Cambridge
O Level

**Cambridge International Examinations**
Cambridge Ordinary Level

**CHEMISTRY** **5070/42**

Paper 4 Alternative to Practical **May/June 2016**

MARK SCHEME

Maximum Mark: 60

**Published**

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**Abbreviations used in the mark scheme**

- / separates alternatives within a marking point.
- **or** gives the alternative marking point.
- **Allow / accept** indicates an answer that is less than ideal but which should be marked correct.
- **Ignore** means mark as if the response was not there.
- **Reject** means the response is not given credit
- Ecf means credit a correct statement / working that follows from a previous wrong response.
- Use of brackets in the Answer column indicates that the word(s) is / are ideal but not required to obtain the mark.

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| Question | Answer | Marks |
|---|---|---|
| 1(a) | M1:**Thermometer / bulb**<br>Thermometer / bulb is too low / should be higher / should not touch the beads / should be at entrance to condenser (1)<br><br>M2: **Receiver / conical flask / C**<br>There should be no bung or cork on **C** / **C** should be open (1) | 2 |
| 1(b)(i) | Fractionating column | 1 |
| 1(b)(ii) | Separate components / separate mixture / separate heptane and hexane / separate liquids / stop heptane reaching condenser | 1 |
| 1(b)(iii) | Condenser | 1 |
| 1(b)(iv) | (To convert) vapour / gas to liquid<br>**or** liquefy vapour / gas<br>**or** condense vapour / gas | 1 |
| 1(c)(i) | 69 °C | 1 |
| 1(c)(ii) | Hexane | 1 |
| 1(d) | M1 Electric (heater) / water bath / hot plate / (1)<br><br>M2 (components of mixture are) flammable / inflammable(1) | 2 |

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| Question | Answer | Marks |
|---|---|---|
| 2(a) | M1 (aqueous) NaOH / sodium hydroxide (solution) (1)<br><br>M2 A*l* / aluminium(foil) / Devardas alloy (1)<br><br>M3 Heat / warm (1)<br><br>M4 Ammonia<br>**or**<br>**gas** turns litmus blue (1) | 4 |
| 2(b) | M1 Heat (1)<br><br>M2 To crystallisation point / saturation (point) (1)<br><br>M3 Wash **and** dry (crystals) (1) | 3 |
| 2(c)(i) | 21<br>24 (1)<br><br>(–)3 (1) | 2 |
| 2(c)(ii) | Endothermic | 1 |

| Question | Answer | Marks |
|---|---|---|
| 3(a)(i) | 1.3(0) g | 1 |
| 3(a)(ii) | 1.62 g | 1 |
| 3(a)(iii) | 0.32 g | 1 |
| 3(a)(iv) | M1 1.30 / 65 and 0.32 / 16<br>**or** 0.02 and 0.02<br>**or** both 1 / 50 (1)<br><br>M2 ZnO (1) | 2 |
| 3(b) | Hydrogen (1)<br><br>Pops in a flame / lighted splint pops / burning splint pops (1) | 2 |

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| Question | Answer | Marks |
|---|---|---|
| 4 | **B** | 1 |

| Question | Answer | Marks |
|---|---|---|
| 5 | **A** | 1 |

| Question | Answer | Marks |
|---|---|---|
| 6 | **C** | 1 |

| Question | Answer | Marks |
|---|---|---|
| 7(a) | Blue to colourless | 1 |
| 7(b) | 28.1 30.9 47.1<br>0.0 3.5 19.5 (3)<br>28.1 27.4 27.6<br><br>Mean titre 27.5 $cm^3$ (1) | 4 |
| 7(c) | $0.0025 / 2.5 \times 10^{-3}$ | 1 |
| 7(d) | $0.0025 / 2.5 \times 10^{-3}$ | 1 |
| 7(e) | $0.0909 / 9.09 \times 10^{-2}$ | 1 |
| 7(f) | 88 | 1 |
| 7(g) | M1 ($M_r$ of COOH) = 45 **or** 12 + 16 + 16 + 1 **or** 12 + 32 + 1 (1)<br><br>M2 **n** = 3 (1)<br><br>M3 $C_4H_8O_2$ (1)<br><br>M4 butanoic acid / methyl propanoic acid (1) | 4 |

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| Question | Answer | Marks |
|---|---|---|
| 8(a) | Colourless (solution) | 1 |
| 8(b) | **(Both)** $Al^{3+}$ or $Zn^{2+}$ (ions present) | 1 |
| 8(c) | $Al^{3+}$ ( ions confirmed) | 1 |
| 8(d) | M1 (dilute) $HNO_3$ / nitric acid ignore acidify(1)<br>M2 (aq) aqueous solution of $AgNO_3$ / silver nitrate (1)<br>M3 white precipitate(1) | 3 |
| 8(e) | $AlCl_3$ | 1 |

| Question | Answer | Marks |
|---|---|---|
| 9(a) | White | 1 |
| 9(b) | 1.3(0), 1.95, 2.6(0), 2.8(0), 2.8(0) | 1 |
| 9(c)(i) | All points correct (1)<br>(Only) two intersecting straight lines, one mark for each line (2) | 3 |
| 9(d)(i) | Value as read from graph (correct to within 0.1) e.g. 3.7 | 1 |
| 9(d)(ii) | Value as read from graph (correct to within 0.025) e.g. 2.8 | 1 |
| 9(d)(iii) | Value as read from graph (correct to within 0.1) e.g. 8.6 | 1 |
| 9(e) | M1 $\frac{10 \times 1.2}{8.6}$ (1)<br>**OR** (moles $BaCl_2$) = $\frac{10 \times 1.2}{1000}$ or = 0.012 (1)<br>M2 1.395 / 1.4 (1) (mol / $dm^3$ ) | 2 |

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