UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2011 question paper for the guidance of teachers

5070 CHEMISTRY

5070/31 Paper 3 (Practical Test), maximum raw mark 40

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) Titration

Accuracy 8 marks

For the two best tires give:
4 marks for a value within 0.2 cm^3 of supervisor
2 marks for a value within 0.3 cm^3 of supervisor
1 mark for a value within 0.4 cm^3 of supervisor

Concordance 3 marks

Give:
3 marks if all the ticked values are within 0.2 cm^3
2 marks if all the ticked values are within 0.3 cm^3
1 mark if all the ticked values are within 0.4 cm^3

Average 1 mark

Give 1 mark if the candidate calculates a correct average (error not greater than 0.05) of all his ticked values.

Assuming a 25 cm^3 pipette and a titre of 24.8 cm^3.

(b) concentration of sulfuric acid in **P** [2]

$= \frac{25 \times 0.1}{2 \times 24.8}$ (1)

= 0.0504 (1)

Answers should be correct to + or – 1 in the third significant figure.

(c) concentration of sulfuric acid in battery acid [1]

= 0.0504 × 100 (1)

= 5.04

answer from **(b)** × 100

(d) mass of sulfuric acid present in 4.50 dm^3 of battery acid [1]

= 5.04 × 4.5 × 98 (1)

= 2220

answer from **(c)** × 4.5 × 98

2 **R** is copper(II) sulfate **S** is copper(I) oxide

Test	Notes
General points For ppt allow solid, suspension, powder For gases Name of gas requires test to be at least partially correct. Effervesces = bubbles = gas vigorously evolved but not gas evolved Solutions Colourless not equivalent to clear, clear not equivalent to colourless	
Solution **R**	
Test 1 **(a)** white ppt (1) **(b)** insoluble in nitric acid (1)	
Test 2 blue ppt (1) soluble in excess (1) dark blue solution (1)	
Test 3 **(a)** solution turns green (1) **(b)** blue ppt (1) insoluble in excess (1)	allow green-blue or green-yellow
Test 4 solid turns red or brown (1) blue colour fades (1)	
Test 5 solid turns brown (1) blue solution (1)	allow colour darkens
Test 6 solid turns brown (1) blue solution (1) solid disappears (1) effervescence (1) yellow or brown gas (1)	allow colour darkens

Test 7 **(a)** solid turns white or off-white (1) **(b)** solid disappears (1) blue solution (1)	
Test 8 **(a)** no reaction (1) **(b)** effervescence (1) gas relights a glowing splint (1) oxygen (1) blue solution (1)	

Conclusions

Anion in **R** is sulfate or SO_4^{2-} (in **test 1** ppt in **(a)** must not dissolve in acid) (1)
The metal in **R** and **S** is copper, copper(II), Cu or Cu^{2+} (1)

Note: 27 marking points, maximum 24.