CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2014 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.

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1 (a) Temperature readings

F: full set of temperatures provided for columns D and E (1)
R: temperatures recorded to 0.5 °C (1)
S: temperature rises correctly calculated, 6 correct (1) OR all correct (2)
P: pattern of results:
a general rise then fall (1)
experiments 1–3 increasing temperature rise (1)
experiments 4–7 decreasing temperature rise (1)

Accuracy:
For each of the experiments 1–7 give 1 mark for each temperature rise within 1.0 °C of the supervisor's value (7) [14]

(b) Graph

Correct plotting of all the points (1)
Two intersecting straight lines which fit the results as plotted (1) [2]

(c) Volume of **P**

Correct recording of the volume from the graph at the point of intersection of the two lines (1) [1]

Mark parts **(d)** – **(f)** using the candidate's volume of **P**.

Assuming the volume of **P** is 23.0 cm^3:

(d) Number of moles of HC*l* in 23.0 cm^3 of **P**

$$= \frac{23.0 \times 1.50}{1000}$$

= 0.0345 (1) [1]

(e) Number of moles of NaOH which react

= 0.0345 (1) [1]

(f) Concentration in mol / dm^3 of **Q**

Volume of **Q**

50.0 – 23.0 = 27.0 (1)

Concentration of **Q**

$$= \frac{0.0345 \times 1000}{27.0}$$

= 1.28 (1) [2]

[Total: 21]

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2 **R** is hydrochloric acid **S** is sodium thiosulfate

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			
Test 1 bubbles gas pops with a lighted splint hydrogen metal disappears	(1) (1) (1) (1)	[4]	 to score hydrogen mark there must be some indication of a test e.g. 'popped with a splint', 'tested with a burning splint'
Test 2 **(a)** white ppt **(b)** ppt remains	(1) (1)	[2]	
Test 3 white or yellow ppt manganate(VII) decolourised pungent gas / sulfur dioxide	(1) (1) (1)	[3]	 allow turns colourless / white / brown
Test 4 decolourised	(1)	[1]	 allow turns colourless
Test 5 white / yellow / red / brown ppt colour of ppt darkens	(1) (1)	[2]	

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Test				Notes
Test 6				
(a)	solution turns purple / red / violet	(1)		accept dark brown
	solution finally colourless / pale yellow	(1)		accept colour fades / becomes paler
(b)	green	(1)		accept black-green
	ppt	(1)		
	insoluble in excess	(1)	[5]	

[maximum 16 marks from 17 scoring points]

Conclusions

Cation in **R** is H^+. (In Test 1 metal reacts.) (1)

Anion in **R** is $C\ell^-$. (In Test 2 there must be a white ppt which remains in nitric acid.) (1)

If both ions in **R** are correct but inverted, allow one mark from the previous two.

S is a reducing agent. (Test 4 decolourised or green ppt in Test 6) (1) [3]

[Total: 19]

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