



PHYSICS

5054/41

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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This document consists of **6** 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)(i)	3.2 (cm) and 8.0 (cm) both correct to 0.1 cm with unit	B1
1(a)(ii)	4.8 cm	B1
1(a)(iii)	ruler must be vertical / access to centre of lamp / filament / judge where the filament is / ruler dead space / ruler too far from lamp	B1
1(b)(i)	correct diagram for power supply, ammeter and LDR with correct symbols.	B1
	correct symbol voltmeter in parallel across LDR	B1
1(b)(ii)1	6.5V and 77mA cao	B1
1(b)(ii)2	84.415...	B1
	84ohms – unit required	B1
1(c)(i)	axes labelled quantity and unit axes correct way round	B1
	scales linear, not awkward	B1
	points plotted accurately	B1
	smooth best fit curve drawn	B1
1(c)(ii)	as d increases, R increases	B1

Question	Answer	Marks
2(a)	2.5 ms	B1
2(b)	metre rule gets rubbed away at the edges owtte	B1
2(c)	328 m/s correct with unit	B1
2(d)	A and B further apart / repeat and average	B1

Question	Answer	Marks
3(a)	5.9 (N) cao	B1
3(b)(i)	5.2 (N) cao	B1
3(b)(ii)	0.7(0) N	B1
3(c)(i)	73.7 (cm ³)	B1
3(c)(ii)	take the maximum value across the top / use of set squares / repeat and average at different places around the diameter or 'top and bottom' of cylinder	B1
3(c)(iii)	1 $74 \times 10 \times 0.0010$ seen and answer 0.74	B1
3(c)(iii)	2 yes because within 10% / they are very close / difference is small / difference within experimental error newton meter cannot be read to that precision	B1

Question	Answer	Marks
4(a)	thermometer stopwatch	B1 B1
4(b)(i)	basic method correct and read initial temperature	B1
	leave for the same period of time/ same temp drop and take final temperature	B1
	conclusion – least temp drop/longest time is best insulator	B1
4(b)(ii)	same thickness of insulator/same volume of water/ same initial temp/same room temp/ any sensible	B1