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Cambridge Ordinary Level

MARK SCHEME for the October/November 2015 series

5070 CHEMISTRY

5070/32 Paper 3 (Practical Test), maximum raw mark 40

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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 20.2 cm^3.

(b) moles of sodium hydroxide in 25 cm^3 of **Q**

$$= \frac{25 \times 0.527}{1000}$$

$$= 0.0132$$ [1]

(c) moles of hydrochloric acid reacting with 25 cm^3 of **Q**

$$= 0.0132$$ [1]

(d) moles of hydrochloric acid in 110 cm^3 of **P**

$$= \frac{0.0132 \times 110}{20.2}$$

$$= 0.0719$$ [1]

(e) moles of hydrochloric acid in 100 cm^3 1 mol / dm^3 acid

$$= \frac{100 \times 1}{1000}$$

$$= 0.1$$ [1]

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(f) moles of hydrochloric acid that reacted with magnesium hydroxide

= 0.1 – 0.0719

= 0.0281 [1]

(g) concentration in g / dm^3 of magnesium hydroxide = $\frac{0.0281}{2} \times 58 \times \frac{1000}{10}$ g

= 78.7 g

If the answer from **(f)** undergoes **any one** of the following processes, score 1 mark
If answer from **(f)** undergoes **all** of the following processes, score 2 marks

(f) / 2 mole of magnesium hydroxide reacting

(f) × 58 mass of magnesium hydroxide

(f) × 1000 / 10 mole in 1 dm^3

[2]

[Total: 19]

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2 **R** is dilute sulfuric acid; **S** is copper(II) oxide

Test		Notes
General points For precipitate/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) ppt remains	(1)	
Test **2**		
(a) bubbles	(1)	
‘pops’ with a lighted splint	(1)	
hydrogen	(1)	to score hydrogen mark there must be some indication of a test e.g. ‘gas pops’ (with a splint), ‘test with lighted splint’
solid disappears	(1)	
(b) white ppt	(1)	
insoluble in excess	(1)	
Test **3**		
blue solution	(1)	
Test **4**		
blue ppt	(1)	
soluble in excess	(1)	
dark / deep blue solution	(1)	

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Test **5** **(a)** (solution / liquid) turns yellow / brown (1) ppt (1) **(b)** decolourised (1) solid (remains) (1)	
Test **6** **(a)** no reaction / few bubbles / solid insoluble (1) **(b)** bubbles (1) relights a glowing splint (1) oxygen (1)	to score oxygen mark there must be some indication of a test e.g. 'tested with a glowing splint', 'relights a (burning) splint'

Any 19 out of 20 points to score. [19]

R contains sulfuric acid / hydrogen sulfate / H_2SO_4 (dependent on white ppt insoluble in acid in test **1 and** bubbling in test 2) (1)

Cation in **S** is copper(II) / Cu^{2+} (dependent on blue in test 3 **or** blue ppt / deep blue solution in test **4**) (1)

[2]

[Total: 21]

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