

Cambridge IGCSE™

COMBINED SCIENCE	0653/62
Paper 6 Alternative to Practical	October/November 2024
MARK SCHEME	
Maximum Mark: 40	

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	Answer	Marks
1(a)(i)	1.1 ; 1.0 ;	2
1(a)(ii)	food A = 2700 (J/g) ; food B = 1500 (J/g) ;	2
1(a)(iii)	fats contain more energy than proteins ORA ;	1
1(a)(iv)	(starting) masses are different / allows foods to be compared ;	1
1(b)(i)	<i>any two from:</i> heat transfer to surroundings AW ; unequal distribution of heat in the water / water not stirred AW ; incomplete burning of food AW ; food held at different distances ;	2
1(b)(ii)	improvement given that is relevant to one correct error stated in (b)(i) , e.g. heatproof insulation to boiling tube, burn food in 100% oxygen, put food close(r) to boiling tube ;	1
1(c)	<i>fat test</i> add <u>ethanol</u> + add <u>water</u> ; <i>observation</i> white emulsion ; <i>protein test</i> add biuret (solution) ; <i>observation</i> (blue to) lilac ;	4

Question	Answer	Marks
2(a)(i)	to ensure even distribution of, heat / temperature ;	1
2(a)(ii)	38.0 ; 62.5 ;	2
2(a)(iii)	17.0 AND 41.5 ;	1
2(a)(iv)	y-axis labelled 'temperature increase / °C' AND x-axis labelled 'mass of H / g' ; suitable linear scales so that points occupy more than half the grid ; plots correct $\pm \frac{1}{2}$ small square ;	3
2(a)(v)	plot at (2.0, 27.0) circled ;	1
2(a)(vi)	straight line of best fit drawn with a ruler ;	1
2(a)(vii)	as <u>mass</u> of H increases, <u>temperature increase</u> also increases ;	1
2(b)	copper sulfate ticked ; sulfate gives a white precipitate with barium nitrate test ; copper gives, green-blue / blue-green, <u>flame</u> in flame test ;	3

Question	Answer	Marks
3(a)	to make it easier to see the light rays e.g. no light source to interfere / obscure rays / no other light refraction ;	1
3(b)	12(.0) (V) ;	1
3(c)	33(°) ;	1
3(d)	use, optics pins / pencil plots, to mark (at least two) points along the line of the reflected ray ; (use a ruler to) draw a straight line connecting these points back to O ;	2
3(e)(i)	estimated value of i_c greater than 40° AND less than 50° ;	1
3(e)(ii)	take more measurements at angles between 40° and 50° ;	1

Question	Answer	Marks
4	<i>one marking point from each section and then any two others</i> 1 additional apparatus method of extending spring, e.g. slotted masses and hanger on suspended spring / balance or newton meter to measure a load ; metre rule / ruler / measuring tape, to measure (diameter / length of) spring; 2 method measure length of spring, with load AND without load ; repeat for at least five different diameters ; valid safety precaution described AND linked to hazard, e.g. wear goggles or use safety screen to protect eyes if spring snaps, use sand box or equivalent to catch falling loads, use G-clamp to clamp stand to the bench to prevent toppling ; 3 control variables same material of spring / diameter of <u>wire</u> ; same initial length of spring / number of turns ; same load applied ; 4 table of results columns for diameter, (load,) initial and final length ; with units for each column shown ; 5 processing results <u>calculate</u> extension / D of spring for each load AND <u>calculate</u> k ; do repeats under same conditions and exclude anomalous results ; plot graph of spring constant k against spring diameter D / compare k values for different spring diameters ;	7