



# Cambridge IGCSE™

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

Paper 6 Alternative to Practical

**May/June 2023**

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 **9** printed pages.

| Question | Answer                                                                                                                                                                                                                                                                                                                                                   | Marks |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1(a)     | $d_0 = 7.5 \text{ (cm)}$                                                                                                                                                                                                                                                                                                                                 | 1     |
| 1(b)(i)  | idea of allow to (just) tip one way then the other way / owtte                                                                                                                                                                                                                                                                                           | 1     |
| 1(b)(ii) | $b / a = 0.14$                                                                                                                                                                                                                                                                                                                                           | 1     |
| 1(c)     | graph:<br><ul style="list-style-type: none"> <li>axes labelled with quantity and unit</li> <li>appropriate scales (plots occupying at least <math>\frac{1}{2}</math> grid between plotted points)</li> <li>plots all correct to <math>\frac{1}{2}</math> small square <u>and</u> precise plots</li> <li>well-judged line <u>and</u> thin line</li> </ul> | 1     |
| 1(d)(i)  | G present and triangle method seen <u>on graph</u>                                                                                                                                                                                                                                                                                                       | 1     |
| 1(d)(ii) | $M_R$ in range 140 to 170 <u>and</u> with unit of g                                                                                                                                                                                                                                                                                                      | 1     |
| 1(e)(i)  | metre ruler on pivot without mass $M$ , read position of pivot when ruler as near to balance as possible / owtte                                                                                                                                                                                                                                         | 1     |
| 1(e)(ii) | $b$ calculated from $b = 48.7 - p$                                                                                                                                                                                                                                                                                                                       | 1     |

| Question | Answer                                                                                                             | Marks |
|----------|--------------------------------------------------------------------------------------------------------------------|-------|
| 2(a)     | voltmeter in parallel connection with resistor U                                                                   | 1     |
| 2(b)     | $V = 1.7$                                                                                                          | 1     |
|          | $I = 0.42$                                                                                                         | 1     |
| 2(c)(i)  | $R = 4.05$ / ecf, 3.89, 3.81                                                                                       | 1     |
|          | consistent to 2 or consistent to 3 significant figures for $R$                                                     | 1     |
| 2(c)(ii) | statement matching results                                                                                         | 1     |
|          | values used seen, and justification matching statement<br>e.g. within limits of experimental accuracy / owtte      | 1     |
| 2(d)(i)  | rectangle with strike-through arrow only                                                                           | 1     |
|          | in series connection                                                                                               | 1     |
| 2(d)(ii) | can obtain continuous set of values /<br>more straightforward to change current /<br>can obtain more values easily | 1     |
| 2(e)     | straight line <u>and</u> through origin                                                                            | 1     |

| Question | Answer                                                                                                                                                                                                       | Marks |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 3(a)(i)  | normal correct                                                                                                                                                                                               | 1     |
| 3(a)(ii) | $\theta_1 = 15(^{\circ}) \pm 1(^{\circ})$                                                                                                                                                                    | 1     |
| 3(b)(i)  | $d = 3.5 \text{ (cm)}$                                                                                                                                                                                       | 1     |
| 3(b)(ii) | no <u>and</u> too close / must be as far apart as possible                                                                                                                                                   | 1     |
| 3(c)     | all lines fine, straight and in correct relation                                                                                                                                                             | 1     |
| 3(d)(i)  | $\alpha = 27(^{\circ}) \pm 2(^{\circ})$                                                                                                                                                                      | 1     |
| 3(d)(ii) | statement matching results                                                                                                                                                                                   | 1     |
|          | justification matching statement and quoting values                                                                                                                                                          | 1     |
| 3(e)     | any <b>two</b> suitable precautions, e.g.: <ul style="list-style-type: none"> <li>• thin lines / sharp pencil</li> <li>• view bottom of pins / keep pins upright</li> <li>• ensure pins far apart</li> </ul> | 2     |
| 3(f)     | difficult to align pins / place pins accurately / pins (too) thick                                                                                                                                           | 1     |

| Question | Answer                                                                                                                                                                                                                                                                                                                                                     | Marks |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 4        | MP1 <b>apparatus:</b><br>thermometer <u>and</u> stop-watch                                                                                                                                                                                                                                                                                                 | 1     |
|          | MP2 <b>method:</b><br>measure independent variable <u>and</u> measure temperature <u>and</u> time                                                                                                                                                                                                                                                          | 1     |
|          | MP3 repeat for new value of independent variable                                                                                                                                                                                                                                                                                                           | 1     |
|          | MP4 <b>control variable:</b><br>any <b>one</b> from:<br><ul style="list-style-type: none"> <li>• volume of water</li> <li>• initial temperature</li> </ul>                                                                                                                                                                                                 | 1     |
|          | MP5 <b>table:</b><br>columns, with units, for independent variable, temperature, time                                                                                                                                                                                                                                                                      | 1     |
|          | MP6 <b>analysis:</b><br>compare readings to see if change in lid thickness produces change in (rate of) temperature change (owtte)<br>plot line graph (with axes specified)                                                                                                                                                                                | 1     |
|          | MP7 <b>additional point</b><br>any <b>one</b> from:<br><ul style="list-style-type: none"> <li>• at least 5 sets of data taken</li> <li>• repeat for each value of independent variable <u>and</u> take average</li> <li>• 2<sup>nd</sup> appropriate control variable stated</li> <li>• description of calculating rate of cooling from results</li> </ul> | 1     |