

Assessment Schedule – 2007**Chemistry: Describe properties and reactions of metals, acids and bases (90640)****Evidence Statement**

Question	Evidence	Achievement	Achievement with Merit	Achievement with Excellence
ONE (a)	(i) Tomato juice (ii) Baking soda (iii) Red / pink	TWO correct		
(b)	This is a neutralisation reaction. Since the volume and concentration of the acid and the base are the same, the base should completely neutralise the acid. $\text{HCl}(aq) + \text{NaOH}(aq) \rightarrow \text{NaCl}(aq) + \text{H}_2\text{O}(\ell)$ The hydrochloric acid will have a low pH (<7) that once neutralised, will be 7.	Recognises that the pH (increases to) is 7/is neutral /neutralised / green with Universal indicator as neutral.	Explains that the pH increase/change is due to the neutralisation of the acid by the base – explains using Acid + Base \rightarrow salt + water / correct balanced equation / correct an ionic equation/ full description involving equivalence of H^+ and OH^- ions.	
TWO (a) (b)	Bubbles / gas formed /fizz /effervescence / (white) solid / calcium carbonate disappear. Neutralisation / acid-carbonate.	TWO correct answers.		
(c)	$\text{CaCO}_3(s) + 2\text{HCl}(aq) \rightarrow \text{CaCl}_2(aq) + \text{CO}_2(g) + \text{H}_2\text{O}(\ell)$ State symbols not needed.	FOUR correct formulae from the reactants or products.	Correctly balanced equation.	
(d)	Gas (CO_2) is forming and escaping from the flask, which causes the mass of the reactants to decrease.	Recognises a gas / CO_2 / CO_2 gas is formed / given off in the reaction.	Recognises that CO_2 / CO_2 gas is formed and it escapes/exits from the flask.	

e) (i) (ii)	<p>Any ONE of:</p> <ul style="list-style-type: none"> an increase in concentration of acid, an increase in temperature of acid, an increase in surface area of calcium carbonate. <p>Surface area of carbonate</p> <ul style="list-style-type: none"> More calcium carbonate particles on the surface of the solid are available to react. More collisions in a given time /more frequent collisions. <p>Concentration of acid</p> <ul style="list-style-type: none"> More acid particles are available to react with the calcium carbonate particles. More collisions in a given time /more frequent collisions. <p>Temperature of acid / reaction mixture</p> <ul style="list-style-type: none"> Increased kinetic energy of the particles / particles moving faster / particles have more energy More collisions in a given time /more frequent collisions . <p>OR</p> <ul style="list-style-type: none"> higher energy of colliding particles so more of the collisions are now effective/successful/have energy > or = than Ea. 	Names ONE correct factor. An increase must be identified (<i>but accepted in (ii) if not written in (i)</i>).	Explains aspects in terms of collisions between particles.	Explains fully the effect this change has on the particles and states the effect on particle collisions (more frequent collisions or more collisions / time or more of the collisions are effective collisions* *temperature only.
THREE (a)	$2\text{Na}(s) + 2\text{H}_2\text{O}(\ell) \rightarrow 2\text{NaOH}(aq) + \text{H}_2(g)$ States not required.	THREE correct formulae from reactants or products.	Correctly balanced equation.	
(b) (c)	<p>Blue / purple.</p> <p>Product sodium hydroxide (NaOH) is formed and it is an alkali (soluble base).</p>	Correct colour plus idea that it is because sodium hydroxide / NaOH / a base / basic product is made.	Merit PLUS explains that NaOH is an alkali / is a base that dissolves in water / is a “basic solution” / provides OH ⁻ ions.	
(d)	<p>Sodium is stored in oil because it is too reactive with oxygen (air), water and acid. It is also very soft. It is malleable and can be shaped but it is too soft/weak to hold its shape.</p> <p>Aluminium, although reactive, has an oxide layer because it has already reacted with oxygen. The oxide layer protects / masks reactivity / prevents further reaction with substance(s) eg water, oxygen, acids. It is now unreactive and it is hard enough as well as malleable to be shaped.</p> <p>(Other chemical and physical properties may be relevant such as density.)</p>	<p>Describes a chemical <u>or</u> physical property of <u>both</u> metals.</p> <p>C(Na) (C) Al OR P(Na) (P) Al but link to use not essential / poorly developed.</p>	Uses a chemical <u>and</u> physical property of both metals to explain a use (or non-use).	Uses a chemical <u>and</u> physical property of both metals to explain a stated use (or non-use).

FOUR (a)	Silver is unreactive so it doesn't easily form compounds. This makes it easy to extract as it is either found as the metal / element / uncombined / native or is extracted easily from compounds/ores because it is an unreactive metal.	Describes (one idea) <ul style="list-style-type: none"> as silver is unreactive metal it is found as the metal / element / uncombined / native OR <ul style="list-style-type: none"> silver is easily extracted from compounds / minerals / ores due to its unreactivity. 	Explains (both ideas)	
(b)	Calcium in our diet is not as a metal/element but is in ionic form (Ca^{2+}). Since the ion has a full valence shell this is not reactive, thus safe to take.	Recognises that calcium in our diet is not consumed as a metal OR that Ca in our diet is as a compound / salt.	Explains that calcium in food is (ingested) as an ion / Ca^{2+} .	Applies calcium's electron configuration (2.8.8.) / ionic form to its unreactivity / stability <u>and</u> hence its safe ingestion.

Judgement Statement — 2007

Achievement	Achievement with Merit	Achievement with Excellence
SEVEN opportunities answered at Achievement level (or higher). Minimum of $7 \times A$	EIGHT opportunities answered including at least FIVE at Merit level (or higher) and THREE at Achievement level (or higher). Minimum $5 \times M + 3 \times A$	EIGHT opportunities answered including at least TWO at Excellence level plus FOUR at Merit level (or higher) and TWO at Achievement level (or higher). Minimum $2 \times E + 4 \times M + 2 \times A$