**- Mark Scheme /**

**Question Answer Marks AO Element Notes Guidance**

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | aqueous ionstested |  |  smallvolume ofaqueous sodiumhydroxide |  | aqueous sodiumhydroxidein excess |
|  | chromium(III),3+Cr |  | greenppt(1) |  | (ppt)soluble /(ppt)dissolves(1) |
|  | iron(II), 2 +Fe |  | greenppt(1) |  | (ppt)insoluble(1) |
|  | 2 |  | (D), F, A, C, E, B (2)if 2 marks not scored: 1 mark for1 consecutive pair of lettersreversed |  | **2** |

3 pH 9 **1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 4(a) |  | (hydrochloric acid contains)chloride (ions) / it contains achloride / you would get a whiteprecipitate |  | **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) potassiummanganate (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 for1 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 for1 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 / moleculesescape from surface of theliquids∞ diffusion∞ molecules in (constant)movement / molecules collide∞ (movement of) molecules israndom / in every direction∞ molecules spread out /molecules mix∞ (molecules spread) fromhigher concentration to lowerconcentration∞ molecules react (when theycollide) |  | **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) potassiummanganate(VII) (1) |  | **2** |

(purple to) colourless (1)

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

into (roaring) Bunsen flame(1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 16 |  | (nitric) acid reacts with / removescarbonate ions (1) |  | **1** |
|  | 17 |  | (add aqueous) sodiumhydroxide/(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 rightcorrect (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 nitrateforms white precipitate (2) |  | **2** |

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

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

flame coloured yellow (1)

31(a) white precipitate **1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 31(b) |  | slight white precipitate / noprecipitate |  | **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 groupshowing all atoms and allbonds |  | **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 12.65and 12.75 (inclusive) |  | **1** |
|  | 35(c) |  | 314 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]