Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES **0654/63**

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)	17 ; 26 ;	**2**
1(b)	good choice of scales and linear ; plots correct ± half small square line 1 ; plots correct ± half small square line 2 ; good best fit line 1 ; good best fit line 2 ;	**5**
1(c)	increases (rate of reaction) ;	**1**
1(d)	goggles to stop chemicals into eyes ;	**1**
1(e)	volume of H_2O_2 + volume of yeast ;	**1**
1(f)(i)	take readings at eye level / read perpendicularly ;	**1**
1(f)(ii)	gas syringe ;	**1**

Question	Answer	Marks
2(a)	<table><tr><td></td><td>colour observed</td><td>conclusion</td></tr><tr><td>biuret solution</td><td>purple ;</td><td>contains protein ;</td></tr><tr><td>iodine solution</td><td>brown / yellow / orange ;</td><td>does not contain starch ;</td></tr></table>	**4**
2(b)(i)	delivery tube under the limewater ;	**1**
2(b)(ii)	limewater and delivery tube ;	**1**
2(b)(iii)	milky ;	**1**
2(c)	To check it does not contain (named) nutrient / protein / starch / control ;	**1**

Question	Answer	Marks
3(a)	**apparatus and safety** labelled diagram of apparatus gas collection: • flask with delivery tube ; • graduated receiving vessel ; • air tight / will work ; • thermometer ; • means to change T ; OR mass decrease: • flask and contents ; • on balance ; • balance at least 1 dp ; • thermometer ; • means to change T ; OR to end: • container and acid and Mg ; • thermometer ; • means to change T ; no naked flame / limit concentration of sulfuric as corrosive / goggles as sulfuric acid corrosive / burns ; **variables** minimum 2 temperatures stated ; 5 stated values of temperature ; **control variables** same size / length / surface area of magnesium ; same volume of acid / same amount of magnesium ; same concentration of acid ;	**7**

Question	Answer	Marks
3(a)	**measurements** (measure) volume of gas ; OR mass loss ; in a certain time ; OR time ; for certain volume of gas ; OR loss of mass ; OR time ; to end / bubbles stop / Mg all gone ; **processing** graph of volume against time / mass against time ; rate = volume ÷ time / mass ÷ time ; more gas in set time is fastest / same gas in less time is fastest ;	

Question	Answer	Marks
3(b)	suitable error ; improvement for stated error ; any misreadings / mis measurements ; repeat ; OR (misread because) parallax ; eye level ; OR surface area of magnesium ribbon ; same shape / size ; OR conc of acid ; use same batch ; OR temperature ; water-bath ; OR mass loss is small ; balance to more dp ; OR loss of gas as assembled ; have tube in flask ;	**2**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>4(a)</td><td>
<table>
<tr><td>test</td><td>observations</td></tr>
<tr><td>(add dilute hydrochloric / nitric) acid ;</td><td></td></tr>
<tr><td>(add dilute nitric acid followed by)
silver nitrate (solution) ;</td><td></td></tr>
<tr><td>(add dilute nitric acid followed by)
barium nitrate / barium chloride
(solution) ;</td><td>white ppt. ;</td></tr>
</table>
</td><td>4</td></tr>
<tr><td>4(b)</td><td>
<table>
<tr><td>test</td><td>obs</td><td>conclusions</td></tr>
<tr><td></td><td></td><td>iron(II) / Fe^{2+} ;</td></tr>
<tr><td></td><td></td><td>ammonium / NH_4^+ / ammonia / NH_3 ;</td></tr>
</table>
</td><td>2</td></tr>
<tr><td>4(c)(i)</td><td>to avoid glass breaking / cracking / to avoid glass melting / mpt high ;</td><td>1</td></tr>
<tr><td>4(c)(ii)</td><td>water ;</td><td>1</td></tr>
<tr><td>4(c)(iii)</td><td>acid ;</td><td>1</td></tr>
<tr><td>4(c)(iv)</td><td>iron(III) / Fe^{3+} ;</td><td>1</td></tr>
<tr><td>4(c)(v)</td><td>iron / Fe and rusting ;</td><td>1</td></tr>
</table>

Question	Answer	Marks
5(a)(i)	7.1 (cm) ;	**1**
5(a)(ii)	4.8 (cm) ;	**1**
5(b)	8.4 (cm) ;	**1**
5(c)(i)	5.95 (cm) ;	**1**
5(c)(ii)	233.444085 ; 233 ;	**2**
5(d)(i)	203 ;	**1**
5(d)(ii)	read scale at right angles / eye level / read scale at bottom of meniscus ;	**1**
5(e)(i)	*h* not measured to the inside bottom of the cup / difficult to measure *h* / thickness of cup ;	**1**
5(e)(ii)	cup not completely full / water spilled (on transfer) ;	**1**

Question	Answer	Marks
6(a)(i)	d = 11.9 (cm) ;	**1**
6(a)(ii)	d_A = 59.5 (cm) ;	**1**
6(a)(iii)	f_A = 14.9 (cm) ;	**1**
6(b)	f_B = 15.1 (cm) ;	**1**
6(c)	*f* correct ; 2 or 3 or 4 s.f. only ;	**2**
6(d)	**Max one from:** move screen slowly / to and fro until sharpest focus obtained ; object / lens / screen perpendicular to bench ; object and lens same height above the bench ; carry out experiment away from other bright light / sources / darkened room; use brighter lamp / repeat (and average) ;	**1**
6(e)	at least 3 values suggested ; all values > 15 (cm) ;	**2**
6(f)	horizontal line from centre of lens to screen ;	**1**