CO-ORDINATED SCIENCES **0654/61**

Paper 6 Alternative to Practical **October/November 2016**

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.

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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

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 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**

Question	Answers	Marks
4(a)(i)	<table><tr><td>dish</td><td colspan="3">Seedling height / mm</td><td>Average seedling height / mm</td></tr><tr><td></td><td>Student 1</td><td>Student 2</td><td>Student 3</td><td></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**

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**