

Cambridge IGCSE™

COMBINED SCIENCE**0653/61**

Paper 6 Alternative to Practical

October/November 2023

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)(i)	37(.0) (°C) ;	1
1(a)(ii)	volume of E recorded as 41.0 ; volume of W recorded as 18.5 ;	2
1(a)(iii)	greater volume of juice produced / more juice produced (when enzyme is used) ;	1
1(a)(iv)	any one from: is an error: temperature decreases during the experiment / substances are mixed before being put in beaker of water ; is not an error: both test-tubes at same (initial) temperature / put under same conditions / same temperature water bath / change in temperature is the same for both ;	1
1(a)(v)	amount of apple puree is not measured / controlled / not the same AND use balance / scales / syringe / measuring cylinder / depth with ruler ;	1
1(a)(vi)	to avoid <u>enzyme</u> being transferred between test-tubes / avoid <u>enzyme</u> getting into W / avoid changing concentration of <u>enzyme</u> ;	1
1(b)	size – greater than half of available space ; quality – continuous outline around main part of apple ; detail – two seeds at centre, stalk and detail at the bottom shown ;	3
1(c)(i)	correct measurement / 18 ± 1 (mm) ;	1
1(c)(ii)	correct calculation / 0.1125 mm ; answer to two significant figures / 0.11 mm ;	2

Question	Answer	Marks
2(a)	test lighted splint AND observation (gives a) (squeaky) pop ;	1
2(b)(i)	25 cm ³ pipette / graduated pipette / volumetric pipette / burette ;	1
2(b)(ii)	to ensure both sides of magnesium react (with the acid) / to ensure all of the surface reacts (with the acid) / to keep all of magnesium in contact with the acid ;	1
2(b)(iii)	idea that it is difficult to judge, when to stop timing / when all the magnesium has disappeared / when the reaction has finished ;	1
2(b)(iv)	30 ; 31 ;	2
2(b)(v)	0.17 AND 0.81 ;	1
2(b)(vi)	y-axis labelled rate (of reaction) in mm / s AND x-axis labelled length (of magnesium) in mm ; suitable linear scales so that points occupy more than half the grid ; plots correct $\pm \frac{1}{2}$ small square ;	3
2(b)(vii)	straight line of best fit drawn with a ruler ;	1
2(b)(viii)	as length (of magnesium) increases so does the rate (of reaction) ;	1
2(c)	there is still, solid / magnesium ribbon, remaining ;	1

Question	Answer	Marks
3(a)	$i = 65^\circ$;	1
3(b)(i)	P ₁ and P ₂ on line AY AND distance at least 5.0 cm apart ;	1
3(b)(ii)	P ₄ marked on line from Y to (approximately) centre of the eye that passes through the centre of P ₃ AND P ₄ is between P ₃ and the eye ;	1
3(c)	θ in correct position on diagram ; θ in range 20° to 30° ;	2
3(d)(i)	circle around 29° ;	1
3(d)(ii)	repeats the measurement for the anomalous result / repeat the measurement of θ at $i = 30^\circ$;	1

Question	Answer	Marks
4	one mark from each section and any two other marking points 1 apparatus thermometer AND stop-watch / stop-clock / timer ; water bath / insulation for beaker of apple juice / insulated container / balance to measure ice / measuring cylinder to measure apple juice ; 2 method use (apple) <u>juice</u> at two (or more) temperatures AND add ice ; do the experiment for at least five different temperature values ; start timer when ice cube(s) added AND stop when ice-cube(s) melt / start timer when ice cube(s) added AND measure time taken to melt ; 3 control variables at different temperatures use the same, shape / size / number / mass / weight / surface area, of ice cube(s) ; at different temperatures use the same volume of apple juice (every time) / do all experiments with a stated volume of apple juice (e.g. 20 cm³) ; 4 table (table with) rows and columns with headings of (initial) temperature (of apple juice) AND time (to melt) ; (table with) appropriate units for each quantity ; 5 conclusion take averages of repeated experiments (at the same temperature) / repeat and exclude anomalous results (at the same temperature) ; plot graph of time (vertical axis) against temperature (horizontal axis) ;	7