

Cambridge IGCSE™

COMBINED SCIENCE**0653/61**

Paper 6 Alternative to Practical

October/November 2024**MARK SCHEME**Maximum Mark: 40

Published

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Question	Answer	Marks
1(a)	size – greater than half of available space ; quality – continuous outline from top to bottom of onion ; detail – central internal layer shown in approximately the correct position, joined at the top and at least 2 more layers to each side, <u>all</u> open at the bottom ;	3
1(b)(i)	54–56 (mm) inclusive ;	1
1(b)(ii)	points A and B marked approximately horizontally on onion and correct measurement of <i>D</i> for drawing ;	1
1(b)(iii)	correct magnification calculation ;	1
1(c)	(iodine remains) brown ;	1

Question	Answer	Marks
2	<i>one marking point from each section and then any two others</i> 1 apparatus ruler to measure onion / balance to measure a mass ; syringes / measuring cylinder to measure a volume / 'amount' of a liquid ; 2 description of method <i>correct method stated:</i> plant onions in soil (in containers) with different concentrations / amounts of mineral solution AND measure size of onion at the end / change in size ; <i>plus any two further details from:</i> use five different concentrations of mineral ; make different concentrations of mineral solution by dilution ; 3 measurements measure diameter / circumference / height / mass of onion at the start (and at the end) ; measure volume of mineral solution added ; 4 constant variables same size / mass onions ; same amount of time (at least 24 hours) ; same (total) amount / volume of mineral solution ; same temperature / same light (intensity / wavelength) ; 5 processing repeat experiment and exclude anomalies ; draw a graph of mass / size, of onion against mineral concentration ; idea of conclusion from graph, e.g. straight line through the origin indicates (directly) proportional ; calculate growth by final minus initial mass / volume / diameter / height ; calculate rate from growth $\div$ time ;	7

Question	Answer	Marks
3(a)	<i>any two from:</i> wear goggles to stop solid H entering eyes ; use, test-tube holders / clamp, to avoid burning, hands / skin / student ; point mouth of test-tube away from other students so any spitting of material cannot harm other students ;	2
3(b)	mass at step 3 = 18.26 (g) ; mass at step 6 = 17.62 (g) ;	2
3(c)	1.81 (g) ;	1
3(d)(i)	0.64 (g) ;	1
3(d)(ii)	a gas is, formed / lost ;	1
3(d)(iii)	35.359 (%) ; 35 (%) ;	2
3(e)	yellow flame leaves soot / carbon / solid deposit <u>on the test tube</u> (and adds to the mass) ;	1
3(f)	heat again to constant mass ;	1
3(g)(i)	carbonate / CO_3^{2-} ;	1
3(g)(ii)	Zn^{2+} ;	1

Question	Answer	Marks
4(a)(i)	set square shown as triangle with one of shorter sides in line with <u>bottom</u> of load hanger AND other short side in line with metre rule ;	1
4(a)(ii)	take reading, at eye level / perpendicular to the rule / scale ;	1
4(a)(iii)	38.0 (cm) ;	1
4(b)(i)	32.3 (cm) ;	1
4(b)(ii)	three e values correct to one decimal place ; all e values correct to one decimal place ;	2
4(b)(iii)	vertical axis labelled e / cm and horizontal axis labelled L / N ; linear scales so that plotted points occupy at least half the grid ; plots correct to $\pm 1/2$ small square ;	3
4(b)(iv)	thin straight line of best fit drawn through the origin with even distribution of points ;	1
4(c)	oscillation of load or spring / load or spring moves / bottom of load hanger may not be horizontal ;	1
4(d)(i)	7.7 (cm) ;	1
4(d)(ii)	second straight line of best fit passing through point e_s (2.0, 7.7) and origin;	1