UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

5070 CHEMISTRY

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

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1 **(a)** **(i)** measuring cylinder (1)

(ii) 24 (1) cm^3 [2]

2 **(a)** brown/red-brown/pink/orange + metal/solid (1)

(b) 1.27 (1) g

(c) 1.59 (1) g

(d) 0.32 (1) g

(e) 1.27/64 = 0.02 ; 0.32/16 = 0.02 (1)
1:1 = CuO (1) [6]

3 **(a)** **(i)** effervescence/fizzing/gas evolved/CO_2 evolved/solid dissolves or disappears (1)

(ii) $CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$ (1)

(iii) decrease – gas/CO_2 evolved and leaves flask/lost as a gas or wtte (1)

(b) **(i)** white ppt. (1)

(ii) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$ (1)

(iii) no change – no (gases or) substances leave container/all contents remain in flask or wtte (1) [6]

4 **(a)** chromatography (1)

(b) correct position of line (below start line) (1)

(c) glass tube/(small) pipette/capillary tube/dropper/glass rod (1)

(d) locating agent (1)

(e) **(i)** M, N, and P (1) all correct

(ii) L and P (1) all correct

(f) P = 2.5 cm ; solvent front = 5.5 cm (1)
Rf = 2.5/5.5 = 0.45 (1) [8]

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5 **(b)** [1]

6 **(b)** [1]

7 **(a)** [1]

8 **(c)** [1]

9 **(b)** [1]

10 **(a)** 3.52 (1) g

(b) pipette (1)

(c) yellow to orange/pink/red (1)

(d)

25.6	28.2	36.3
0.0	3.5	11.4
25.6	24.7	24.9

1 mark for each correct row **or** column (3)
Mean value = 24.8 (1) cm^3

(e) 0.00248 (1)

(f) 0.00124 (1)

(g) 0.0124 (1)

(h) 106 (1)

(i) 1.3 **or** 1.31 (1) g

(j) 2.2 **or** 2.21 (1) g

(k) $x = \frac{106 \times 2.21}{18 \times 1.31} = 9.9$ or 9.93
$Na_2CO_3.10H_2O$ (1) [15]

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11 **(a)** colourless solution (1)

(b) **(i)** Mg^{2+} Ca^{2+} or Zn^{2+} or Pb^{2+} (1) any two

(ii) Zn^{2+} or Pb^{2+} (1)

(c) **(i)** white ppt (1)

(ii) insoluble in excess (1)

(d) aq. NaOH (1) A*l* (1) warm (1)
ammonia or gas turns litmus blue (1)
Omission of NaOH or A*l* in test means no mark for test but observation mark can score.
If Nitric acid or any nitrate is used in the test, all four marks are lost.
$Al(NO_3)_3$ (1)

OR $FeSO_4$ (1) conc (1) H_2SO_4 (1) brown ring (1) [10]

12 **(a)** 29, 49, 21, 18 (1) all correct

(b) points plotted correctly (1) smooth curve through points (1)

(c) 14 (1) cm^3

(d) As A_r increases number of moles decreases (1)

(e) **(i)** Aluminium has a valency of 3 / Aluminium ions are Al^{3+} / A*l* is in group three. (1)
1 mole of A*l* produces 3/2 moles of hydrogen (1) etc.

(ii) Aluminium has an oxide layer (1) [8]
In this question use candidate's graph and read to +/– half a small square.

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