

Cambridge IGCSE™

COMBINED SCIENCE**0653/63**

Paper 6 Alternative to Practical

October/November 2023

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.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2023 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

Question	Answer	Marks
1(a)(i)	<i>factor 1</i> light ; <i>explanation</i> (only) parts exposed to the light test positive for starch ORA ; <i>factor 2</i> chlorophyll ; <i>explanation</i> (only) the parts of the leaf that are <u>green</u> test positive for starch ORA ;	4
1(a)(ii)	so <u>colour</u> (change) with iodine can be seen ;	1
1(b)	Benedict's (solution) ; (from blue to) green / yellow / orange / brick-red;	2

Question	Answer	Marks
2	one mark from each section and any two other marking points 1 apparatus measuring cylinder / burette / graduated pipette / volumetric pipette / syringe ; water-bath / thermometer / stop-watch / timer ; safety goggles to keep, urea / urease, out of eyes OR gloves to keep urease / urea from touching skin ; 2 method add two or more concentrations of urease solution to urea solution and add (universal) indicator ; use at least five different concentrations ; 3 measurements volume of urea ; volume of urease (and water) ; compare colour (to chart) to determine pH, value / number ; 4 control variables (for different concentrations of urease) ; same volume / concentration of urea ; same total volume of urease/enzyme and water ; same temperature ; 5 processing and drawing a conclusion plot graph of pH (number) against (enzyme) concentration ; take averages of pH from repeated experiments (at the same concentration) / repeat and exclude anomalous results (at the same concentration) ;	7

Question	Answer	Marks
3(a)(i)	9 ;	1
3(a)(ii)	blue-green is not on the chart / no pH for blue-green ;	1
3(b)(i)	carbon dioxide ;	1
3(b)(ii)	carbonate ;	1
3(c)(i)	ammonia ;	1
3(c)(ii)	ammonium ;	1
3(d)(i)	measuring cylinder / burette / graduated pipette ;	1
3(d)(ii)	1.15 ;	1
3(d)(iii)	55 ;	1
3(d)(iv)	0.0209 ; to two significant figures 0.021 (g / s) ;	2
3(d)(v)	idea that cannot easily tell when the fizzing stops ;	1
3(d)(vi)	<i>any one from:</i> repeat measurements to exclude anomalous results ; repeat AND average to reduce effect of random errors ; use larger amounts of (both) reagents to give a longer reaction time ; measure time to collect fixed volume of gas (e.g. with gas syringe) because not subjective judgment of fizzing / measure volume in a fixed time because not subjective judgement of fizzing ;	1

Question	Answer	Marks
4(a)	$u = 21(0 \text{ cm})$;	1
4(b)(i)	$h_o = 1.5 \text{ (cm)}$;	1
4(b)(ii)	$h_i = 5.2 \text{ (cm)}$;	1
4(c)(i)	$M = 0.5$;	1
4(c)(ii)	y-axis labelled magnification or M no units AND x-axis labelled object distance or u / cm ; suitable scale such that plots occupy more than half the grid ; plots correct $\pm \frac{1}{2}$ small square ;	3
4(c)(iii)	curved line of best fit ;	1
4(c)(iv)	u in range 31–32 (cm) ;	1
4(c)(v)	f in range 15.5–16.0 (cm) ;	1
4(d)(i)	<i>any two from:</i> move screen backwards and forwards (through focus) ; use dark room ; use bright lamp ; ensure lens is completely clean ;	2
4(d)(ii)	read perpendicular to the, lens / metre rule ;	1