CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 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.

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1 (a) Titration

Accuracy 8 marks

For the two best 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 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/her ticked values. [12]

Assuming a 25.0 cm^3 pipette and a titre of 25.2 cm^3,

(b) moles of hydrochloric acid present in average volume of **Q**

$$= \frac{25.2 \times 0.2}{1000}$$

$$= 0.00504$$ [1]

(c) moles of sodium carbonate in **P**

$$= \frac{25.0 \times 0.02}{1000}$$

$$= 0.0005$$ [1]

(d) moles of hydrochloric acid reacting with sodium carbonate

$$= 2 \times 0.0005$$

$$= 0.001$$ [1]

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(e) moles of hydrochloric acid reacting with sodium hydroxide

= 0.00504 – 0.001

= 0.00404 [1]

(f) concentration of sodium hydroxide in **P**

$$= \frac{0.00404 \times 1000}{25.0}$$

= 0.162 mol/dm^3 [1]

[Total: 17]

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2 **R** is sulfuric acid; **S** is potassium iodide.

Observations		Notes
General points For ppt/precipitate 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 For solutions colourless not equivalent to clear, clear not equivalent to colourless		
Test 1 **(a)** white ppt **(b)** insoluble in acid	 (1) (1)	
Test 2 effervescence pops with a lighted splint hydrogen solid disappears	 (1) (1) (1) (1)	 to score hydrogen mark there must be some indication of a test e.g. 'popped with a splint', 'tested with a burning splint'
Test 3 effervescence turns limewater milky carbon dioxide solid disappears	 (1) (1) (1) (1)	 to score carbon dioxide mark there must be some indication of the limewater test e.g. 'tested with limewater'

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Test 4		
(a) yellow ppt	(1)	
(b) insoluble in acid	(1)	
Test 5		
(a) filtrate is yellow/red/brown	(1)	
(b) turns blue-black	(1)	allow blue or black but not purple
Test 6		
(a) turns yellow/brown	(1)	
solid formed	(1)	
(b) decolourised	(1)	
white solid remains	(1)	
Test 7		
(a) yellow/brown solution	(1)	accept liquid turns brown for 1 mark in **(a)**
black solid	(1)	
(b) solid disappears	(1)	
yellow solution	(1)	accept colourless solution
(c) liquid turns brown	(1)	accept black solid and/or yellow/brown liquid

A cation in **R** is hydrogen/H^+ (bubbles or gas tested in test 2 or 3). [1]

An anion present in **R** is sulfate/SO_4^{2-} (test 1 white ppt remains in acid). [1]

If cation and anion identifications are both correct but inverted allow 1 mark.

S is NaI [1]

Note: There are 26 scoring points – any 23 to score.

[Total: 23]

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