



**Cambridge International Examinations**  
Cambridge Ordinary Level

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**CHEMISTRY****5070/32**

Paper 3 Practical Test

**May/June 2017**

MARK SCHEME

Maximum Mark: 40

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**Published**

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| Question | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Marks |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1(a)     | <p><b>Titration</b></p> <p><b>Measurements (1)</b><br/>Both readings (initial and final) are present for each titration, readings are recorded to 1dp, no reading is in excess of 50.0 and no initial reading is given as 50.0.</p> <p><b>Titres (1)</b><br/>All the titres are calculated correctly i.e. no subtraction errors.</p> <p><b>Accuracy (6)</b><br/>For each of the two best titres give:<br/>3 marks for a titre within 0.2 cm<sup>3</sup> of the Supervisor's value.<br/>2 marks for a titre within 0.3 cm<sup>3</sup> of the Supervisor's value.<br/>1 mark for a titre within 0.4 cm<sup>3</sup> of the Supervisor's value.</p> <p><b>Concordance (3)</b><br/>Give 3 marks if all the ticked values are within 0.2 cm<sup>3</sup>.<br/>Give 2 marks if all the ticked values are within 0.3 cm<sup>3</sup>.<br/>Give 1 mark if all the ticked values are within 0.4 cm<sup>3</sup>.</p> <p><b>Average (1)</b><br/>Give 1 mark if the candidate calculates a correct average of selected titres.</p> | 12    |
| 1(b)     | <p>Assuming a pipette of 25 cm<sup>3</sup> and the average volume of <b>Q</b> used = 20.3 cm<sup>3</sup></p> <p>Moles of sodium thiosulfate = <math>(20.3 \times 0.0230) / 1000</math><br/>= 0.000467</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1     |
| 1(c)     | <p>Moles of iodine = <b>(b)</b> / 2<br/>= 0.000467 / 2<br/>= 0.000234</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1     |
| 1(d)     | <p>Moles of iodine in 250 cm<sup>3</sup> of <b>P</b> = <b>(c)</b> × 250 / volume of <b>P</b> used<br/>= 0.000234 × 250 / 25<br/>= 0.00234</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1     |

| Question                                                                                                                                                                                                                                                                                                                                                                                                            | Answer                                                                                                                                | Marks |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1(e)                                                                                                                                                                                                                                                                                                                                                                                                                | Moles of chlorine in 50 cm <sup>3</sup> of chlorine water = (d)<br>= 0.00234                                                          | 1     |
| 1(f)                                                                                                                                                                                                                                                                                                                                                                                                                | Mass, in g, of chlorine in 1 dm <sup>3</sup> of chlorine water = (e) × 71 × 1000 / 50<br>= 0.00234 × 71 (1) × 1000 / 50 (1)<br>= 3.32 | 2     |
| <b>Question 2 General points</b><br><br><b>R</b> is ammonium chromium(III) sulfate<br><b>S</b> is iron(III) chloride<br><br>For gases: to gain credit for the name of the gas produced, the test must be at least partially correct.<br><br>Solutions: colourless is not equivalent to clear and clear is not equivalent to colourless<br><br>No credit is given for conclusions based upon incorrect observations. |                                                                                                                                       |       |
| 2(a) (test 1)                                                                                                                                                                                                                                                                                                                                                                                                       | (a) White ppt (1)<br>(b) Insoluble (1)                                                                                                | 18    |
| 2(a) (test 2)                                                                                                                                                                                                                                                                                                                                                                                                       | Green ppt (1)<br>Insoluble in excess (1)                                                                                              |       |
| 2(a) (test 3)                                                                                                                                                                                                                                                                                                                                                                                                       | (a) Green ppt (1)<br>Soluble in excess (1)<br>Green solution (1)<br>(b) Gas turns damp red litmus paper blue (1)<br>Ammonia (1)       |       |
| 2(a) (test 4)                                                                                                                                                                                                                                                                                                                                                                                                       | (a) White ppt (1)<br>(b) Ppt remains (1)                                                                                              |       |
| 2(a) (test 5)                                                                                                                                                                                                                                                                                                                                                                                                       | Red-brown ppt (1)<br>Insoluble in excess (1)                                                                                          |       |

| Question      | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Marks    |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 2(a) (test 6) | (a) Yellow colour fades / turns colourless (1)<br>(b) Liquid turns green / black (1)<br>Ppt (1)                                                                                                                                                                                                                                                                                                                                                                         |          |
| 2(a) (test 7) | (a) Red–brown solution (1)<br>(b) Liquid turns black-blue (1)                                                                                                                                                                                                                                                                                                                                                                                                           |          |
| 2(b)          | <p><b>Conclusions</b></p> <p><b>R</b> contains:</p> <p>ammonium / <math>\text{NH}_4^+</math> (1) dependent on a mark being awarded in test 3(b)</p> <p>chromium(III) / <math>\text{Cr}^{3+}</math> (1) dependent on insoluble green ppt in test 2 and soluble in test 3</p> <p>sulfate / <math>\text{SO}_4^{2-}</math> (1) dependent on white ppt insoluble in acid in test 1</p> <p>The oxidising agent in <b>S</b> is iron(III) / <math>\text{Fe}^{3+}</math> (1)</p> | <b>4</b> |