

Question 1

1(b)	flame test / description of flame test (1) yellow flame colour (1)	2
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Question 2

2(d)	Cr^{3+}	1
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Question 3

3(e)	Fe	1
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Question 4

4(b)(i)	combustion of fossil fuels	1
4(b)(ii)	acid rain / stated effect of acid rain	1
4(b)(iii)	2nd box down ticked (calcium oxide)	1
4(b)(iv)	H_2O (1) 2 (HCl) (1)	2
4(b)(v)	(aqueous acidified) potassium manganate ((VII)) (1) turns colourless / decolourised (1)	2

Question 5

5(a)(iv)	add acidified aqueous silver nitrate white AND precipitate	1 1
5(a)(v)	tap water contains dissolved ions / tap water contains impurities ORA	1

Question 6

6(a)	substance containing only one type of atom / substance where the atoms have the same proton number	1
6(b)	water treatment / water purification / killing bacteria	1
6(c)(i)	2 (P) (1) 5 (Cl_2) (1)	2
6(c)(ii)	releases thermal energy / releases heat	1
6(d)(i)	bromine (1) sodium chloride (1)	2
6(d)(ii)	(add nitric acid and aqueous) silver nitrate (1) cream precipitate / cream solid (1)	2
6(d)(iii)	bromine is less reactive than chlorine / chlorine more reactive than bromine	1

Question 7

7(a)(ii)	Cu^{2+}	1
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Question 8

8(b)	(acidify and) add barium nitrate (1) white precipitate (1)	2
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Question 9

9(a)	potassium (1) phosphorus (1)	2
9(b)	calcium chloride (1) water (1)	2
9(c)	(add dilute nitric acid and) silver nitrate (1) white precipitate (1)	2
9(d)(i)	vehicle engines / high temperature furnaces / lightning	1
9(d)(ii)	breathing difficulties / asthma	1

Question 10

10(a)	metallic	1
10(b)(i)	lighted splint and (squeaky) pop	1
10(b)(ii)	14	1
10(b)(iii)	universal indicator	1
10(b)(iv)	$2\text{Na(s)} + 2\text{H}_2\text{O(l)} \rightarrow 2\text{NaOH(aq)} + \text{H}_2\text{(g)}$ M1 NaOH as product in equation (1) M2 fully correct equation (1) M3 state symbols (1)	3

Question 11

11(f)	ammonia	1
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Question 12

12(a)	<i>test:</i> relights AND <i>observations:</i> a glowing splint	1
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Question 13

13(f)	cobalt	1
13(g)	chlorine	1
13(h)	copper	1

Question 14

14(c)(i)	(thermal) decomposition	1
14(c)(ii)	HCNO	1
14(c)(iii)	(damp red) litmus (litmus) turns blue	2

Question 15

15(f)	lithium	1
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Question 16

16(c)(i)	lilac	1
16(c)(ii)	OH ⁻	1
16(c)(iii)	blue	1

Question 17

17(c)(i)	hydrogen	1
17(c)(ii)	hydroxide OR OH ⁻	1
17(c)(iii)	7 < pH ≤ 12	1
17(c)(iv)	Ca(OH) ₂	1
	rest of equation: Ca + 2H ₂ O → Ca(OH) ₂ + H ₂	1