

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.

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

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Page 2	Mark Scheme: Teachers' version	Syllabus	Paper
	GCE O LEVEL – May/June 2011	5070	41

- 1 (a) measuring cylinder (1) [1]
- (b) 24 (1) cm³ [1]
- (c) (i) (litmus) turns red (1) [1]
- (ii) effervescence/gas evolved/solid dissolves **or** disappears (1) [1]
- (d) C₂H₅OH or C₂H₆O/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⁻ → 2H₂O + O₂ + 4e⁻ (2)
electrons not included **or** unbalanced (1) [4]
- (c) (i) hydrogen (1)
- (ii) pops in a flame (1)
- (iii) 2H⁺ + 2e⁻ → H₂ (1) [3]
- (d) 40 (1) cm³ [1]
- [Total: 9]**

Page 3	Mark Scheme: Teachers' version	Syllabus	Paper
	GCE O LEVEL – May/June 2011	5070	41

- 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) cm³ [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) $\text{NH}_4\text{NO}_3 - 28/80 \times 100 = 35\%$
350 g (1) [1]

[Total: 15]

Page 4	Mark Scheme: Teachers' version	Syllabus	Paper
	GCE O LEVEL – May/June 2011	5070	41

- 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]
- $\text{Fe}(\text{NO}_3)_3$ (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)** $M_r \text{KClO}_3 = 122.5$ (1)
 using equation 2 moles KClO_3 gives 3 moles of O_2
 or 2 moles KClO_3 gives $3 \times 24000 \text{ cm}^3 \text{ O}_2$ (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]