Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

PHYSICS **5054/42**

Paper 4 Alternative to Practical **May/June 2019**

MARK SCHEME

Maximum Mark: 30

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.

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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.

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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.

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Question	Answer	Marks
1(a)(i)	voltmeter (correct symbol) in parallel with heater or power supply	**B1**
1(b)(i)	41.5 (correct answer only)	**B1**
1(b)(ii)	1 so that <u>all</u> the thermal energy is transferred to the water / so that thermal energy is not lost to the surroundings	**B1**
	2 to ensure that all the water is at the same temperature	**B1**
1(c)(i)	axes labelled, quantity and unit correct way around	**B1**
	scales linear, not awkward <u>and</u> *y*-axis starts from 20 °C	**B1**
	points plotted accurately	**B1**
	smooth, thin best-fit curve drawn	**B1**
1(c)(ii)	subtraction of any 2 values seen	**C1**
	17 ± 2 (°C)	**A1**
1(d)(i)	11840 J / 1.2×10^4 J	**B1**
1(d)(ii)	correct substitution / rearrangement of equation	**C1**
	correct calculation from candidate's values	**A1**
1(e)(i)	heat loss (by conduction / convection) from sides / base of beaker / heat loss (by convection / evaporation) from surface / heat loss to surroundings / thermometer is too close to / touches the beaker / thermometer is too close to the heater	**B1**
1(e)(ii)	insulate the sides/base / use a lid / clamp thermometer (above the base of the beaker) / place thermometer correctly / to not allow heater to touch the beaker	**B1**
1(f)	(rate of)heat loss (from sides / base / surface) is equal to (rate of) heat gain (from heater)	**B1**

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Question	Answer	Marks
2(a)	30(°)	**B1**
2(b)(i)	refracted ray correct side of normal and $r = (19 \pm 1)°$	**B1**
2(b)(ii)	Y labelled and normal correct	**B1**
2(c)	mark ray with pins / dots / crosses (in middle of beam) **and** join them (back to the prism) / draw the line	**B1**

Question	Answer	Marks
3(a)(i)	bottom of ball level with the 55 cm mark on rule	**B1**
3(a)(ii)	eye (on either side) looking towards rule and perpendicular to reading	**B1**
3(b)(i)	54.75	**C1**
	55 (cm)	**A1**
3(b)(ii)	bounce height difficult to judge / measure / ball only momentarily at rest / ball changes direction (too) quickly	**B1**
3(c)	not enough time (to read scale) / difficult to get head down to take the reading / (bounce / maximum) height is (too) small / (bounce / maximum) height is (too) close to the ground / (bounce) height < 10 cm	**B1**

Question	Answer	Marks
4(a)(i)	no current / lamp does not light (whichever way around the circuit is connected to the box)	**B1**
4(a)(ii)	lamp lights / current flows whichever way around the circuit is connected	**B1**
4(a)(iii)	lamp lights / current flows for one orientation of circuit	**B1**
4(b)	lamp is dim(mer) / current is less when the resistor is connected (or reverse argument)	**B1**

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