

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

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 must be read in conjunction with the question papers and the report on the examination.

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- 1 (a) (i) measuring cylinder (1)  
(ii) 24 (1) cm<sup>3</sup> [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<sub>2</sub> evolved/solid dissolves or disappears (1)  
(ii)  $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$  (1)  
(iii) decrease – gas/CO<sub>2</sub> evolved and leaves flask/lost as a gas or wtte (1)  
(b) (i) white ppt. (1)  
(ii)  $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$  (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<sup>3</sup>

(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)  $x = \frac{106 \times 2.21}{18 \times 1.31} = 9.9 \text{ or } 9.93$

Na<sub>2</sub>CO<sub>3</sub>·10H<sub>2</sub>O (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) Al (1) warm (1)  
ammonia or gas turns litmus blue (1)  
Omission of NaOH or Al 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  $Al^{3+}$  / Al is in group three. (1)  
1 mole of Al 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.