Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/53**

Paper 5 Practical Test **May/June 2019**

MARK SCHEME

Maximum Mark: 60

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 May/June 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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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.

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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)	time **and** minutes ;	**1**
1(a)(ii)	temperature for large test-tube at time = 0 ; full set of results for large test-tube and temperatures reduce over time ; full set of results for small test-tube and bigger drop over 5 minutes ; reading to nearest 0.5 °C ;	**4**
1(b)(i)	axes labelled including units ; sensible linear scale and uses at least half the space ;	**2**
1(b)(ii)	at least 4 correct plots ± half small square for each line ; two smooth curves of best fit correctly labelled ;	**2**
1(c)(i)	both calculated correctly ;	**1**
1(c)(ii)	greater loss in small test-tube because steeper graph / larger ΔT in same time ;	**1**
1(c)(iii)	expect yes, because small test-tube / the baby has the greater heat loss / loses heat faster ;	**1**

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Question	Answer	Marks
2	**alkali** named alkali e.g. sodium hydroxide / potassium hydroxide / limewater / ammonia / ammonium hydroxide etc. ; **apparatus and method** measuring cylinder / pipette / burette **and** thermometer ; suitable vessel for reaction **and** lid / lagging / polystyrene cup ; repeat all three (several times) ; **readings** initial temperature ; highest / final temperature ; **control** same volumes / amounts of acids / alkali ; same concentrations of acids / alkali ; same starting temperature **use of results** calculate rise in temperature for each acid and compare / higher temperature rise means more heat given out ;	**max 7**

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Question	Answer	Marks
3(a)(i)	t = 24.5 to 26.5 inclusive s ;	**1**
3(a)(ii)	$T = t / 20$;	**1**
3(a)(iii)	T^2 correct ;	**1**
3(b)	g (calculated and) within the range 8 to 12 ; answer to 3 significant figures ;	**2**
3(c)	full set of values present ; t value greater than in **3(a)(i)** ;	**1**
3(d)	g calculated correctly ;	**1**
3(e)	agree, values close enough ; **or** disagree, difference too large ;	**1**
3(f)(i)	1 / their value of T from **3(c)** ;	**1**
3(f)(ii)	reaction time errors less significant / larger length, measurement errors less significant ;	**1**

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Question	Answer	Marks
4(a)	clear and continuous outline ; larger than half the box ; detail in centre ;	**3**
4(b)(i)	measurement to nearest mm and smaller than **1(b)(ii)** ;	**1**
4(b)(ii)	line drawn and correct measurement to nearest mm ± 2 mm ;	**1**
4(b)(iii)	correct calculation ;	**1**
4(c)(i)	Benedict's ;	**1**
4(c)(ii)	green / yellow / orange / red ;	**1**

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<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(a)(i)</td><td>
<table>
<tr><td></td><td>dilute nitric acid</td><td>barium nitrate</td></tr>
<tr><td>sodium carbonate</td><td>effervesces / bubbles / fizzes and…>>></td><td>>>>…and white ppt;</td></tr>
</table>
</td><td>1</td></tr>
<tr><td>5(a)(ii)</td><td>
<table>
<tr><td></td><td>dilute nitric acid</td><td>barium nitrate</td></tr>
<tr><td>sodium sulfate</td><td>no reaction and…>>></td><td>>>>…and white ppt.;</td></tr>
</table>
</td><td>1</td></tr>
<tr><td>5(b)(i)</td><td>both give white ppt. / both give same result ;</td><td>1</td></tr>
<tr><td>5(b)(ii)</td><td>add dilute nitric acid first / add dilute nitric acid ;
carbonate will bubble with nitric acid / acid removes carbonate / carbonate will not give ppt. with barium nitrate after acid added first ;</td><td>2</td></tr>
<tr><td>5(c)</td><td>
<table>
<tr><th>tests</th><th>observations</th><th>conclusions</th></tr>
<tr><td>add sodium hydroxide solution or ammonia solution ;</td><td>no ppt ;</td><td>not Cu^{2+} / Zn^{2+} / Fe^{2+} / Fe^{3+} ;</td></tr>
<tr><td>heat with sodium hydroxide solution ;</td><td>(red) litmus goes blue ;</td><td>ammonium / NH_4^+ ;</td></tr>
<tr><td>dilute nitric acid and…>>></td><td>>>>…and no reaction ;</td><td>(not carbonate)</td></tr>
<tr><td>add barium nitrate solution and…>>></td><td>>>>…and white (ppt) ;</td><td>sulfate / SO_4^{2-} ;</td></tr>
</table>
</td><td>max 8</td></tr>
</table>

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Question	Answer	Marks
6(a)	l_1 recorded in mm ;	**1**
6(b)(i)	l_2 recorded and *e* calculated correctly ;	**1**
6(b)(ii)	correct calculation of *k* ;	**1**
6(c)	*any two from* place the ruler close to the spring ; view perpendicularly / view at eye level ; clamp rule vertically ; use a set-square / other fiducial aid ;	**max 2**
6(d)	l_A recorded and e_A correct ;	**1**
6(e)	*m* calculated correctly ;	**1**
6(f)	$e_W < e_A$;	**1**
6(g)	ρ calculation correct ; value between 2.(0) and 4.(0) ;	**2**

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