



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CO-ORDINATED SCIENCES

0654/61

Paper 6 Alternative to Practical

October/November 2016

MARK SCHEME

Maximum Mark: 60

Published

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Page 2	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0654	61

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
	Cambridge IGCSE – October/November 2016	0654	61

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. <u>0</u> ;	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 $\frac{1}{2}$ 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

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0654	61

Question	Answers				Marks	
4(a)(i)	dish	Seedling height / mm			Average seedling height / mm	2
		Student 1	Student 2	Student 3		
	A	32	34 ;	30 ;	32	
	B	14	18	16	16	
	C	2	3	1	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 \pm 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
	Cambridge IGCSE – October/November 2016	0654	61

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 indicator / 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

Page 6	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – October/November 2016	0654	61

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