CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2013 series

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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

1 (a) Titration

Accuracy (max 8)

For each of the best two titres 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 (max 3)

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 (max 1)

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

[12]

Assuming a 25 cm^3 pipette and a titre of 20.2 cm^3

(b) concentration of phosphoric acid in **P**

$= \frac{25.0 \times 0.10}{20.2 \times 2}$ (1)

= 0.0619 (1)

Answers should be correct to $+$ or -1 in the third significant figure. **[2]**

(c) mass of phosphoric acid in 100 cm^3 of the rust remover

$= 0.0619 \times 98$ (1)

= 6.07 **[1]**

(d) percentage by mass of phosphoric acid in the rust remover

$\frac{6.07}{103} \times 100$ (1)

= 5.89% **[1]**

[Total: 16]

2 **R** is sulfuric acid, **S** is copper(II) sulfate

Test	Notes
General Points For ppt allow solid, suspension, powder. do not allow substance, particles, deposit, residue, sediment, gelatinous, insoluble etc. do not allow cloudy/milky/white solution etc for ppt forms but do allow cloudy/milky/white solution remains or clears for ppt remains or dissolves. do not allow solution/ppt turns colourless for ppt dissolves. For gases Name of gas requires test to be at least partially correct. Effervesces = bubbles = gas vigorously evolved, but not gas evolved. For solutions colourless not equivalent to clear, clear not equivalent to colourless.	
Solution **R**	
Test 1 **(a)** white ppt (1) **(b)** insoluble in acid (1)	
Test 2 effervescence (1) turns lime water milky (1) carbon dioxide (1) solid disappears (1)	
Test 3 **(a)** effervescence (1) **(b)** faster effervescece (1) pops with a lighted splint (1) hydrogen (1) brown solid (1)	

Test 4 **(a)** blue ppt (1) dissolves in excess (1) dark blue solution (1) **(b)** blue ppt (1) dissolves in excess (1) blue solution (1)	
Test 5 **(a)** blue solution/no change (1) **(b)** dark blue solution (1) **(c)** red/brown (1) solid/ppt (1)	allow for 1 mark (liquid turns) yellow/green/red/brown
Test 6 **(a)** white ppt (1) **(b)** insoluble in acid (1)	

Conclusions

The anion in **R** and **S** is sulfate/SO_4^{2-} (ppt remains in acid in Test 1 and Test 6) (1)

The cation in **R** is hydrogen/H^+ (any effervescence in Test 2 or Test 3) (1)

The cation in **S** is copper/Cu^{2+} (any blue in Test 4) (1)

Note: There are 26 scoring points – any 24 to score.

[Total: 24]