Mark scheme

Chemical analysis

Chemistry 0620 · Questions from Paper 4 and Paper 6

Total marks

80

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
6	8	7	6	8	8	6	10	10	11	**80**

Question 1 [6]

1(a)	(conical) flask	**1**
1(b)	safety glasses/goggles/gloves/lab coat	**1**
1(c)	to see colour change clearly/easily/accurately/better	**1**
1(d)	swirl the flask	**1**
1(e)	water: to clean / to remove residue from previous experiment	**1**
	acid: to remove the water	**1**

Question 2 [8]

2(a)(i)	K^+	**1**
2(a)(ii)	Cr^{3+}	**1**
2(a)(iii)	Ca^{2+}	**1**
2(a)(iv)	Br^-	**1**
2(a)(v)	SO_4^{2-}	**1**
2(b)	(compound / salt) on wooden splint **or** (nichrome / platinum) wire (1) into (roaring) Bunsen flame (1)	**2**
2(c)	$Mg_3(PO_4)_2$	**1**

Question 3 [7]

3(a)(i)	(damp red) litmus (paper) turns blue	**1**
3(a)(ii)	ammonia / NH_3	**1**
3(b)	white precipitate	**1**
3(c)	(solution) becomes pink	**1**
3(d)	**M1** sodium / Na^+ **M2** zinc / Zn^{2+} **M3** iodide / I^-	**3**

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Question 4 [6]

4(a)	(**R** is) hydrated / has water of crystallisation	1
4(b)	**M1** aluminium / Al^{3+} **M2** bromide / Br^-	2
4(c)	yellow (flame)	1
4(d)	no change / no reaction / remains colourless	1
4(e)	becomes colourless / (pink / purple) is decolourised	1

Question 5 [8]

5(a)	**M1** limewater becomes milky	1
	M2 effervescence / fizzing / bubbling	1
5(b)(i)	no change	1
5(b)(ii)	dropwise: white precipitate	1
	excess: no (further) change / precipitate remains / white precipitate / insoluble	1
5(b)(iii)	white precipitate	1

5(c)	**M1** potassium / K^+ **M2** bromide / Br^-	1
	KBr = 2	1

Question 6 [8]

6(a)	brown precipitate or red-brown precipitate	1
	remains / does not (re)dissolve (in excess)	1

6(b)(i)	(red) litmus turns blue	1
6(b)(ii)	ammonia / NH_3	1
6(c)	no change / no precipitate / no reaction	1
6(d)	sulfur dioxide / SO_2	1
6(e)	lithium sulfite / Li_2SO_3	2

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Question 7 [6]

7	**any 6 from:** **MP1** known / stated volume of one cleaner **MP2** measured with appropriate named apparatus (pipette / measuring cylinder / burette) **MP3** named indicator used in this experiment **MP4** acid added to cleaner in flask **MP5** correct end-point colour for indicator used stated **MP6** recorded / measured start and end reading on burette **MP7** biggest volume (of acid) used has most concentrated ammonia	**6**

Question 8 [10]

8(a)	**M1** use of a wire / splint to get substance into a flame	**1**
	M2 putting sample INTO flame **and** identifying (Bunsen) flame as roaring / blue / non-luminous / hot	**1**
8(b)	ammonia / NH_3	**1**
8(c)	**M1** barium / Ba^{2+}	**1**
	M2 nitrate / NO_3^-	**1**
8(d)	white precipitate	**1**
8(e)	**M1** fizzing / bubbles / effervescence	**1**
	M2 limewater becomes milky	**1**
8(f)	**M1** green precipitate	**1**
	M2 remains in excess / does not dissolve / green precipitate	**1**

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Question 9 [10]

9(a)	red (flame colour)	1
9(b)	**M1** (from) purple **M2** (to) colourless	2
9(c)(i)	sulfur dioxide / SO_2	1
9(c)(ii)	no change	1
9(d)	**M1** iron(II) / Fe^{2+} **M2** chromium(III) / Cr^{3+}	2

9(e)	**M1** add (excess / more) aqueous sodium hydroxide **M2** chromium(III) **AND** forms a solution / precipitate dissolves **OR** **M2** iron(II) **AND** forms a green precipitate / precipitate does not dissolve / (precipitate) becomes brown **OR** **M1** leave to stand / add more (aqueous ammonia) **M2** chromium(III) **AND** remains green / does not turn brown **OR** **M2** iron(II) **AND** turns brown	2
9(f)	iodide / I^-	1

Question 10 [11]

10 tests on solution **N**

(e) appearance colourless (1) [1]
pH 11–14 (1) [1]

(f) colourless / no change (1)
white (1)
precipitate (1) [3]

(g) litmus paper turns blue (1)
pungent smell (1) [2]

(h) **(i)** hydrogen / H_2 (1) [1]

(ii) ammonia (1) [1]

(i) hydrochloric acid (2) [2]
acid or chloride only, 1 mark.

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