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Cambridge Ordinary Level

MARK SCHEME for the October/November 2015 series

5070 CHEMISTRY

5070/31 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

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**

$$= \frac{25 \times 0.336}{1000}$$

$$= 0.0084$$ [1]

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

$$= 0.0084$$ [1]

(d) moles of hydrochloric acid in 250 cm^3 of **P**

$$= \frac{0.0084 \times 250}{20.2}$$

$$= 0.104$$ [1]

(e) moles of hydrochloric acid in 250 cm^3 0.500 mol/dm^3 acid

$$= \frac{250 \times 0.5}{1000}$$

$$= 0.125$$ [1]

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(f) moles of hydrochloric acid that reacted with calcium carbonate

= 0.125 – 0.104

= 0.021 [1]

(g) mass of calcium carbonate in one tablet = $\frac{0.021 \times 100}{2 \times 2}$

= 0.525 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 calcium carbonate

(f) × 100 mass of calcium carbonate

(f) / 2 moles in 1 tablet

[2]

[Total: 19]

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2 **R** is dilute hydrochloric acid; **S** is manganese(IV) 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** white ppt	(1)	
Test **2** insoluble in acid	(1)	
Test **3** ppt dissolves colourless solution	(1) (1)	
Test **4** **(a)** effervescence turns limewater milky carbon dioxide solid disappears **(b)** white ppt ppt dissolves colourless solution	(1) (1) (1) (1) (1) (1) (1)	To score carbon dioxide mark there must be some indication of a test e.g. 'tested with lime water'
Test **5** **(a)** white ppt **(b)** ppt disappears	(1) (1)	

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Test **6** **(a)** 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'
Test **7** **(a)** yellow/brown filtrate (1) **(b)** liquid turns blue/black (1)	
Test **8** litmus turns white/bleached (1) chlorine (1)	to score chlorine mark there must be some indication of the gas e.g. 'smell of chlorine'

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

R contains hydrochloric acid/hydrogen chloride / HC*l* (dependent on white ppt in test **1**; insoluble in acid in test **2 or** chlorine identified in test **8**; **and** bubbling / gas in test **4**) (1)

S is an oxidising agent/oxidant (dependent on indication of iodine in test **7 or** chlorine in test **8**) (1)

[2]

[Total: 21]

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