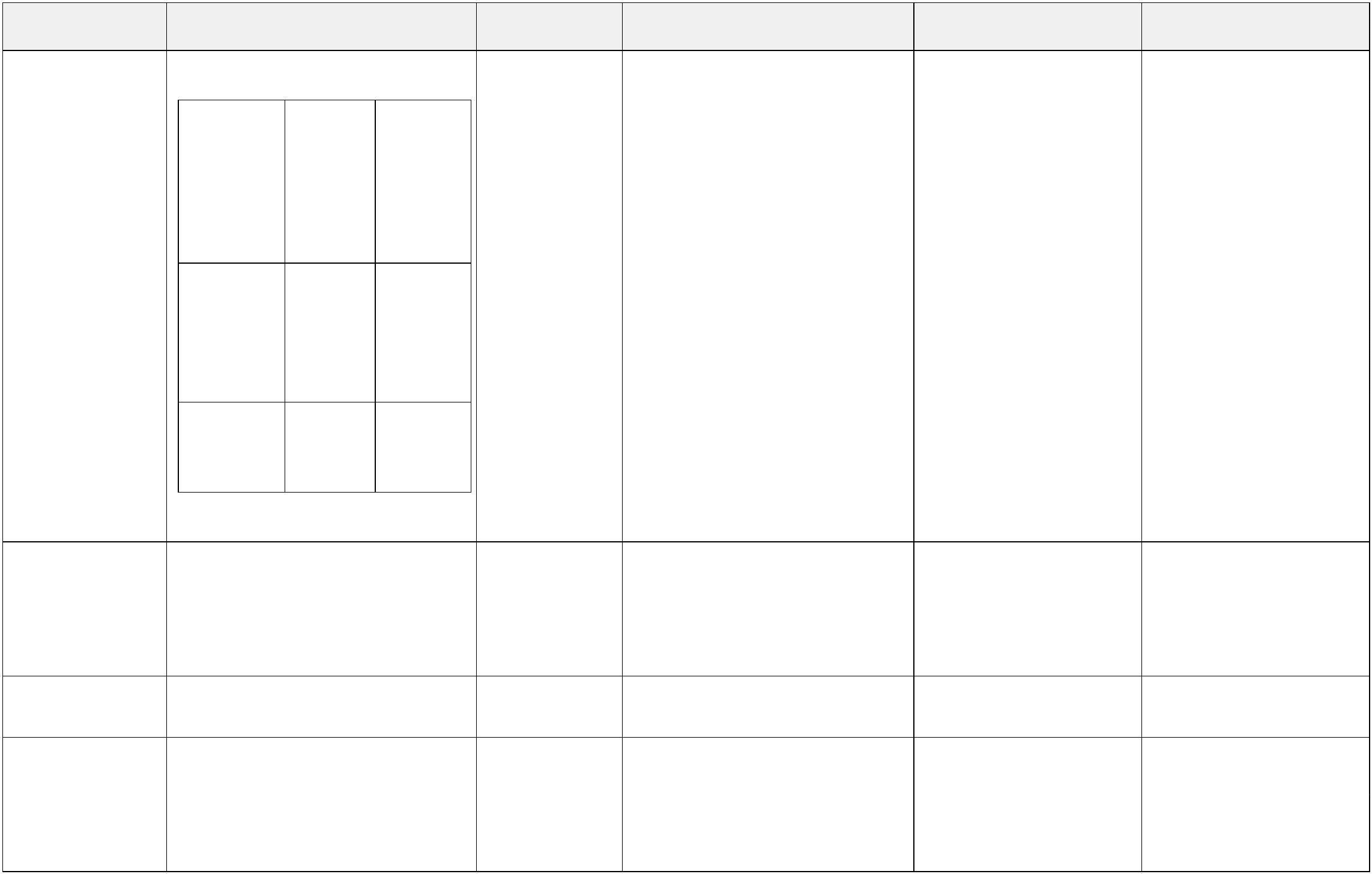
**- Mark Scheme /**



**Question Answer Marks AO Element Notes Guidance**

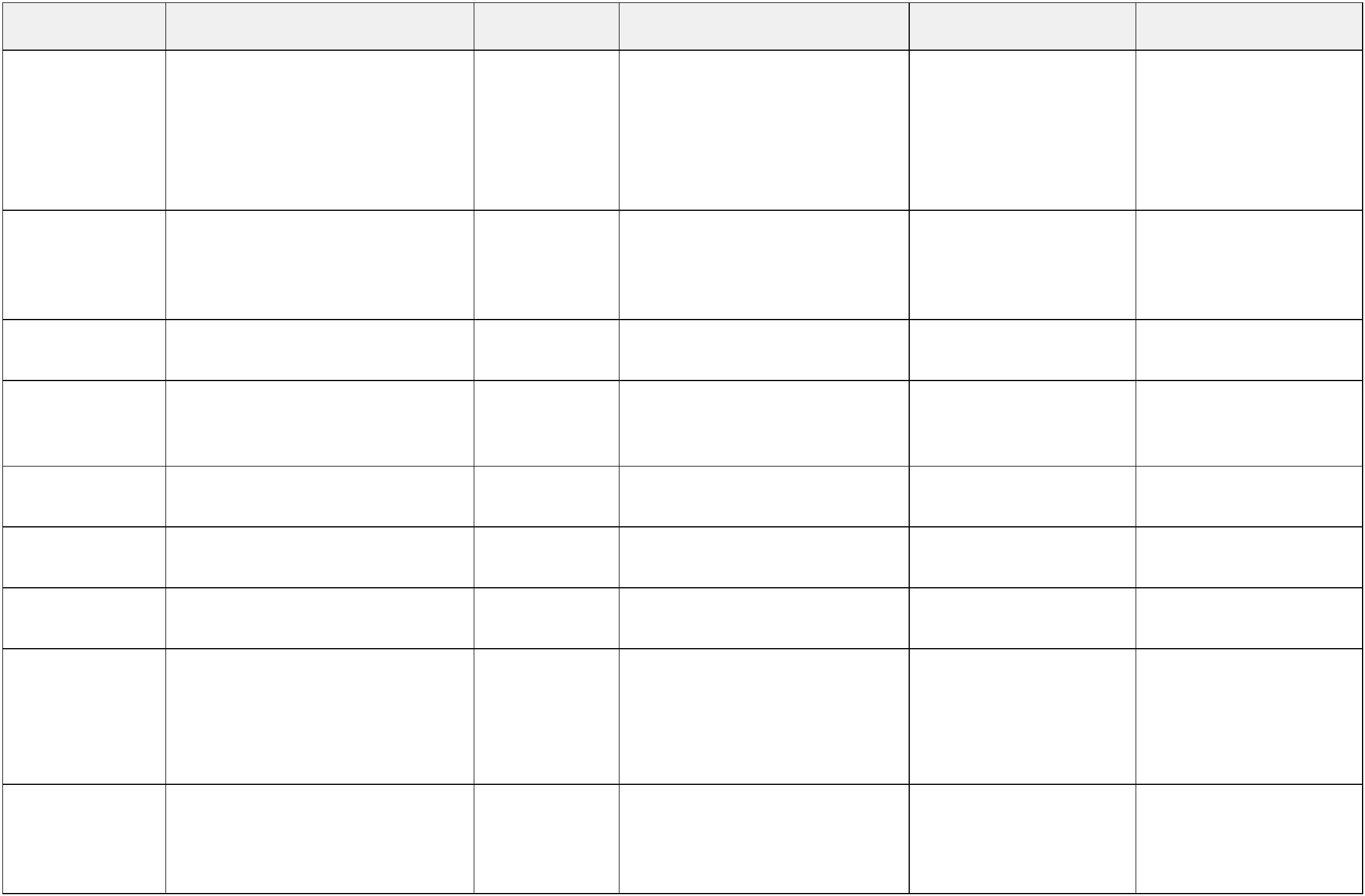
1 1 mark each for any three of: **3**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | aqueous  ions  tested |  | small  volume  of  aqueous  sodium  hydroxide |  | aqueous  sodium  hydroxide  in excess | |
|  | | | | chromium(III),  3+  Cr | |  | green  ppt  (1) |  | (ppt)  soluble /  (ppt)  dissolves  (1) | |
|  | | | | iron(II),  2 +  Fe | |  | green  ppt  (1) |  | (ppt)  insoluble  (1) |
|  | 2 |  | (D), F, A, C, E, B (2)  if 2 marks not scored: 1 mark for  1 consecutive pair of letters  reversed | | | | | | | | |  | **2** |

3 pH 9 **1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 4(a) |  | (hydrochloric acid contains)  chloride (ions) / it contains a  chloride / you would get a white  precipitate |  | **1** |

**- Mark Scheme /**



**Question Answer Marks AO Element Notes Guidance**

4(b) chloride: white (precipitate) (1) **3**

iodide: yellow (precipitate) (1)

precipitate (formed) for bothchloride and iodide (1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 5 |  | basic (oxide)  **AND**  Li is a metal |  | **1** |

6(a) octane **1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 6(b) |  | (aqueous) potassium  manganate (VII) |  | **1** |

6(c) hydrochloric acid **1**

6(d) water **1**

6(e) ethanol **1**

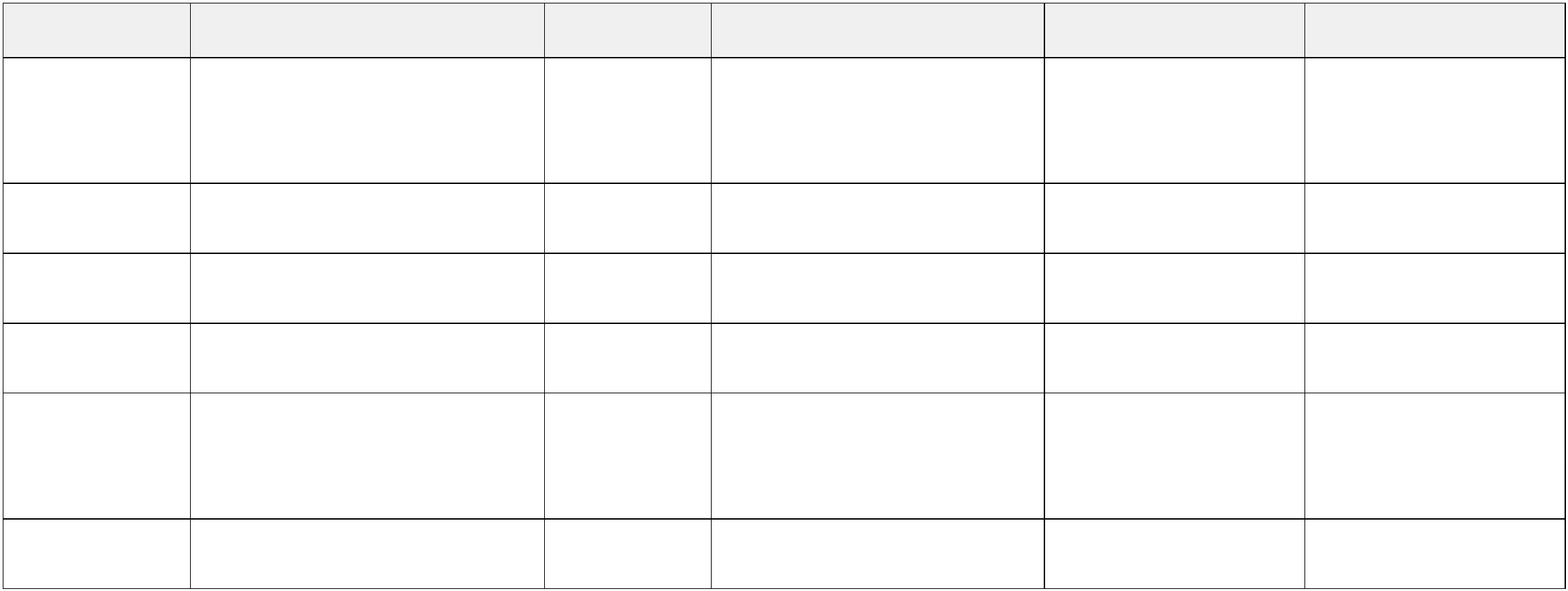
7 basic (no mark alone) **1**

**AND**

sodium is a metal (1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 8 |  | (C), A, F, D, B, E (2)  if 2 marks not scored 1 mark for  1 consecutive pair reversed |  | **2** |

**- Mark Scheme /**



**Question Answer Marks AO Element Notes Guidance**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 9 |  | (B), A, E, C, D, F (2)  If 2 marks not scored: 1 mark for  1 consecutive pair reversed |  | **2** |

10(a) 4 (NO) **1**

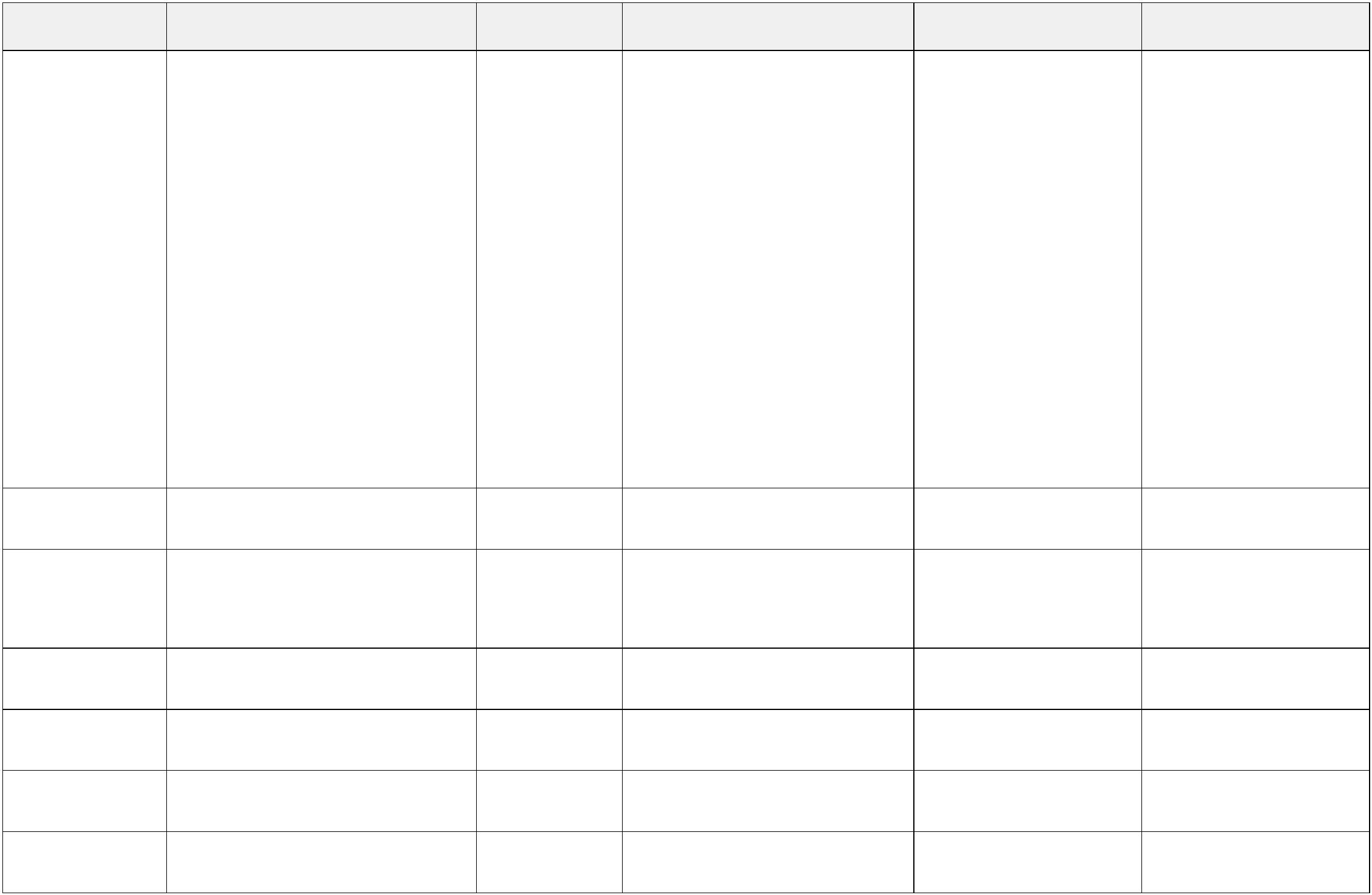
10(b) heat released / heat given out **1**

10(c) oxygen added (to NO) **1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 10(d) |  | acidic oxide  **AND**  nitrogen is a non-metal |  | **1** |

11(a) neutralisation **1**

**- Mark Scheme /**



**Question Answer Marks AO Element Notes Guidance**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 11(b) |  | 1 mark each for any three of:  ∞ evaporation / molecules  escape from surface of the  liquids  ∞ diffusion  ∞ molecules in (constant)  movement / molecules collide  ∞ (movement of) molecules is  random / in every direction  ∞ molecules spread out /  molecules mix  ∞ (molecules spread) from  higher concentration to lower  concentration  ∞ molecules react (when they  collide) |  | **3** |

12(a) yellow flame **1**

12(b) solid dissolves/disappears (1) **2**

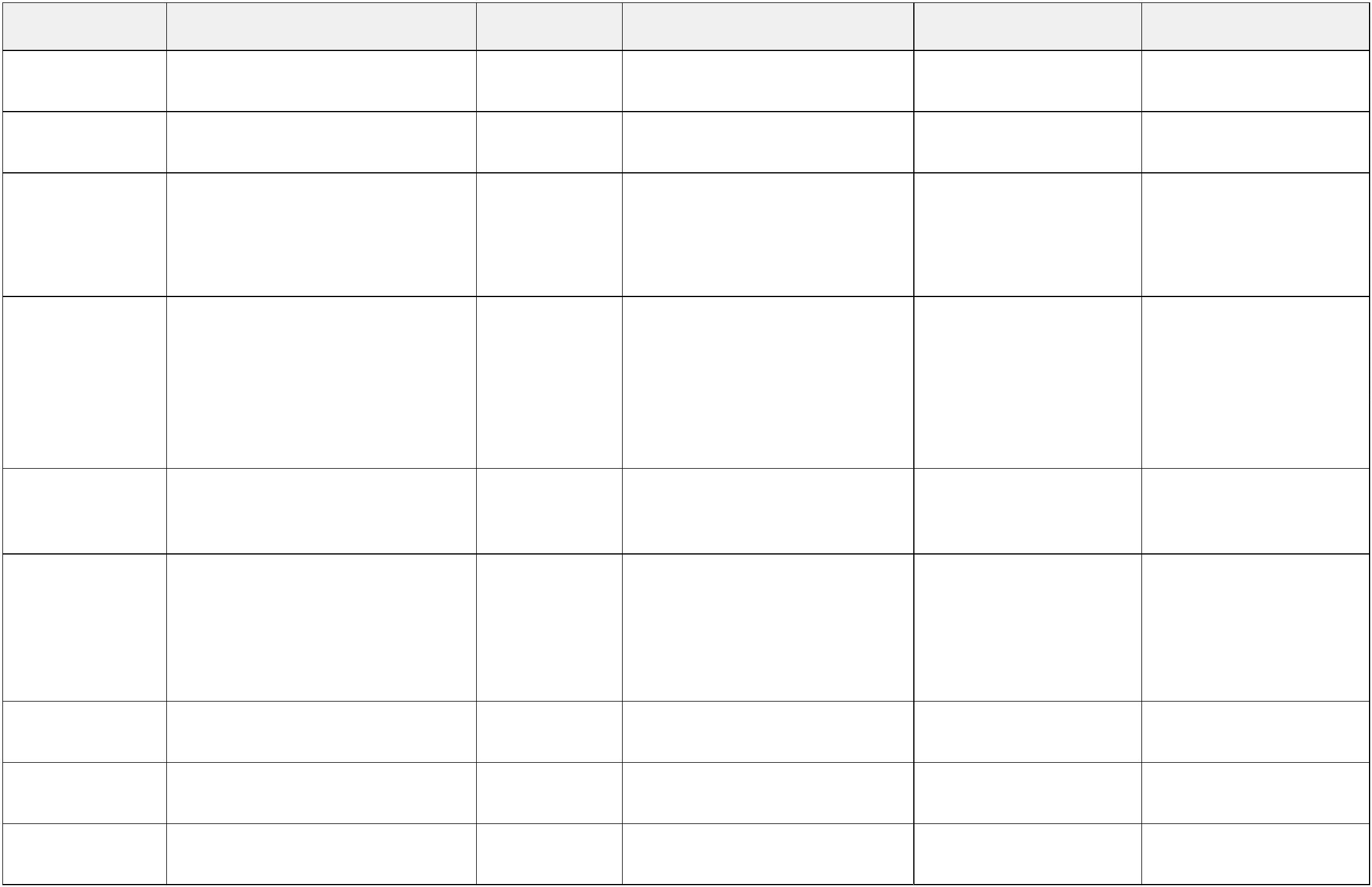
blue solution (1)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 13(a) | |  | | +  K | |  | | **1** | |
|  | 13(b) | |  | | 3+  Cr | |  | | **1** | |
|  | | 13(c) | |  | | 2+  Ca | |  | | **1** | |

−

13(d) Br **1**

**- Mark Scheme /**



**Question Answer Marks AO Element Notes Guidance**

|  |  |
| --- | --- |
|  | 2 −  13(e) SO4  **1** |

14(a) (it causes) acid rain **1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 14(b) |  | test – (aqueous) potassium  manganate(VII) (1) |  | **2** |

(purple to) colourless (1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 15 |  | (compound / salt) on wooden  splint or (nichrome/platinum)  wire (1) |  | **2** |

into (roaring) Bunsen flame(1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 16 |  | (nitric) acid reacts with / removes  carbonate ions (1) |  | **1** |
|  | 17 |  | (add aqueous) sodium  hydroxide/(aqueous) ammonia  (1) |  | **2** |

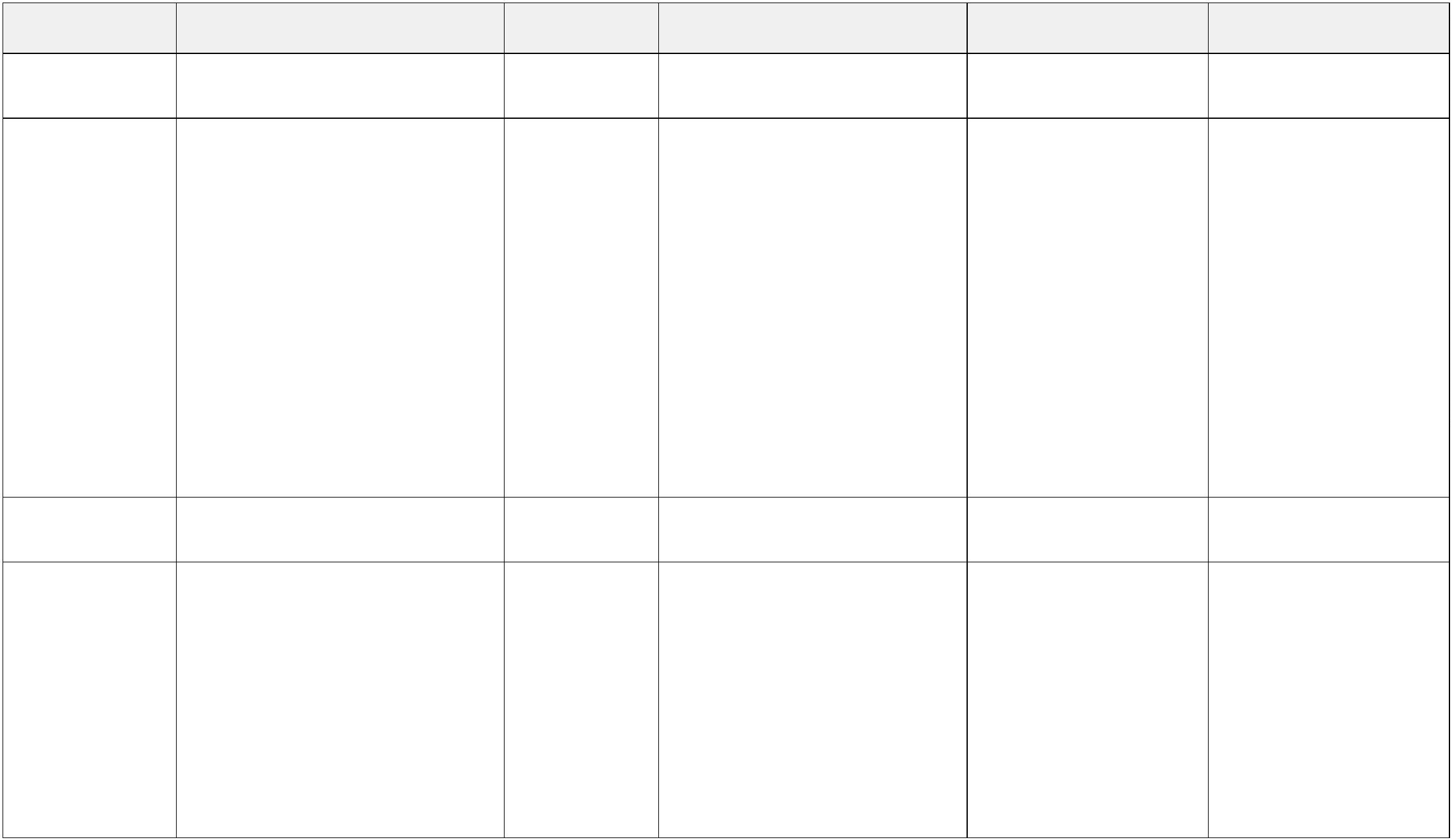
green precipitate (1)

18 magnesium nitrate **1**

19 **D** / calcium oxide / CaO **1**

20 pH 6 **1**

**- Mark Scheme /**



**Question Answer Marks AO Element Notes Guidance**

21 calcium chloride **1**

22 any **three** from: **3**

• **heat** copper oxide with sulfuric acid

• filter off (excess) copperoxide

• heat **filtrate** to point ofcrystallisation/heat (coppersulfate) **solution** to point of crystallisation

• dry between filter papers / dryin drying oven

23 ammonium sulfate **1**

24(a) any **two** from: **2**

• faster rate of fizzing

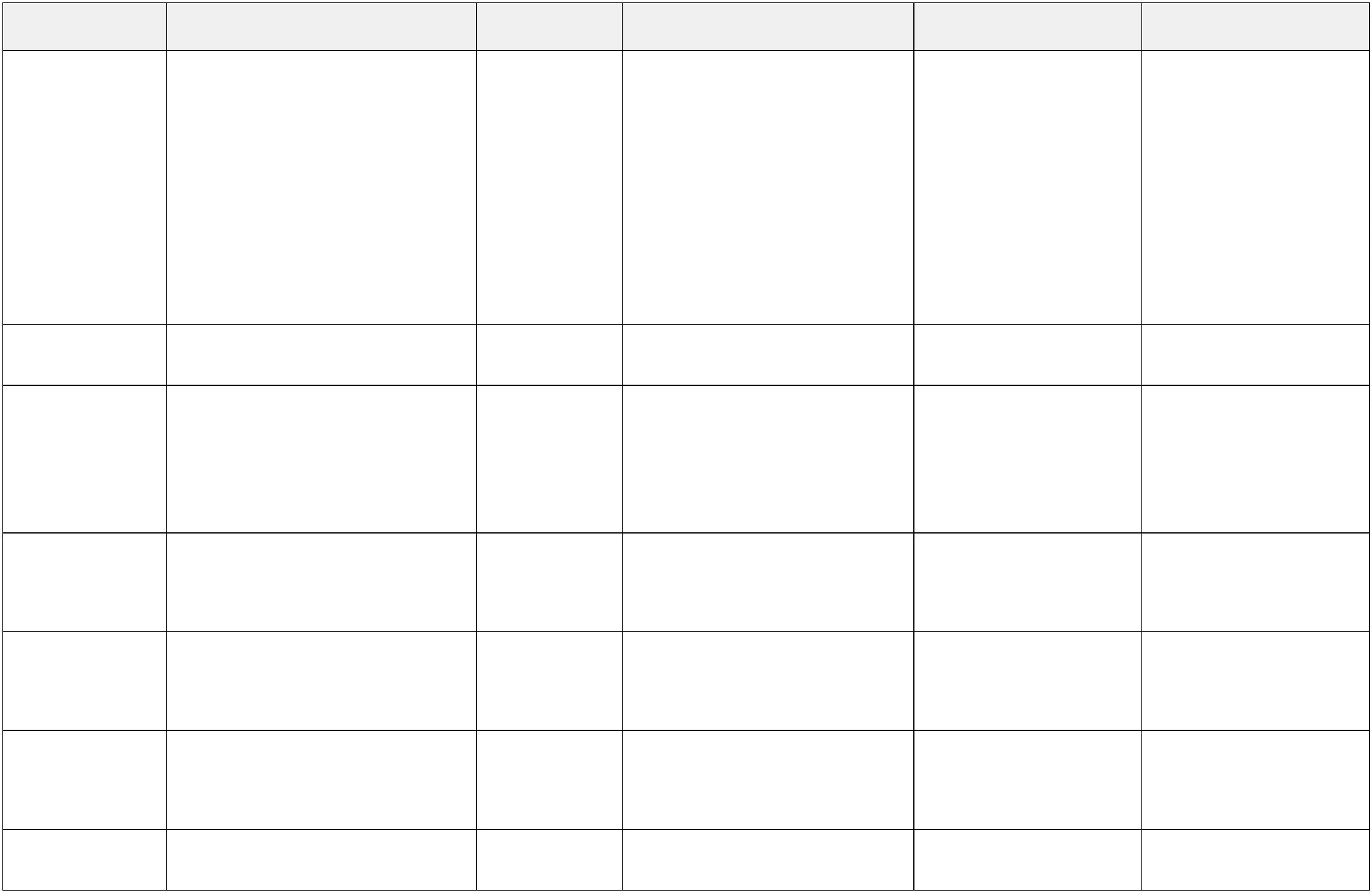
• solid dissolves quicker / disappears

quicker / gets smaller quicker

• fizzing stops quicker

• dissolving stops quicker

**- Mark Scheme /**



**Question Answer Marks AO Element Notes Guidance**

24(b) any **three** from: **3**

• temperature

• volume (of acid)

• concentration (of acid)

• mass / amount (of CaCO3)

• particle size / surface area (ofCaCO3)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | –  25(a) N3  **1** | | | | | |
|  | 25(b) |  | **M1** state symbols on right  correct (s) then (aq) |  | **2** |

**M2** (Pb(NO3)2 +) **2** (NaN3) →(Pb(N3)2 +) **2NaNO3**

25(c) **M1** filter **2**

**M2** wash with water

26 **M1** (sodium oxide) basic **2**

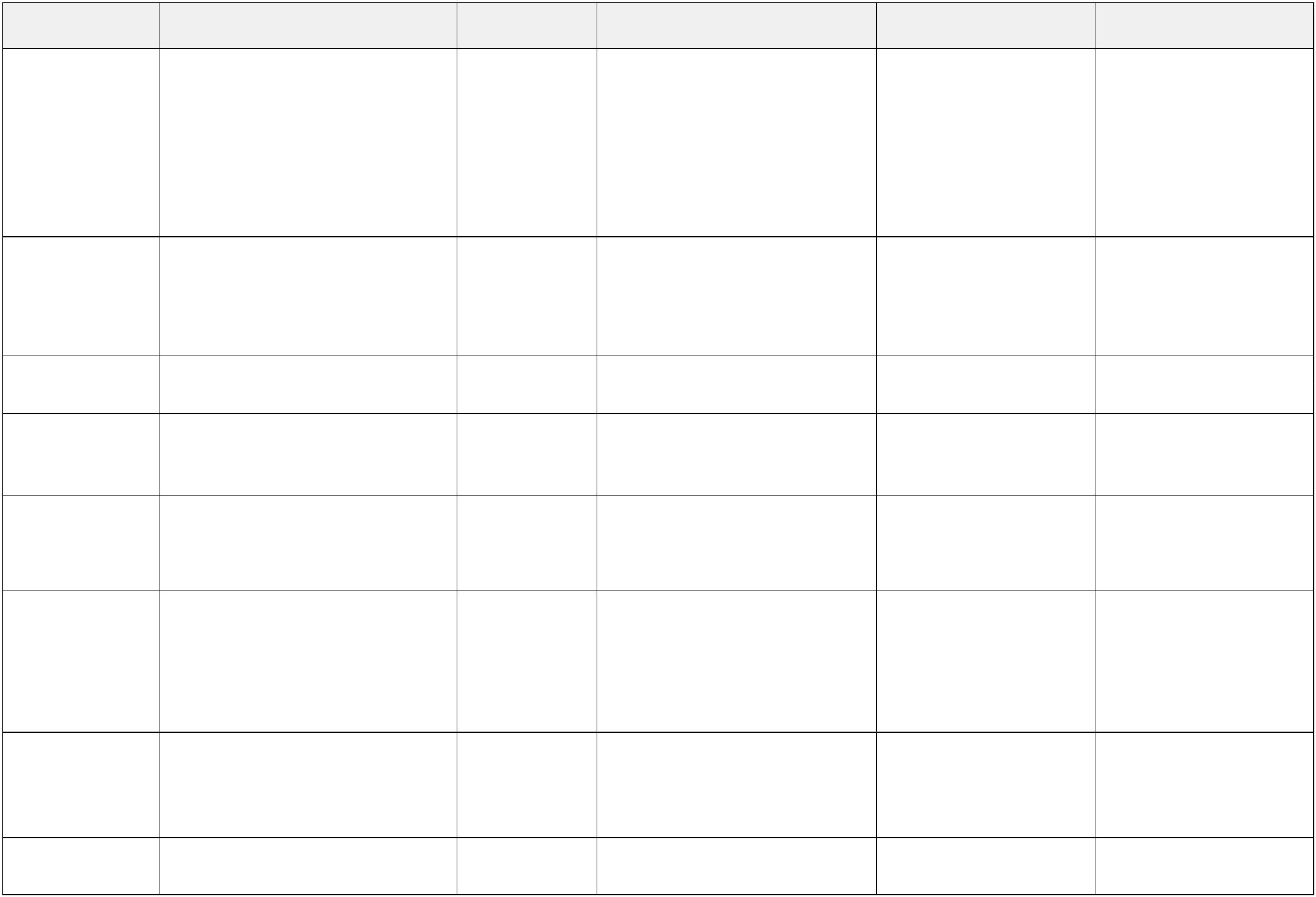
**M2** (silicon dioxide) acidic

27 lighted splint (1) **2**

pops / explodes (1)

28 pH 10 **1**

**- Mark Scheme /**



**Question Answer Marks AO Element Notes Guidance**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 29 |  | (acidified and add aqueous)  barium chloride / barium nitrate  forms white precipitate (2) |  | **2** |

if 2 marks not scored: 1 mark forbarium chloride / barium nitrate

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 30 |  | flame test / description of flame  test (1) |  | **2** |

flame coloured yellow (1)

31(a) white precipitate **1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 31(b) |  | slight white precipitate / no  precipitate |  | **1** |

32 cream (1) **2**

precipitate / solid (1)

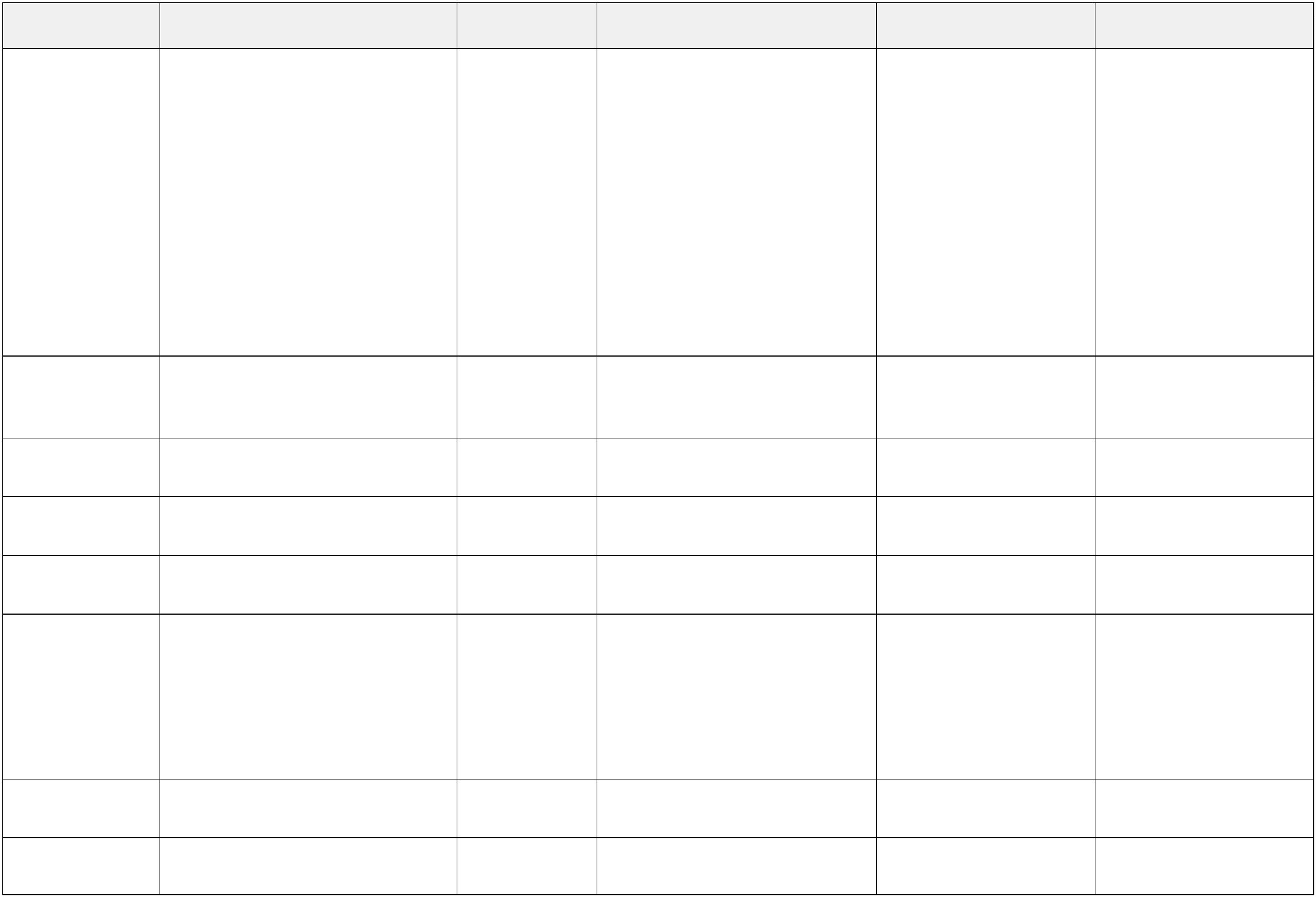
33 ammonia (is released) (1) **2**

(ammonia is) alkaline / methylorange is yellow in alkalineconditions (1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 34(a) |  | structure of COOH group  showing all atoms and all  bonds |  | **1** |

34(b) turns it red / pink **1**

**- Mark Scheme /**



**Question Answer Marks AO Element Notes Guidance**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 35(a) |  | One mark each for any **two**  of: |  | **2** |

**•** not much decrease / gradual decrease in pH at first

**•** sudden decrease in pH as

more acid added

**•** not much decrease / gradual decrease in pH when acid in excess

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 35(b) | |  | | any value between pH 12.65  and 12.75 (inclusive) | |  | | **1** | |
|  | | 35(c) | |  | | 3  14 cm | |  | | **1** | |

36(a) H2O

**1**

36(b) filtration / filter **1**

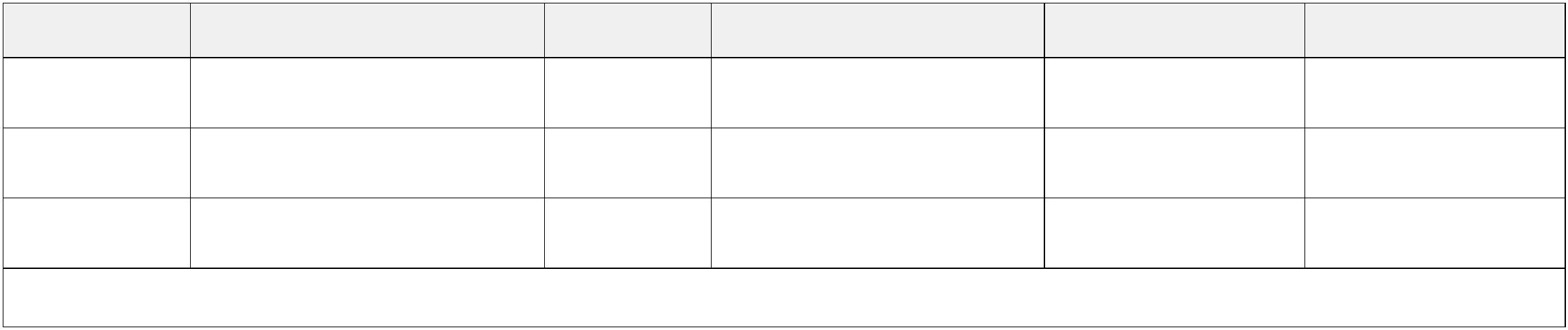
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 37(a) |  | bubbles/effervescence / fizzing  (1) |  | **2** |

solid or magnesiumdissolves / solid or magnesiumdisappears (1)

37(b) lilac flame **1**

37(c) white precipitate **1**

**- Mark Scheme /**



**Question Answer Marks AO Element Notes Guidance**

38 C*l* 2 / chlorine

**1**

39 pH 1 **1**

40 chlorine / C*l* 2

**1**

[Total: 93]