UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2011 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.

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1 **(a)** measuring cylinder (1) [1]

(b) 24 (1) cm^3 [1]

(c) **(i)** (litmus) turns red (1) [1]

(ii) effervescence/gas evolved/solid dissolves **or** disappears (1) [1]

(d) C_2H_5OH or C_2H_6O/ethanol (1) (both for 1 mark) [1]

[Total: 5]

2 **(a)** 5.40 (1) g [1]

(b) **(i)** 4.27 (1) g

(ii) 1.13 (1) g [2]

(c) 136/18 (1) [1]

(d) x = 2 (1) (not 1.99) [1]

(e) anhydrous/dehydrated/efflorescent (1) [1]

[Total: 6]

3 **(a)** improve conductivity or wtte (1) [1]

(b) **(i)** oxygen (1)

(ii) relights a glowing splint (1)

(iii) $4OH^- \rightarrow 2H_2O + O_2 + 4e^-$ (2)
electrons not included **or** unbalanced (1) [4]

(c) **(i)** hydrogen (1)

(ii) pops in a flame (1)

(iii) $2H^+ + 2e^- \rightarrow H_2$ (1) [3]

(d) 40 (1) cm^3 [1]

[Total: 9]

4 **(d)** (1) [1]

5 **(c)** (1) [1]

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

7 **(b)** (1) [1]

8 **(a)** (1) [1]

[Total: 5]

9 **(a)** 1.76 (1) g [1]

(b) pink to colourless (1) [1]

(c)

27.6	40.7	47.2
0.0	13.6	19.9
27.6	27.1	27.3

1 mark for each correct line **or** column (3)
Mean value 27.2 (1) cm^3 [4]

(d) 0.00272 (1) [1]

(e) 0.00272 (1) [1]

(f) 0.0272 (1) [1]

(g) 0.05 (1) [1]

(h) 0.0228 (1) [1]

(i) **(i)** 0.388 (1)

(ii) 220(.22) (1) g [2]

(j) ammonium hydroxide (or aq. Ammonia) + nitric acid (1) [1]

(k) NH_4NO_3 – 28/80 × 100 = 35%
350 g (1) [1]

[Total: 15]

10 **(a)** coloured solution (1) [1]

(b)(i), **(b)(ii)**, **(c)(i)**, **(c)(ii)** Fe^{3+} ions present at least once in each of tests **(b)** and **(c)** (1) [1]

(b)(ii) and **(c)(ii)** ppt insoluble (1) total [1]

(d) aq. NaOH (1), Al foil (1), warm (1)
ammonia or gas turns litmus blue (1)
IF Al or NaOH missing max 1 for result of test on gas
IF heat missing remaining 3 marks are available
IF Nitric acid or any nitrate is added (0)

OR
Brown ring test
Conc (1) Sulfuric acid (1) Iron(II) Sulfate (1) Brown ring (1)
IF Iron(II) Sulfate missing or Nitric acid or any nitrate added (0) [4]

$Fe(NO_3)_3$ (1) [1]

[Total: 8]

11 **(a)** 32, 52, 64, 70 all correct (1) [1]

(b) All points plotted correctly (1)
Two smooth curves through points (1)
Passing through zero (1) [3]

(c) **(i)** 32 (1) cm^3

(ii) 58 – 48 (1) = 10 (1) cm^3 [3]

(d) as a catalyst or to speed up the reaction (1) [1]

(e) reaction complete (1) [1]

(f) M_r $KClO_3$ = 122.5 (1)
using equation 2 moles $KClO_3$ gives 3 moles of O_2
or 2 moles $KClO_3$ gives 3 × 24000 cm^3 O_2 (1)
0.245 g $KClO_3$ (1)
[A correct answer gets all 3 marks]
235 (g) scores (2) [3]

* In all appropriate cases please read the candidate's graph to the nearest half small square.

[Total: 12]