Cambridge O Level

Cambridge Assessment International Education
Cambridge Ordinary Level

PHYSICS **5054/41**

Paper 4 Alternative to Practical **October/November 2018**

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.

Cambridge International is publishing the mark schemes for the October/November 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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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)	moving / disturbed water would cause the colour to spread / allows water to settle / be still	**B1**
1(b)	water might boil / colour would spread throughout too quickly / allows steady movement of water / allows the colour to move slowly / to be able to observe the colour changes / able to see the convection current / able to see water moving	**B1**
1(c)	clockwise arrow	**B1**
1(d)	any sensible e.g. goggles / safety screen / gloves (whilst handling crystal)	**B1**

Question	Answer	Marks
2(a)(i)	length *h* shown	**B1**
2(a)(ii)	length *d* shown	**B1**
2(a)(iii)	metre rule	**B1**
2(a)(iv)	22.2 cm or 22 cm	**B1**
2(a)(v)	0.00972	**C1**
	0.0097 (J)	**A1**
2(b)	axes labelled quantity and unit and axes correct way round	**B1**
	scales linear, not awkward, start from (0.0)	**B1**
	points plotted accurately to the nearest half square	**B1**
	smooth, thin best fit curve drawn	**B1**
2(c)	ball would roll too far / in all directions / would roll off the bench / to increase friction	**B1**

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Question	Answer	Marks
3(a)(i)	eye position indicated in line with (bottom of) meniscus meniscus	**B1**
3(a)(ii)	no parallax error explained / eye is in line with (bottom of) meniscus / eye is level with (bottom of) meniscus / line of sight is perpendicular to the scale / eye in line with the reading	**B1**
3(a)(iii)	78 (cm^3) cao	**B1**
3(b)(i)	balance / scales	**B1**
3(b)(ii)	finds mass of empty measuring cylinder / beaker	**B1**
	tares / zeros and then finds mass of cylinder / beaker + water	**B1**
	OR	
	finds mass of empty cylinder / beaker and mass of cylinder / beaker +water	**(B1)**
	subtracts to find mass of water (Uses equation to find density)	**(B1)**
3(c)	drops of water left in the beaker / m. cylinder / splashes any sensible practical reason to give a different reading / zero error on balance	**B1**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>4(a)</td><td>micrometer / (digital) callipers</td><td>B1</td></tr>
<tr><td>4(b)(i)</td><td>so wire does not get hot</td><td>1</td></tr>
<tr><td rowspan="2">4(b)(ii)</td><td>0.34 A</td><td>B1</td></tr>
<tr><td>2.8 V</td><td>B1</td></tr>
<tr><td rowspan="3">4(c)(i)</td><td>all units correct in table headings</td><td>B1</td></tr>
<tr><td>all values transferred correctly i.e.
<table>
<tr><th>wire diameter / mm</th><th>voltage / V</th><th>current / A</th></tr>
<tr><td>0.15</td><td>2.8</td><td>0.34</td></tr>
<tr><td>0.24</td><td>2.8</td><td>0.85</td></tr>
</table></td><td>B1</td></tr>
<tr><td>both resistances calculated correctly i.e. 8.2(8.24) and 3.3 (3.29) ohms</td><td>B1</td></tr>
<tr><td>4(c)(ii)</td><td>as diameter increases, resistance decreases or wtte</td><td>B1</td></tr>
</table>

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