



Cambridge IGCSE™

COMBINED SCIENCE

0653/61

Paper 6 Alternative to Practical

May/June 2022

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.

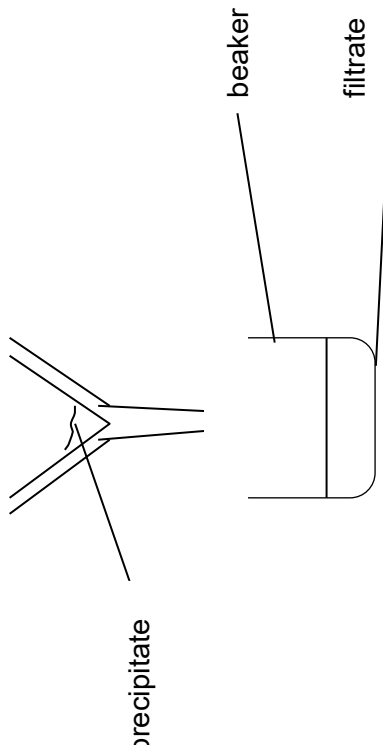
Cambridge International will not enter into discussions about these mark schemes.

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This document consists of **9** printed pages.

Question	Answer	Marks
1(a)	All values fully correct 5, 4, 3, 1, 1 ; (3 marks) Values for A B C are 5, 4, 3 ; Values for D and E are 1 or 2 ;	3
1(b)	the higher the (concentration of) ethanol the higher the colour score ORA ;	1
1(c)	so that total / final volume is constant ;	1
1(d)	prevent contamination ;	1
1(e)	use of a knife / cutting beetroot (into discs) AND cutting away from body / keep away from hands / fingers / use of a flat solid surface ; OR ethanol flammable AND no naked flames ;	1

Question	Answer	Marks
2	<i>One marking point from each section and any other two marks</i> 1 Apparatus timer / stopwatch / stop-clock ; ruler / light meter / method of varying light intensity (e.g. variable resistor/light filters) ; 2 Method and safety use blackout ; put lamp at different distances ; do at least five different distances ; care with hot lamp because of burns to hand / electricity and water because of shock / dark glasses to protect from bright light ; 3 Measurements same time and count number of bubbles / measure volume of gas OR same number of bubbles / volume and measure length of time ; measure distance to lamp / measure light intensity / suggests appropriate measurement of distance / light intensity ; 4 Constant variables same lamp / <u>same</u> plant / <u>same</u> amount/type/number of plant(s) ; same time / same <u>volume</u> / <u>same</u> number of bubbles (depends on method) ; <u>same</u> temperature (of water) ; 5 Processing results processes to give rate e.g. divide number of bubbles / volume of gas by time / state <u>units</u> for rate e.g. bubbles or volume per specified time ; do repeats under same conditions and take an average / exclude anomalous results / check results are similar ; plot volume / amount / number of bubbles / time / rate against distance of lamp / light intensity ;	7

Question	Answer	Marks								
3(a)(i)	<table border="1"><tr><td>carbonate</td><td></td></tr><tr><td>chloride</td><td></td></tr><tr><td>nitrate</td><td></td></tr><tr><td>sulfate</td><td>✓</td></tr></table> ; 	carbonate		chloride		nitrate		sulfate	✓	1
carbonate										
chloride										
nitrate										
sulfate	✓									
3(a)(ii)	filter paper inside filter funnel ; suitable container collecting filtrate ; precipitate labelled inside filter paper and filtrate labelled in container ; <i>example of a full mark drawing:</i>	3								
3(b)(i)	hydrogen ;	1								
3(b)(ii)	87 / 87.87 / 88.9 ; 88; correctly rounded answer gains both marks	2								
3(c)(i)	21.0 (°C) ;	1								

Question	Answer	Marks
3(c)(ii)	29.5 (°C) ;	1
3(c)(iii)	8.5 (°C) ;	1
3(c)(iv)	lid / insulation ;	1
3(c)(v)	to ensure even temperature throughout ;	1
3(c)(vi)	idea that takes into account variation in results/temperature / idea of temperature varying / temperatures may be different (each time) ;	1

Question	Answer	Marks
4(a)(i)	47.3 (cm) ; answer given to 3 sig figs ;	2
4(a)(ii)	idea that the metre rule is read perpendicular to the scale / take the reading perpendicular (to bottom of the spring) / use of fiducial aid ;	1
4(b)	2.8 (cm) ;	1
4(c)(i)	axes correct, labelled and with units, correct way round ; linear scale chosen so that plotted points cover at least $\frac{1}{2}$ grid in each direction ; points plotted correctly $\pm 1 / 2$ small square ;	3
4(c)(ii)	good best-fit line judgement ;	1
4(d)(i)	spring may get longer / apparatus (e.g. spring or rule) may have been moved ;	1
4(d)(ii)	54.3 (cm) ;	1
4(d)(iii)	9.8 (cm) ;	1

Question	Answer	Marks
4(d)(iv)	correct value of mass found from candidate's graph ; evidence of working shown on the graph ;	2