



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY

0610/61

Paper 6 Alternative to Practical

October/November 2016

MARK SCHEME

Maximum Mark: 40

Published

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

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Abbreviations used in the Mark Scheme:

- ; separates marking points
- / alternatives
- I ignore
- R reject
- A accept (for answers correctly cued by the question, or guidance for examiners)
- AW alternative wording
- AVP any valid point
- ecf credit a correct statement / calculation that follows a previous wrong response
- ora or reverse argument
- () the word / phrase in brackets is not required, but sets the context
- underline actual words given must be used by the candidate (or grammatical variants of them)

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Question	Answer	Mark	Guidance
1(a)	<p>one table drawn with lines;</p> <p>correct column / row headings (time and temperature);</p> <p>appropriate units (°C <u>and</u> minutes) in the header only;</p> <p>correct temperatures recorded for beaker A;</p> <p>correct temperatures recorded for beaker B;</p>	5	

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Question	Answer	Mark	Guidance
1(b)(i)	<p>temperature differences: Beaker A = 12.5 °C, Beaker B = 20 °C;</p> <p>divide both temperature differences by 5 (minutes);</p> <p>A = 2.5, B = 4;</p> <p>correct units (°C / min);</p>	4	
1(b)(ii)	<p>the greater the volume of the body the smaller the rate of heat loss / ref to speed (e.g. slower) / ora;</p> <p>rate of heat loss in A is less than beaker B / ora;</p> <p>appropriate data quote comparing A and B;</p> <p>the greater the volume of the body the greater the (total) heat loss / ora;</p>	2	
1(c)(i)	<p><i>any 2 from:</i></p> <p>temperature of environment;</p> <p>size / volume of beaker / shape;</p> <p>starting temperature of water;</p> <p>time intervals / 1 minute to record temperature;</p> <p>total time / 5 minutes for investigation;</p>	2	
1(c)(ii)	<p>idea of time taken for the thermometer to reach the water temperature is longer;</p>	1	

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Question	Answer	Mark	Guidance
1(c)(iii)	<p><i>error:</i> drawing the line accurately / judging the water level against the line / measuring height (rather than volume);</p> <p><i>improvement:</i> measure the volumes of water / AW ;</p>	2	<p>A not measuring volume I different sizes unqualified</p> <p>A beakers of different sizes would mean volumes would be inaccurate for the error and using identical beakers for the improvement</p>
1(c)(iv)	<p>gloves;</p> <p>heat mats under beakers;</p> <p>goggles;</p> <p>use tongs;</p> <p>wear a lab coat;</p> <p>standing up throughout the investigation;</p>	1	A any suitable safety precaution

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Question	Answer	Mark	Guidance
1(d)	<p><i>any 6 from:</i></p> <ol style="list-style-type: none"> 1 identical containers / containers of equal volume / containers of equal size; 2 same volume of water in each container; 3 same starting temperature for the water; 4 idea of placing (containers) in 2 or more different temperatures; 5 detail of method to keep external temperature constant, e.g. use of water-bath or a fridge and explanation; 6 measure temperature in each container for the same time / measure temperature in each container at set intervals; 7 repeat and calculate an average / mean; 8 calculate / compare rate of heat loss (for each temperature); 	6	<p>A same depth</p> <p>A named places</p> <p>A time how long it takes for temperature to fall a set number of degrees</p> <p>A repeat to identify anomalies</p>

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Question	Answer	Mark	Guidance
1(e)(i)	<p>A(xes) – labelled with units;</p> <p>S(cale) – even scale and plots to fill half or more of the printed grid ;</p> <p>P(lot) – all points plotted accurately $\pm \frac{1}{2}$ square ;</p> <p>L(ine) – line joining all the points $\pm \frac{1}{2}$ square ;</p>	4	<p>A points joined by ruled lines / curved line of best fit</p> <p>R bar chart or if line extrapolates beyond the plot points</p>
1(e)(ii)	<p>as temperature increases (rate of) sweating increases / ora;</p> <p>idea of increasing rate of increase as temperature rises / not a linear relationship / not directly proportional;</p>	2	<p>A higher temperature, more sweat</p> <p>A exponential increase</p>
	Total:	29	

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Question	Answer	Mark	Guidance												
2(a)	<table><tr><td>letter</td><td>genus of flower</td></tr><tr><td>A</td><td>Geranium</td></tr><tr><td>B</td><td>Sorghum</td></tr><tr><td>C</td><td>Draba</td></tr><tr><td>D</td><td>Fuschia</td></tr><tr><td>E</td><td>Dactylis</td></tr></table>	letter	genus of flower	A	Geranium	B	Sorghum	C	Draba	D	Fuschia	E	Dactylis	4	4 or 5 correct = 4 marks 3 correct = 3 2 correct = 2 1 correct = 1
letter	genus of flower														
A	Geranium														
B	Sorghum														
C	Draba														
D	Fuschia														
E	Dactylis														

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Question	Answer	Mark	Guidance
2(b)(i)	<p>O(utline) – single clear lines and without shading;</p> <p>S(ize) – occupies at least half of the space provided;</p> <p>D(etail) to show anther and filament in approx. the correct proportion (anther approx. half the length of filament);</p> <p>L(abel) to both anther and filament / stamen;</p>	4	
2(b)(ii)	<p>length of filament on Fig.2.2 with units = 27–31 mm;</p> <p>length of filament on drawing with units;</p> <p>correct calculation from candidates figures;</p>	3	<p>A measurements in cm</p> <p>A ± 1 mm for their measurement</p> <p>ecf for correct calculation from incorrect measurements</p>
	Total:	11	