



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

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**PHYSICAL SCIENCE**

**0652/51**

Paper 5 Practical Test

**October/November 2019**

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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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

**PUBLISHED****Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

**GENERIC MARKING PRINCIPLE 1:**

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

**GENERIC MARKING PRINCIPLE 2:**

Marks awarded are always **whole marks** (not half marks, or other fractions).

**GENERIC MARKING PRINCIPLE 3:**

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

**GENERIC MARKING PRINCIPLE 4:**

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

**GENERIC MARKING PRINCIPLE 5:**

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

**GENERIC MARKING PRINCIPLE 6:**

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

Question	Answer	Marks
1(a)	11 temperatures recorded ; All temperatures to nearest 0.5 °C ; Temperatures increase and decrease ;	3
1(b)(i)	both axes <u>labelled</u> and <u>linear</u> ; plotted points cover $\geq \frac{1}{2}$ grid space ; all points plotted correctly $\pm \frac{1}{2}$ small square ;	3
1(b)(ii)	two best-fit lines, drawn with a ruler ; highest temperature recorded $\pm \frac{1}{2}$ small square from any 2 lines that cross ;	2
1(c)	correct calculation from their highest temperature ;	1
1(d)	<i>any two:</i>  <b>reason 1:</b> measuring cylinder used <b>improvement:</b> use a burette / pipette / syringe ;  <b>reason 2:</b> heat loss <b>improvement:</b> use a lid / lag or insulate it / use a polystyrene cup ;  <b>reason 3:</b> thermometer not accurate enough <b>improvement:</b> use a data logger / thermometer with a better resolution ;	2
1(e)	same as <b>1(c)</b> ; same amount / 25 cm <sup>3</sup> NaOH / H <sub>2</sub> SO <sub>4</sub> in excess / there are 2 H's in sulfuric acid ;	2

Question	Answer	Marks
2(a)	white / grey(solid) <b>and</b> blue (solution) ;	<b>1</b>
2(b)(i)	no change / no ppt / stays blue and white ppt ;  (pale) blue ppt ;	<b>2</b>
2(b)(ii)	blue-green ;	<b>1</b>
2(b)(iii)	copper sulfate ;	<b>1</b>
2(c)	(dark blue solution and (pale)) <u>blue ppt</u> (on excess) ;  ammonia (solution) ;	<b>2</b>

Question	Answer	Marks
3(a)(i)	sensible value for $P$ (likely to be 80.0 cm)	1
3(a)(ii)	calculation correct	1
3(a)(iii)	<i>any one:</i> difficult to ensure rule is perfectly balanced ; centre of soft modelling clay may not be exactly on 10 cm mark ; cannot see / read the marks on the rule ; centre of mass of rule not at 50 cm mark ; difficult to find centre of 50 g mass ; difficult to keep pivot under the 50 cm mark / the pivot slips ;	1
3(b)(i)	sensible value for $d_1$ (likely to be 3.2 cm) ;	1
3(b)(ii)	diagram showing wooden blocks touching either side of soft modelling clay ball (and metre rule against blocks) ;	1
3(b)(iii)	(sensible values for $d_2$ and $d_3$ ) calculation correct – must use all 3 values ;	1
3(b)(iv)	calculation correct ; to 2 / 3 sig figs ;	1 1
3(b)(v)	calculation correct ;	1
3(c)(i)	sensible value for $V_3$ (likely to be 70 cm <sup>3</sup> ) ;	1
3(c)(ii)	calculation correct ;	1
3(c)(iii)	calculation correct ;	1
3(d)	method 1: measuring cylinder only measures to the nearest $\frac{1}{2}$ cm <sup>3</sup> is not very accurate ; method 2: calculation in method 1 assumes a perfect sphere / shape / difficulty in balancing / difficulty in locating position of centres of the masses ;	1

Question	Answer	Marks
4	<p><b>1 mark from each 'MP' section and any two other marking points from any section.</b>  <b>1 MP section missing – 6 max</b>  <b>2 MP sections missing – 5 max etc.</b></p> <p><b>MP1 apparatus</b>  stopwatch / clock / timer and rule(r) / measuring tape ;</p> <p><b>MP2 method</b>  measure length (of pendulum) ;  measure time for 1 (or more complete) swings / measure the period ;  for different lengths ;</p> <p><b>MP3 control variables</b>  same bob / mass of bob / volume of bob ;  same angle of swing / displace bob the same distance ;</p> <p><b>MP4 precautions for accuracy</b>  time (5 / 10 (or more) oscillations and divide / take an average ;  ruler close to pendulum / string when measuring ;  view reading / ruler at eye level / perpendicular (to scale) ;  repeat each reading ;  use of a fiducial aid explained ;</p> <p><b>MP5 table</b>  table with headings of length and time / period / number of swings ;  with units cm / m and s / sec(s) / seconds ;</p>	7