

Cambridge IGCSE™

COMBINED SCIENCE**0653/62**

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.

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Question	Answer	Marks
1(a)(i)	8 ; 10 ;	2
1(a)(ii)	96 AND 120 ;	1
1(a)(iii)	both axes labelled with units heart rate BPM (vertical axis) AND running time (mins) ; suitable linear scales such that plots occupy more than half of the grid ; plots correct $\pm \frac{1}{2}$ small square ;	3
1(a)(iv)	suitable curve of best fit drawn ;	1
1(a)(v)	as running time increases, heart rate increases AND becomes constant AW ;	1
1(a)(vi)	because speed also affects heart rate / so results at each running time are comparable / so there is only one independent variable ;	1
1(b)	0.95 (mV) ; 0.8(0) (s) ;	2
1(c)	<i>similarity</i> any <u>description</u> that identifies PQR as being the same, e.g. R same amplitude/voltage, PQR same duration, etc. ; <i>difference</i> any <u>description</u> that that identifies ST as being different (in second ECG / ORA), e.g. trough at S is smaller/lengthened, T is inverted/smaller/delayed / S is missing, etc. ;	2

Question	Answer	Marks
2(a)	1.2 (g) ;	1
2(b)	to, increase the contact between the iron powder and the acid ;	1
2(c)	hydrogen / H ₂ ;	1
2(d)	labelled diagram of filter paper in (filter) funnel AND named collecting vessel, e.g. conical flask, beaker test-tube, boiling tube ; residue and filtrate correctly labelled ;	2
2(e)(i)	sulfate ;	1
2(e)(ii)	iron(II) ;	1

Question	Answer	Marks
3	one mark from each section and any two other marking points 1 apparatus balance ; measuring cylinder / burette / graduated pipette / volumetric pipette to measure sodium hydroxide ; safety goggles to keep, citric acid / sodium hydroxide out of eyes OR goggles / gloves, because sodium hydroxide is corrosive to skin ; 2 method add two or more different masses of citric acid to (aqueous) sodium hydroxide and use of (universal) indicator ; use at least five different masses ; 3 measurements mass of citric acid / stated mass (e.g. 20 grams) ; compare colour (to chart) to determine pH, value / number ; volume of (aqueous) sodium hydroxide / stated volume (e.g. 20 cm³) ; 4 control variables (at different masses) use the same concentration of (aqueous) sodium hydroxide ; (at different masses) use the same volume of (aqueous) sodium hydroxide ; 5 processing and drawing a conclusion plot <u>graph</u> of pH (number) against mass of citric acid ; take averages of pH from repeated experiments (at the same mass) / repeat and exclude anomalous results (at the same mass) ;	7

Question	Answer	Marks
4(a)(i)	220(.0) (cm ³) ;	1
4(a)(ii)	read perpendicular to the, scale / reading / meniscus ;	1
4(b)(i)	$\theta_M = 68.5$; $\theta_G = 71.0$;	2
4(b)(ii)	$\Delta\theta_M = 11.5$ (°C) AND $\Delta\theta_G = 9.5$ (°C) ;	1
4(b)(iii)	$R_M = 1.9$ AND $R_G = 1.6$; both answers to two significant figures ; °C / min ;	3
4(b)(iv)	calculates difference between higher and lower value, e.g. $1.9 - 1.6 = 0.3$; calculates percentage difference AND states appropriate conclusion, e.g. $0.3 \div 1.9 \times 100 = 15.8\%$ / $0.3 \div 1.6 \times 100 = 18.8\%$, so not equal as difference is greater than 10% ; OR calculates 10%, decrease of higher value / increase of lower value, e.g. $1.9 - 10\% = 1.71$ / $1.6 + 10\% = 1.76$; compares, lower value to 10% decrease of higher value / higher value to 10% increase of lower value, AND states appropriate conclusion, e.g. $1.71 > 1.6$ / $1.76 < 1.9$, so not equal as difference is greater than 10% ;	2
4(c)(i)	to allow, the thermometer to rise to the temperature of the hot water / temperature reading to stabilise ;	1
4(c)(ii)	<i>any two from:</i> use same starting temperature of water (in both containers) ; repeat (the experiment) AND take the mean of the readings / exclude anomalies ; put lids on the containers ; stir the water before each temperature reading ; use two containers that have the same, shape / size / thickness ;	2