| Question | Answer | Extra information | Marks | AO / Spec ref. |
| --- | --- | --- | --- | --- |
| **01** | element; compoundmelting point | Either order. | 21 | AO1C8.1.1 |
| **02** | iron(II) ─ greeniron(III) ─ brown |  | 11 | AO1C8.3.2 |
| **03.1** | Use a clean wire/blue flame;add sample to the flame by spray/on a splint/on a wire. |  | 11 | AO2C8.3.1 |
| **03.2** | yellow/orange/gold |  | 1 | AO1C8.3.1 |
| **03.3** | lilac/mauve/purple |  | 1 | AO1C8.3.1 |
| **03.4** | The (yellow/orange/gold) colour of the sodium (ions) is very intense/a strong colour;this masks the (lilac/mauve/purple) colour of the potassium ions. |  | 11 | AO3C8.3.1 |
| **03.5** | (Bubble gas through) limewaterturns it cloudy/milky/misty. |  | 11 | AO2C8.2.3 |
| **03.6** | sodium carbonate | Accept sodium hydrogen carbonate. | 1 | AO2C8.2.3C8.3.2 |
| **04** | lithium chloride |  | 1 | AO2C8.3.1C8.3.4 |
| **05** | chlorine – damp litmus paper – bleachedhydrogen – burning splint – popcarbon dioxide – limewater – milkyoxygen – glowing splint – relights |  | 1111 | AO1C8.2.1C8.2.3C8.2.2C8.2.4 |
| **06.1** | So it does not smudge/run/dissolve. |  | 1 | AO3C8.1.3 |
| **06.2** | Any **three** from:* X contains six/6 colourings
* Y contains five/5 colourings
* both X and Y contain the same

five/5 colourings* both contain A **and** C
* neither contains B **or** D.
 | If neither of first two bullet points given, allow **1** mark for X contains more colours than Y or converse. | 3 | AO3C8.1.3 |
| **06.3** | A |  | 1 | AO3C8.1.3 |
| **07** | **Level 3:** Description of methods used to identify both positive **and** negative ions, with relevant results. | 5–6 | AO1×4AO2×2C8.3.1C8.3.3C8.3.4 |
| **Level 2:** Description of workable methods used, with results to identify positive **or** negative ions. | 3–4 |
| **Level 1:** Any description of a method used and/or a result given. | 1–2 |
| **Level 0:** No relevant content. | 0 |
| **Indicative content:*** **Test:** Add (platinum/nichrome) wire (for the flame test).
* **Result:** The sodium compounds result in a yellow/orange/gold flame or the potassium compound results in a lilac/purple/mauve flame.
* Accept any method of introducing the solution into the flame, e.g. a splint soaked in the solution or sprayed from a bottle.
* The student could state that potassium carbonate gives a different colour to the three sodium compounds, as long as it is clear that the flame test colour comes from Na+ or K+.
* **Test:** Add dilute nitric acid to all four solutions.

Allow any acid.* **Result:** Sodium carbonate and potassium carbonate will effervesce/ give off gas **or** sodium chloride and sodium iodide will not effervesce.
* **Test:** Add dilute nitric acid followed by silver nitrate.
* **Result:** Sodium chloride and sodium iodide produce a precipitate **or** sodium chloride produces a white precipitate and sodium iodide produces a yellow precipitate.

Accept sodium carbonate and potassium carbonate do not produce a precipitate.This indicative content is not exhaustive, other creditworthy responses should be awarded marks as appropriate. |  |  |