Cambridge Assessment International Education

Cambridge IGCSE™

COMBINED SCIENCE **0653/63**

Paper 6 Alternative to Practical **October/November 2020**

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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[Turn over

Question	Answer	Marks
1(a)(i)	to be able to make a (valid) comparison / to see if the mineral makes a difference / only change one variable / because different species grow differently ;	**1**
1(a)(ii)	correct units used, mm ; plant **C** = 82 ;	**2**
1(a)(iii)	(percentage difference = (93 – 60) ÷ 60 × 100 =) 55% ;	**1**
1(b)	*any two from:* number of leaves (C has more leaves than B) ; size of leaves (leaves on C bigger than B) ; size / length, of roots (roots are longer on C) ; colour of leaves (B has green leaves and C has yellow leaves) ;	**2**
1(c)	magnesium needed to make chlorophyll / chloroplasts ;	**1**

Question	Answer	Marks
2	**1 mark from each section and then additional 2 marks** **1 apparatus / chemicals** lamp / light source / sun ; stop-watch / timer ; ruler / thermometer / light meter ; **2 method** (independent variable) vary / double, light intensity ; (dependent variable) measure amount of gas produced ; in fixed amount of time ; OR measure time taken ; for fixed amount of gas to be produced ; **3 measurements** light intensity, e.g. number of lamps, brightness / voltage of lamp, distance of lamp from plant, AVP ; volume of gas, e.g. count number of bubbles, height of gas in test tube, AVP ; time, e.g. in one minute, measure with stop-watch, AVP ; **4 control variables** CO_2 / pH ; temperature ; distance between lamp and plant (if changing lamp / lamp brightness) ; size / type of plant / volume of water (for repeats) ; **5 processing** repeat and find average ; calculate rate, e.g. volume per sec, number of bubbles per minute ; positive relationship between rate and intensity, e.g. rate of photosynthesis increases as, number of lamps increases / distance from lamp is reduced ; candidate explains how results will test hypothesis statement ;	**7**

Question	Answer	Marks
3(a)(i)	51.0 ;	**1**
3(a)(ii)	55 ; 14 ;	**2**
3(b)(i)	axes labelled with quantity and unit (time s, temperature °C) ; linear scales so points cover over half of the grid (time on vertical axis) ; points plotted correctly ;	**3**
3(b)(ii)	point at 51.0 circled ;	**1**
3(b)(iii)	(anomalous result is too) high AND stopped stopwatch too late / difficult to see when the cross has disappeared / difficult to decide on end point ;	**1**
3(b)(iv)	line of best-fit ;	**1**
3(b)(v)	rate increases as temperature increases ; as temperature increases the increase in rate becomes less ;	**2**
3(b)(vi)	too fast / time too short to measure ;	**1**
3(c)	use a light meter to judge when the mixture becomes opaque / measure temperature immediately after adding hydrochloric acid / acid and thiosulfate at same starting temperature (e.g. by using a water bath) ;	**1**

Question	Answer	Marks
4(a)(i)	to show that there is only a temperature change when the wool is wet / to show that it's the liquid that affects the temperature (not the cotton wool) / so the wet and dry ones can be compared ;	**1**
4(a)(ii)	all temperature changes correctly calculated ; all temperatures recorded to nearest 0.5 °C ;	**2**
4(a)(iii)	**B** **A** **C** ;	**1**
4(a)(iv)	*any two from:* use same, amount / mass / volume, of each liquid ; measure temperature change over a longer time interval ; use more precise thermometer / datalogger ;	**2**
4(b)(i)	(liquid with) smallest energy needed for evaporation has greatest temperature change ORA ;	**1**
4(b)(ii)	(E = 3.0 × 2257 =) 6771 ; 6800 (kJ) ;	**2**
4(c)(i)	53.38 (g) ;	**1**
4(c)(ii)	(53.38 – 43.77 =) 9.61 (g) ;	**1**
4(c)(iii)	(53.38 – 53.23 =) 0.15 (g) ;	**1**
4(c)(iv)	increase temperature / larger beaker / bigger surface (area) ;	**1**