

CAMBRIDGE INTERNATIONAL EXAMINATIONS

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^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**

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

$$= 0.0084$$

[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 = $\frac{0.021 \times 100}{2 \times 2}$

$$= 0.525 \text{ g}$$

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 (1) colourless solution (1)	
Test 4 (a) effervescence (1) turns limewater milky (1) carbon dioxide (1) solid disappears (1) (b) white ppt (1) ppt dissolves (1) colourless solution (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 (1) (b) ppt disappears (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/HCl (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]