CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2013 series

5070 CHEMISTRY

5070/42 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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CAMBRIDGE
International Examinations

1 **(a)** 28, 23 (1) 5 (1) [2]

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

(ii) vertical line labelled ΔH must go to same level as products (1)
horizontal line below reactant line, ignore any labelling (1)
(horizontal line above reactant line i.e. endothermic, 1st mark only can score.) [2]

(c) **(i)** blue (ignore any initial colour) (1) [1]

(ii) pH meter/pH or universal indicator/pH paper (1) [1]

(iii) 10–14 (1) [1]

[Total: 8]

2 **(a)** nitric (acid), HNO_3 (1) (both) [1]

(b) heat/warm/evaporate/boil/leave in sun (1)
to crystallisation point/saturation point/evaporate some (but not all) of the water/ leave solution to cool/leave to crystallise (1)
wash and dry crystals (1) [3]

(c) **(i)** molar mass of NH_4NO_3 = 80 (1)
28/80 × 1000 = 350 (g) (1) [2]

(ii) (350/28) × 24 = 300 (dm^3) (1) [1]

(d) ammonium sulfate, $(NH_4)_2SO_4$ (1)(both) [1]

(e) NH_4^+ (1)
warm with (aq) NaOH (1)
NH_3 turns litmus blue OR gas turns litmus blue (1) [3]

[Total: 11]

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

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

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

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

7 **(a)** 1.65 (g) (1) [1]

(b) **(i)** (to prevent) oxidation of Fe^{2+} ions or to prevent Fe^{2+} being converted to Fe^{3+}/ Fe(III) (1) [1]

(ii) hydrogen (1)

pops in a flame/lighted splint (1) [2]

(c) **(i)** green/colourless (1)

(ii) purple/pink (1) [2]

(d)

27.8	32.1	47.3	1 mark for each correct
0.0	5.7	20.7	row or column to
27.8	26.4	26.6	benefit of candidate (3)

mean titre = 26.5 (1) cm^3 [4]

(e) 0.00053 (moles) (1) [1]

(f) 0.00265 (moles) (1) [1]

(g) 0.0265 (moles) (1) [1]

(h) 1.484 (g) (1) [1]

(i) 89.7–90.(0)(%)(1) [1]

[Total: 15]

8 **(a)** colourless solution (1)

(b) **(i)** white ppt (1) soluble in excess(1)

(c) **(i)** white ppt , insoluble in excess (1) (both)

(d) $Ba(NO_3)_2$ or $BaCl_2$ (1) + HCl or HNO_3 (1)
(incorrect formula negates correct name and vice versa)
white ppt (1) (dependent on use of barium salt)
conclusion $Al_2(SO_4)_3$ (1) [8]

[Total: 8]

9 **(a)** carbon/graphite/platinum (1) [1]

(b) **E** or negative or cathode (1) [1]

(c) a gas is evolved/oxygen gas evolved/bubbles/effervescence/fizzing (1) [1]

(d) **(i)** 1.5, 2.0, 2.25, 2.25, 2.25 (1) all correct. [1]

(ii) all points plotted correctly (1)
two intersecting straight lines (2) (1 mark for one straight line) [3]

(iii) 32 (min) (1) [1]

(iv) 45 (min) (1) [1]

(e) **(i)** blue (1) [1]

(ii) colourless (1) [1]

(f) sloping line continues in a straight line upwards all the way to t = 70, labelled S(1). [1]

(g) blue (all shades but not combinations such as greeny blue etc.)(1)
concentration of Cu/Cu(II)/Cu^{2+} ions remains constant
OR concentration of electrolyte remains constant
OR explanation based on copper/copper ions being removed and deposited into the solution (1) [2]

[Total: 14]