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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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
- <u>underline</u> actual words given must be used by the candidate (or grammatical variants of them)

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

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

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

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Question	Answer	Mark	Guidance
1(d)	*any 6 from:*	**6**	
	1 identical containers / containers of equal volume / containers of equal size;		
	2 same volume of water in each container;		**A** same depth
	3 same starting temperature for the water;		
	4 idea of placing (containers) in 2 or more different temperatures;		**A** named places
	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;		**A** time how long it takes for temperature to fall a set number of degrees
	7 repeat and calculate an average / mean;		**A** repeat to identify anomalies
	8 calculate / compare rate of heat loss (for each temperature);		

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Question	Answer	Mark	Guidance
1(e)(i)	**A**(xes) – labelled with units; **S**(cale) – even scale and plots to fill half or more of the printed grid ; **P(**lot) – all points plotted accurately ± ½ square ; **L**(ine) – line joining all the points ± ½ square ;	**4**	**A** points joined by ruled lines / curved line of best fit **R** bar chart or if line extrapolates beyond the plot points
1(e)(ii)	as temperature increases (rate of) sweating increases / **ora**; idea of increasing rate of increase as temperature rises / not a linear relationship / not directly proportional;	**2**	**A** higher temperature, more sweat **A** exponential increase
	Total:	**29**	

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Question	Answer	Mark	Guidance
2(a)	<table><tr><th>letter</th><th>genus of flower</th></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> ;;;;	**4**	4 or 5 correct = 4 marks 3 correct = 3 2 correct = 2 1 correct = 1

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

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