



**Cambridge Assessment International Education**  
Cambridge International General Certificate of Secondary Education

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**PHYSICS****0625/63**

Paper 6 Alternative to Practical

**October/November 2018**

MARK SCHEME

Maximum Mark: 40

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**Published**

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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This document consists of **7** printed pages.



| Question | Answer                                                                                                                                                                              | Marks |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1(a)(i)  | $l = 6.0$ , $w = 3.0$ , $h = 4.0$ (cm)                                                                                                                                              | 1     |
| 1(a)(ii) | $V_1 = 72$ (cm <sup>3</sup> )                                                                                                                                                       | 1     |
| 1(b)     | difficult to measure irregular dimensions / owtte                                                                                                                                   | 1     |
|          | repeat (in several places for each dimension and take averages)                                                                                                                     |       |
| 1(c)     | $W = 1.4$ (N)                                                                                                                                                                       | 1     |
| 1(d)     | $\rho_1 = 1.9(4)$                                                                                                                                                                   | 1     |
|          | unit g / cm <sup>3</sup>                                                                                                                                                            |       |
| 1(e)(i)  | $V_2 = 160$ (cm <sup>3</sup> )                                                                                                                                                      | 1     |
| 1(e)(ii) | line of sight perpendicular                                                                                                                                                         | 1     |
| 1(f)(i)  | $V_3$ present and $\rho_2 = 2.0$ (g / cm <sup>3</sup> )                                                                                                                             | 1     |
| 1(f)(ii) | <i>suggestion supported by valid reason e.g.</i><br>$\rho_2$ as volume is measured directly;<br>$\rho_1$ as measuring cylinder is less precise;<br>string adds to volume displaced. | 1     |

| Question  | Answer                                                                                                                                                            | Marks |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 2(a)      | correct voltmeter symbol in parallel with wire <b>X</b>                                                                                                           | 1     |
| 2(b)      | $V = 1.9 \text{ (V)}$                                                                                                                                             | 1     |
| 2(c)(i)   | graph:                                                                                                                                                            |       |
|           | axes labelled correct orientation, with quantity and unit                                                                                                         | 1     |
|           | appropriate scales (plots occupying at least $\frac{1}{2}$ grid)                                                                                                  | 1     |
|           | plots all correct to $\frac{1}{2}$ small square and precise plots                                                                                                 | 1     |
|           | well-judged line and thin line                                                                                                                                    | 1     |
| 2(c)(ii)  | G present and triangle method <u>seen on graph</u>                                                                                                                | 1     |
| 2(c)(iii) | $l = 4.5 \text{ (cm)}$ and $L = 13.5 \text{ (cm)}$                                                                                                                | 1     |
| 2(c)(iv)  | $R$ in range 0.17 to 0.23                                                                                                                                         | 1     |
|           | 2 / 3 sig figs and unit = $\Omega$ or $\Omega / \text{cm}$                                                                                                        | 1     |
| 2(d)      | Any <b>one</b> from:<br>use smaller current / potential difference;<br>use wire with greater resistance;<br>open switch / switch off circuit in between readings. | 1     |

| Question  | Answer                                                                                                                                                                                            | Marks |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 3(a)(i)   | $\alpha = 20^\circ \pm 1^\circ$                                                                                                                                                                   | 1     |
| 3(a)(ii)  | normal correct                                                                                                                                                                                    | 1     |
| 3(a)(iii) | pin separations $\geq 5.0$ cm                                                                                                                                                                     | 1     |
| 3(b)(i)   | line in correct place and neat                                                                                                                                                                    | 1     |
| 3(b)(ii)  | $\theta = 40^\circ \pm 1^\circ$                                                                                                                                                                   | 1     |
| 3(c)(i)   | line in correct place and neat                                                                                                                                                                    | 1     |
| 3(c)(ii)  | $\theta = 68^\circ \pm 1^\circ$                                                                                                                                                                   | 1     |
| 3(d)      | statement matching results including qualitative justification (e.g. 'within limits of experimental accuracy' / owtte)                                                                            | 1     |
|           | justification that makes use of the data to support statement                                                                                                                                     | 1     |
| 3(e)      | Any <b>two</b> suitable precautions:<br>pins upright / view pins at base;<br>thin pins;<br>thin lines / sharp pencil;<br>large pin separations;<br>ensure mirrored surface lies along drawn line. | 2     |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                          | Marks |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 4        | <b>MP1 Apparatus</b><br>thermometer AND stopwatch / (stop)clock / timer                                                                                                                                                                                                                                                                                         | 1     |
|          | <b>MP2 Diagram</b><br>workable arrangement                                                                                                                                                                                                                                                                                                                      | 1     |
|          | <b>MP3 Method</b><br>hot water in beaker and cold water in test-tube AND measure (start and) end temperatures in test-tube AND over measured time                                                                                                                                                                                                               | 1     |
|          | <b>MP4 Method</b><br>repeat for different metals                                                                                                                                                                                                                                                                                                                | 1     |
|          | <b>MP5 Comparison</b><br>calculation of (rate of) temperature rise / heating curves for different metals                                                                                                                                                                                                                                                        | 1     |
|          | <b>MP6 and MP7 Precautions</b><br>Any <b>two</b> from:<br>same start temperatures (of hot / cold water);<br>same duration of experiment;<br>same volume of cold water (being heated);<br>repeat experiment <u>and</u> take average (of calculated values);<br>use of insulation;<br>stir (cold) water;<br>heat to keep water in beaker at constant temperature. | 2     |