

Cambridge IGCSE™

COMBINED SCIENCE**0653/62**

Paper 6 Alternative to Practical

February/March 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.

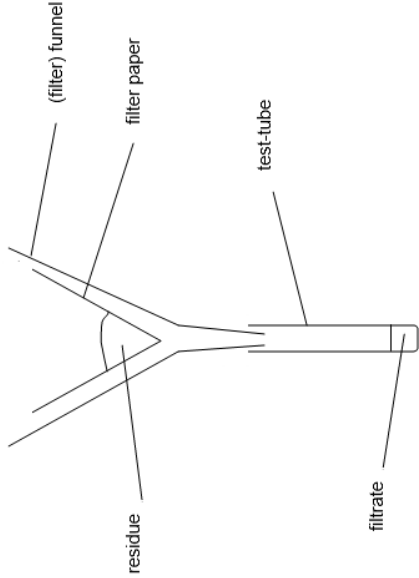
Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the February/March 2024 series for most Cambridge IGCSE, Cambridge International A and AS Level components, and some Cambridge O Level components.

Question	Answer	Marks
1(a)(i)	65.5 (°C) ;	1
1(a)(ii)	22(.0) and 12(.0) (°C) ;	1
1(a)(iii)	<u>heat</u> loss is reduced / is less, in a huddle / slower <u>heat</u> loss in huddle / greater / faster <u>heat</u> loss, in single test tube ;	1
1(a)(iv)	value between 12 and 22 (°C) AND heat loss greater than middle and less heat loss than single AW ;	1
1(b)	starting temperatures were not the same ;	1
1(c)	surface area of penguins / surface area of huddle / <u>external</u> temperature / wind speed / volume of penguin / thickness of feathers ;	1
1(d)	they have cooled to room temperature ;	1

Question	Answer	Marks
2	One marking point from each section and any two others (if one section is missing max 6 etc.). 1 Apparatus stop-clock / pulse meter / heart rate monitor (to measure pulse / exercise duration) ; exercise apparatus, e.g. treadmill / measuring apparatus for distance / height, e.g. tape measure ; 2 Method and safety describes a method to vary intensity ; measure pulse rate before and after <u>three</u> intensities of exercise ; wait until pulse rate returns to initial / resting, pulse rate between repeats ; check for health concerns / specific safety linked to apparatus used ; 3 What you will measure counts number of pulses in a fixed time, e.g. 15s / measures pulse in bpm ; gives units for measurement, e.g. distance m / time s or min / height cm / speed in km / h ; 4 Which variables you will keep constant the same person each time / same characteristics of more than one person, e.g. same age / sex ; controls intensity of exercise, e.g. same duration of exercise (different intensity / speed) / same distance (different speeds) / same speed (different duration) / same exercise (different number of repetitions) ; 5 Processing results subtract initial pulse rate from final pulse rate / find change from initial and final pulse rate ; plot distance / duration / height, of exercise against pulse rate (dependent on candidate's method) ; repeat measurements of pulse rates for the same intensity AND identify anomalies / take average AW ;	7

Question	Answer	Marks
3(a)(i)	24.0 (°C) ; 55.5 (°C) ;	2
3(a)(ii)	31.5 (°C) ;	1

Question	Answer	Marks
3(a)(iii)	$(10.0 \times 3.96 \times 31.5 =) 1247.4 \text{ (J)} ;$ 1250 (J) ;	2
3(a)(iv)	to get even distribution of temperature / to ensure complete reaction ;	1
3(a)(v)	insulate boiling tube / lid on boiling tube / use a, plastic beaker / plastic boiling tube ;	1
3(a)(vi)	 correct apparatus shown assembled (filter) funnel, filter paper and collecting vessel ; filtrate (in collecting vessel) and residue (in filter paper) and labelled ; (filter) <u>funnel</u> and filter paper and collecting vessel (beaker / test-tube / boiling tube / flask) labelled ;	3
3(b)(i)	(light) blue precipitate ; (in excess) changes to a dark blue solution ;	2
3(b)(ii)	chloride ;	1

Question	Answer	Marks
4(a)(i)	correct symbol for voltmeter connected across the resistance wire ;	1
4(a)(ii)	prevent battery running down / wire overheating ;	1
4(a)(iii)	1.10 (V) ; 0.23 (A) ;	2
4(b)	4.8 (Ω) ;	1
4(c)(i)	appropriate scales (vertical axes shows values 0–8.0 and y axis 0–75.0 and plots occupying at least $\frac{1}{2}$ grid) ; plots all correct to $\frac{1}{2}$ small square and precise plots ;	2
4(c)(ii)	thin straight line of best fit drawn with even distribution of points ;	1
4(c)(iii)	triangle method seen on graph and triangle at least half the length of line of best fit between first and last point ; correct calculation of gradient ;	2
4(c)(iv)	Ω/cm ;	1
4(d)	can identify / exclude, anomalous values / check that values are similar / close together ;	1
4(e)	difficult to position crocodile clip exactly / wire may not be uniform diameter / wire not perfectly straight / has kinks in it ;	1