Mark scheme

Tests for ions and gases

Chemistry 0620 · Questions from Paper 4 and Paper 6

Total marks

90

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
6	7	8	8	9	9	10	11	11	11	**90**

Question 1 [6]

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

Question 2 [7]

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

Question 3 [8]

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

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Question 4 [8]

4	**Tests on solution L**	
4(a)	stays purple **or** no change	**1**
4(b)	green ppt	**1**
	(dissolves / soluble) producing a green solution	**1**
4(c)	grey-green precipitate	**1**
	remains in excess / does not dissolve	**1**
4(d)	white precipitate	**1**

	Tests on solid M	
4(e)	sodium / Na^+	**1**
	carbonate / CO_3^{2-}	**1**

Question 5 [9]

5(a)(i)	white	**1**
	precipitate	**1**
5(a)(ii)	clears / dissolves / colourless solution	**1**
5(b)(i)	white precipitate	**1**
5(b)(ii)	clears / dissolves / colourless solution	**1**
5(c)	bubbles / effervescence	**1**
	litmus turns blue	**1**

5(d)	lithium	**1**
	iodide	**1**

Question 6 [9]

6(a)	ammonia / NH_3	**1**
6(b)	lithium nitrate lithium (ions) / Li^+	**1**
	nitrate / NO_3^-	**1**
6(c)	white precipitate	**1**
	dissolves / disappears / forms colourless solution	**1**
6(d)	white precipitate	**1**
	remains / does not dissolve / no further change / white precipitate / nothing happens	**1**
6(e)	no change	**1**
6(f)	white precipitate	**1**

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Question 7 [10]

7(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**
7(b)	ammonia / NH_3	**1**
7(c)	**M1** barium / Ba^{2+}	**1**
	M2 nitrate / NO_3^-	**1**
7(d)	white precipitate	**1**
7(e)	**M1** fizzing / bubbles / effervescence	**1**
	M2 limewater becomes milky	**1**
7(f)	**M1** green precipitate	**1**
	M2 remains in excess / does not dissolve / green precipitate	**1**

Question 8 [11]

8 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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Question 9 [11]

9	**Tests on solid G**	
9(a)	any **three** from: • bubble / fizz / effervescence • blue solution formed • (gas made turns) limewater • milky	**3**
9(b)	• carbon dioxide / CO_2	**1**

9(c)	blue	**1**
	precipitate	**1**
	dark(er) / royal blue and dissolves / solution	**1**
9(d)	not a halide	**1**
	tests on solid H	
9(e)	hydrated	**1**
	sodium / Na^+ sulfate / SO_4^{2-} sodium sulfate = 2 Na_2SO_4 = 2	**1**

Question 10 [11]

10(a)(i)	• limewater turns milky (when gas passed through it) and any **one** from • effervescence / fizzing / bubbles • solid disappears / dissolves	**2**
10(a)(ii)	carbon dioxide / CO_2	**1**
10(b)	(pale / light) green (flame)	**1**
10(c)	(solution becomes) pink / pale purple / lilac	**1**
10(d)	white precipitate	**1**

10(e)	no change	**1**
10(f)(i)	ammonia / NH_3	**1**
10(f)(ii)	no change / stays blue	**1**
10(g)	ammonium chloride / NH_4Cl **M1** ammonium / NH_4^+ **M2** chloride / Cl^-	**2**

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