Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education (9–1)

CO-ORDINATED SCIENCES (9–1) **0973/61**

Paper 6 Alternative to Practical **October/November 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 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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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)	90 85 95 ; ;	**2**
1(a)(ii)	90 ;	**1**
1(a)(iii)	any **one** of: Temperature / volume / amount of beans / same size test-tube / amount / volume / concentration of hydrogen peroxide AVP ;	**1**
1(b)	gas tight and works and safe ;	**1**
1(c)	glowing splint ; relights ;	**2**
1(d)	yellow / green / orange / red ; **reducing** sugar ; purple / lilac ; protein ;	**4**
1(e)	(add) ethanol (to dissolve the fat) and (pour solution into) water ; white emulsion ;	**2**

Question	Answer	Marks
2	**apparatus** pond weed in container of water ; **method** use of one light source on its own ; all three light sources used separately ; repeats i.e. more than one full set of results ; **measure** number of bubbles / volume of gas produced ; in a set time ; **or** time ; collect set volume of gas / number of bubbles ; **control** same plant / same amount / same species of plant ; same distance of lamp from plant / same light intensity ; same temperature ; same water source ; same carbon dioxide concentration ; no contamination from other light sources ; **conclusion** greatest volume of gas / number of bubbles **or** shorter time to collect is **colour / light** that gives greatest rate ORA ; **Max 7**	**7**

Question	Answer	Marks
3(a)(i)	29 ;	**1**
3(a)(ii)	carbon dioxide ;	**1**
3(a)(iii)	wash out apparatus ; discard chemicals ;	**2**
3(b)(i)	0.034(482758) any number of sf greater than 2 ; 0.034 i.e. 2sf ;	**2**
3(b)(ii)	the greater the surface area the greater the rate ;	**1**
3(c)(i)	any **one** of: volume / amount of acid / concentration of acid / temperature / volume / amount of limewater ;	**1**
3(c)(ii)	chips not exactly the same size ;	**1**
3(c)(iii)	timing to the same milkiness (opaqueness of ppt.) in limewater ;	**1**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>4(a)(i)</td><td>23.5 ;</td><td>1</td></tr>
<tr><td>4(a)(ii)</td><td>18.0 / 18 ;</td><td>1</td></tr>
<tr><td>4(a)(iii)</td><td>–5.5 ;</td><td>1</td></tr>
<tr><td>4(a)(iv)</td><td>H is soluble in water / H dissolves ;
absorbs heat / endothermic ;</td><td>2</td></tr>
<tr><td>4(b)(i)</td><td>not carbonate ;
not a sulfate ;</td><td>2</td></tr>
<tr><td>4(b)(ii)</td><td>chloride / Cl^- ;</td><td>1</td></tr>
<tr><td>4(c)</td><td><table><tr><td>(add aqueous) sodium hydroxide ;</td><td></td></tr><tr><td></td><td>(red litmus to) blue ;</td></tr></table></td><td>2</td></tr>
</table>

Question	Answer	Marks
5(a)(i)	l = 5.3 w = 3.4 h = 2.0 all to nearest millimetre	**2**
5(a)(ii)	V = 36(.04) (cm^3) ;	**1**
5(b)(i)	block is not a regular shape / corresponding sides unequal / difficult to measure because sides not straight / rule only reads to the nearest mm ;	**1**
5(b)(ii)	use a measuring cylinder / displacement can / displacement of water ;	**1**
5(c)(i)	68.6 ; x = 18.6 ;	**2**
5(c)(ii)	m correct and rounded correctly, 1750 ÷ **(c)(i)** ;	**1**
5(d)(i)	difficult to obtain an exact balance / centre of block difficult to place over mark ;	**1**
5(d)(ii)	calculation correct, **(c)(ii)** ÷ **(a)(ii)** ;	**1**

Question	Answer	Marks
6(a)(i)	0.31 ;	**1**
6(a)(ii)	Ω ;	**1**
6(a)(iii)	0.9 / 0.86 (Ω) ;	**1**
6(b)	1.51 (V) ;	**1**
6(c)(i)	axes labelled with units correct orientation ; suitable choice of scales (⩾ half the grid used) ; 4 plots correct to half a small square ;	**3**
6(c)(ii)	good best-fit line judgement ;	**1**
6(d)(i)	(expect yes) (straight) line through the origin ;	**1**
6(d)(ii)	more values of l / repeats ;	**1**