

**MARK SCHEME for the October/November 2010 question paper  
for the guidance of teachers**

**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.

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1 (a) Titration [12]

Accuracy 8 marks

For the two best titres give:

4 marks for a value within 0.2 cm<sup>3</sup> of supervisor

2 marks for a value within 0.3 cm<sup>3</sup> of supervisor

1 mark for a value within 0.4 cm<sup>3</sup> of supervisor

Concordance 3 marks

Give:

3 marks if all the ticked values are within 0.2 cm<sup>3</sup>

2 marks if all the ticked values are within 0.3 cm<sup>3</sup>

1 mark if all the ticked values are within 0.4 cm<sup>3</sup>

Average 1 mark

Give 1 mark if the candidate calculates a correct average (error not greater than 0.05) of all his ticked values.

Assuming a 25 cm<sup>3</sup> pipette and a titre of 24.8 cm<sup>3</sup>.

(b) concentration of hydrogen ions in P [2]

$$= \frac{25 \times 0.1}{24.8} (1)$$

$$= 0.101 (1)$$

Answers should be correct to + or – 1 in the third significant figure.

(c) moles of hydrogen ions in 10000 dm<sup>3</sup> of contaminated water [1]

$$= 0.101 \times 10000 (1)$$

$$= 1010$$

(d) mass of calcium carbonate needed to neutralise the acid [2]

$$= 1010/2 (1)$$

$$= 1010 \times 100 (1)$$

$$= 50500 \text{ g}$$

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2 R is aluminium S is potassium nitrate

<b>Test</b>	<b>Notes</b>
<p><b>General points</b>            For ppt            allow solid, suspension, powder</p> <p>For gases            Name of gas requires test to be at least partially correct.            Effervesces = bubbles = gas vigorously evolved (but not just gas evolved)</p> <p>Solutions            Colourless not equivalent to clear, clear not equivalent to colourless</p>	
<b>Solution R</b>	
Test 1  effervescence (1) pops with a lighted splint (1) hydrogen (1)	
Test 2  white ppt (1) soluble in excess (1) colourless solution (1)	
Test 3  white ppt (1) insoluble in excess (1)	
Test 4  <b>(a)</b> effervescence (1) pops with a lighted splint (1) hydrogen (1)  <b>(b)</b> white ppt (1) soluble in excess (1) colourless solution (1)	
Test 5  <b>(a)</b> no reaction (1)  <b>(b)</b> red/brown solid formed (1) blue colour fades (1) effervescence (1)	

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Test 6		
(a) liquid turns green	(1)	accept green-yellow or colourless
(b) green ppt	(1)	black/dirty green ppt
insoluble in excess	(1)	
Test 7		
turns litmus blue	(1)	
ammonia	(1)	

[20]

**R** is aluminium/Al (ppt must dissolve in test 2 and ppt must not dissolve in test 3) (1)

**R** is acting as a reducing agent (any green in test **6(a)** or green/black in test **6(b)**) (1)

**S** contains nitrate or  $\text{NO}_3^-$  (test 7 correct – allow alkaline gas, smell of ammonia) (1)

[3]

**Note:** 26 marking points, maximum 23.