

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge Ordinary Level

## **MARK SCHEME for the May/June 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<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/her ticked values.

[12]

**Calculations**

Assuming a 25.0 cm<sup>3</sup> pipette and a titre of 20.2 cm<sup>3</sup>.

**(b)** moles of sodium hydroxide in 25.0 cm<sup>3</sup> of **P**

$$= \frac{25.0 \times 0.0984}{1000}$$

$$= 0.00246$$

[1]

**(c)** concentration, in mol/dm<sup>3</sup>, of H<sub>3</sub>PO<sub>3</sub> in **Q**

$$= \frac{5.04}{82}$$

$$= 0.0615$$

[1]

**(d)** moles of H<sub>3</sub>PO<sub>3</sub> in average titre of **Q**

$$= \frac{20.2 \times 0.0615}{1000}$$

$$= 0.00124$$

[1]

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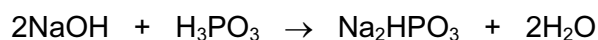
(e) moles of sodium hydroxide which react with 1 mole of  $\text{H}_3\text{PO}_3$

$$= \frac{0.00246}{0.00124}$$

$$= 1.98$$

[1]

(f) balanced equation for the reaction



whole numbers consistent with answer in (e) on left hand side of equation (1)

correct formulae for products and balancing of the equation (1)

[2]

[Total: 18]

**2 R** is ammonia **S** is iron(II) sulfate

Test	Notes
<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 gas evolved.</p> <p>Solutions            Colourless not equivalent to clear, clear not equivalent to colourless.</p>	
<p><b>1</b></p> <p>gas turns damp red litmus blue (1)</p> <p>ammonia (1)</p>	<p>to score ammonia mark there must be some indication of a test, i.e. smell of ammonia, alkaline gas, tested with litmus</p>
<p><b>2</b></p> <p>white ppt (1)</p> <p>soluble in excess (1)</p> <p>colourless solution (1)</p>	

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<b>Test</b>	<b>Notes</b>
<b>3</b> <b>(a)</b> white ppt (1) <b>(b)</b> solid disappears (1) colourless solution (1)	
<b>4</b> <b>(a)</b> no reaction (1) <b>(b)</b> bubbles (1) gas relights a glowing splint (1) oxygen (1) blue solution (1)	to score oxygen mark there must be some indication of a test, e.g. 'tested with a glowing splint', 'relights a splint'
<b>5</b> <b>(a)</b> white ppt (1) <b>(b)</b> solid remains (1)	
<b>6</b> green ppt (1) insoluble in excess (1) turns brown at surface (1)	

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Test	Notes
7	
(a) filtrate is yellow (1)	
(b) red-brown ppt (1)	
insoluble in excess (1)	

Any 20 of the 21 scoring points

[20]

### Conclusions

**R** is ammonia/ $\text{NH}_3$  or ammonium hydroxide/ $\text{NH}_4\text{OH}$   
(ammonia identified in test 1)

(1)

**S** is iron(II) sulfate/ $\text{FeSO}_4$   
(in test 4 white ppt insoluble in acid and in test 6 green ppt)

(1)

[2]

[Total: 22]