	8–9	Level 3 The explanation is supported throughout by sustained linkage and application of knowledge and understanding of scientific ideas to the given context. The explanation shows a well-developed, sustained line of scientific reasoning which is clear and logically structured.