CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2014 series

5070 CHEMISTRY

5070/41 Paper 4 (Alternative to Practical), maximum raw mark 60

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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1 **(a)** **(i)** $2Cu + O_2 \rightarrow 2CuO$ (1)

(ii) black (1)

(b) **(i)** 72 (1) cm^3 [1]

(ii) nitrogen (1) [1]

(iii) 18 (1) cm^3 [1]

(iv) 0.00075 (1) moles [1]

(v) 0.096 (1) g [1]

(c) 300 (1) cm^3 [1]

[Total: 8]

2 **(a)** **(i)** red / pink (1) [1]

(ii) hydrochloric acid (1) [1]

(iii) Universal indicator / pH meter / full range indicator (1) [1]

(b) **(i)** diffusion (1) [1]

(ii) ammonium chloride **AND** NH_4Cl (1) [1]

(iii) **C** (1)

Explanation
Ammonia molecules move or diffuse faster (than HCl molecules), or reverse (1)

Ammonia has lower density <u>than HCl</u> / lower M_r <u>than HCl</u> / ammonia molecules are lighter <u>than HCl molecules</u>, or reverse (1)

If density of gases are compared to air, both densities must be stated e.g. ammonia lighter than air AND hydrogen chloride heavier than air. [3]

(c) **Y** (NH_3) (1); **X** (HCl) (1)

<u>Both</u> soluble in water (1)
HCl is more dense than air **AND** NH_3 is less dense than air (1) [4]

[Total: 12]

3 **(d)**

4 **(b)** **[Total:**

5 **(a)** **[Total: 1]**

6 **(b)** **[Total: 1]**

7 **(a)** 1.70 (1) g [1]

(b) carbon dioxide (1) turns lime water milky / white ppt (1) [2]

(c) pink / red to yellow (1) [1]

(d)

25.9	48.6	32.4	(1)	1 mark for each correct
0.0	23.3	6.9	(1)	row or column to the benefit of the candidate (3)
25.9	25.3	25.5	(1)	

Mean value 25.4 (1) cm^3 [4]

(e) 0.00254 (1) moles [1]

(f) 0.00254 (1) moles [1]

(g) 0.0254 (1) moles [1]

(h) 0.05 (1) moles [1]

(i) 0.0246 (1) moles [1]

(j) 0.0123 (1) moles [1]

(k) 138 (1) 39 (1) [2]

[Total: 16]

8 **(a)** Transition metal ion / compound may be present (1)

(b) **(i)** green precipitate (1)

(ii) precipitate insoluble (1)

(iii) **gas** evolved that turns damp red litmus blue (1)
ammonia (1)

(c) $BaCl_2$ or $Ba(NO_3)_2$ or names(1)
HCl or HNO_3 or names(1)
white ppt (1)

[Total: 8]

9 **(a)** yellow (1) [1]

(b) 0.64, 1.27, 1.91, 2.35, 2.35, 2.35 all correct (1) [1]

(c) all points plotted correctly (1)
two straight lines, one of which must go through zero (1)
lines intersect (1) [3]

(d) **(i)** 3.2 (1) cm^3 [1]

(ii) 2.35 (1) g [1]

(iii) 7.4 (1) cm^3 [1]

All answers in (d) must come from the candidate's graph. Read candidate's graph to +/– half a small square.

(e) $AgNO_3 + KI \rightarrow AgI + KNO_3$ (1) [1]

(f) 1.35 (1) mol / dm^3 [1]

(g) M_r $AgCl$, 143.5 (1)
Mass of $AgCl = 1.435$ (1) g [2]

[Total: 12]