Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

COMBINED SCIENCE	**0653/61**
Paper 6 Alternative to Practical	**October/November 2016**
MARK SCHEME	
Maximum Mark: 60	

Published

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Page 2	Mark Scheme	Syllabus	Paper
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Question	Answers	Marks
1(a)	time <u>and</u> minutes ; observation / appearance ;	2
1(b)	iodine (molecules) move into bag / tube ; by diffusion / because they are small enough ; starch and iodine produce blue-black / darker colour ;	3
1(c)(i)	(blue-black) colour goes / fades / goes brown ;	1
1(c)(ii)	**no** starch left / **no** starch-iodine complex ;	1
1(c)(iii)	Benedict's solution ; heat ; yellow / green / orange / red ;	3
	Total:	10

Question	Answers	Marks
2(a)(i)	add sodium hydroxide (solution) / NaOH ; green ppt. ;	2
2(a)(ii)	add dilute nitric acid / HNO_3 ; then add barium nitrate solution / $Ba(NO_3)_2$; white ppt. ;	3
2(b)(i)	hydrogen / H_2 ;	1
2(b)(ii)	white ppt. ; ppt. dissolves / becomes colourless solution / soluble in excess ;	2

Page 3	Mark Scheme	Syllabus	Paper
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Question	Answers	Marks
2(c)(i)	displacement / redox / cation reduced / it is reduced / Fe^{2+} goes to Fe / it is replaced by Mg / it is replaced by Mg^{2+} ;	1
2(c)(ii)	exothermic ;	1
	Total:	**10**

Question	Answers	Marks
3(a)(i)	6.5 ;	1
3(a)(ii)	65 ;	1
3(a)(iii)	appropriate precaution (either written or shown on diagram) ; take reading at eye level / use of set square to ensure rule vertical / use of fiducial aid ;	max 1
3(b)	31.0 ;	1
3(c)	T = 1.55 ; T^2 = 2.4 ;	2
3(d)	suitable choice of scales (more than half the grid used) ; at least 4 plots correct to ½ small square ; good best-fit straight line with a ruler, omission of anomalous point ;	3
3(e)	yes agree (no mark) (straight) line through the origin no disagree (no mark) all points / anomaly not on the (straight) line ;	max 1
	Total:	**10**

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Page 4	Mark Scheme	Syllabus	Paper
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Question	Answers	Marks
4(a)(i)	<table><tr><td>dish</td><td colspan="3">Seedling height / mm</td><td rowspan="2">Average seedling height / mm</td></tr><tr><td></td><td>Student 1</td><td>Student 2</td><td>Student 3</td></tr><tr><td>**A**</td><td>32</td><td>**34 ;**</td><td>**30 ;**</td><td>**32**</td></tr><tr><td>**B**</td><td>14</td><td>18</td><td>16</td><td>**16**</td></tr><tr><td>**C**</td><td>2</td><td>3</td><td>1</td><td>**2**</td></tr></table>	**2**
4(a)(ii)	averages calculated correctly – A = 32, B = 16, C = 2 ;	**1**
4(b)(i)	horizontal axis labelled dish A, B and C ; linear vertical axis labelled height / mm <u>and</u> uses at least half the grid ; all bars correct height ± one half small square ;	**3**
4(b)(ii)	reduces effect of errors / takes account of variations / anomalies accounted for / some results may be error ;	**1**
4(c)	reduced it / shorter / stunted / grows more slowly ; higher concentration has a greater effect ;	**2**
4(d)	same specified environmental conditions, e.g. temperature, light (intensity) ;	**max 1**
	Total:	**10**

Page 5	Mark Scheme	Syllabus	Paper
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Question	Answers	Marks
5(a)	oxygen / O_2 ;	1
5(b)(i)	litmus ; blue to red gas is acid **AND** red to blue gas is alkaline ; OR UI / full range indictor / pH indicator ; red / orange / yellow / any pH less than acid **AND** blue / purple / any pH greater than 7 alkali ;	2
5(b)(ii)	gas will not change the colour of red **and** blue litmus / UI **and** green or pH 7 ;	1
5(c)	diagram showing the inverted **test**-tube with the open end under water ; water risen into the test-tube ;	2
5(d)	gas **V** = ammonia / NH_3 ; gas **W** = hydrogen chloride / HCl / sulfur dioxide / SO_2 ;	2
5(e)	add limewater to test-tube and shake ; (limewater goes) white precipitate / milky ;	2
	Total:	10

Question	Answers	Marks
6(a)	A in series with the power source **AND** V in parallel ;	**1**
6(b)	0.65 (A) ; 1.5 (V) ;	**2**
6(c)	wire **L** = 1.5 ; wire **M** (= 1.5 / 0.65 =) 2.3 ; ohms / Ω ;	**3**
6(d)	minimum of 3 lengths ; minimum 10 cm range ; control **ONE** from material / cross-section / temperature ; graph of resistance against length ;	**4**
	Total:	**10**