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Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY

0610/62

Paper 6 Alternative to Practical

October/November 2016

MARK SCHEME

Maximum Mark: 40

Published

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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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)	any two from: <table><tr><th>feature</th><th>seedlings grown in light</th><th>seedlings grown in dark</th></tr><tr><td>total height (of shoot / seedling / seed)</td><td>short</td><td>tall;</td></tr><tr><td>coleoptile height</td><td>short</td><td>long;</td></tr><tr><td>leaves</td><td>leaf opened out / present</td><td>leaf still curled / not opened out / not present;</td></tr><tr><td>position of shoot / stem / coleoptile</td><td>almost vertical</td><td>bent;</td></tr><tr><td>AVP, e.g. width of stem / shoot / coleoptiles</td><td>wider</td><td>narrower;</td></tr></table>	feature	seedlings grown in light	seedlings grown in dark	total height (of shoot / seedling / seed)	short	tall;	coleoptile height	short	long;	leaves	leaf opened out / present	leaf still curled / not opened out / not present;	position of shoot / stem / coleoptile	almost vertical	bent;	AVP, e.g. width of stem / shoot / coleoptiles	wider	narrower;	2	
feature	seedlings grown in light	seedlings grown in dark																			
total height (of shoot / seedling / seed)	short	tall;																			
coleoptile height	short	long;																			
leaves	leaf opened out / present	leaf still curled / not opened out / not present;																			
position of shoot / stem / coleoptile	almost vertical	bent;																			
AVP, e.g. width of stem / shoot / coleoptiles	wider	narrower;																			

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Question	Answer	Mark	Guidance
1(b)(i)	1 one table drawn with (ruled) lines; 2 column and row headings with units in the header only; 3 three trials identified; 4 twelve measurements entered; 5 all measurements taken in the light within the ranges: coleoptiles 19–26 / 1.9–2.6 total lengths 57–65 / 5.7–6.5 6 all measurements taken in the dark within the ranges: coleoptiles 64–80 / 6.4–8.0 total lengths 83–111 / 8.3–11.1	6	

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Question	Answer	Mark	Guidance												
1(b)(ii)	1 light not needed for germination / seeds can germinate in the dark; 2 (in the light) leaf is visible / open / ora; 3 (in light) seedlings are shorter / do not grow as tall / ora; 4 (in light) coleoptiles are shorter / ora; 5 (in the light) seedlings grow upright / AW / seedlings grow slanted in the dark; 6 (in the light) stem / coleoptiles is wider / ora;	2													
1(c)(i)	<table><tr><th>test</th><th>seedlings grown in light</th><th>seedlings grown in dark</th></tr><tr><td>Benedict's</td><td>blue</td><td>blue;</td></tr><tr><td>iodine</td><td>blue-black</td><td>blue-black;</td></tr><tr><td>biuret</td><td>purple</td><td>purple;</td></tr></table>	test	seedlings grown in light	seedlings grown in dark	Benedict's	blue	blue;	iodine	blue-black	blue-black;	biuret	purple	purple;	3	
test	seedlings grown in light	seedlings grown in dark													
Benedict's	blue	blue;													
iodine	blue-black	blue-black;													
biuret	purple	purple;													
1(c)(ii)	starch and protein present but not (simple) sugars;	1													

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Question	Answer	Mark	Guidance
1(d)(i)	1 ref to using same species / age, etc. maize; 2 ref. to finding starting (dry) mass; 3 ref. to method of drying; 4 ref. to <u>planting</u> maize (grains) in soil / AW; 5 ref. to planting two sets of at least 100 maize / seeds; 6 ref. to keeping (both sets) in a warm room at / given °C / constant temperature; 7 one other valid detail of the method; 8 ref. to one set of seeds placed in light ref. to one set of seeds placed in dark; 9 ref to removing (10) seedlings (from each set) every two days for drying and weighing 10 repeat <u>and</u> calculate the mean / average;	6	
1(d)(ii)	water content in, seeds / seedlings, is variable; for comparisons to be valid;	1	
		Total: 21	

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Question	Answer	Mark	Guidance						
2(a)(i)	<u>94</u> ; <u>134</u> ;	2							
2(a)(ii)	same time / 2 minutes for whole exercise; same time / 10 minutes for rest between exercises; same rate / every 2 sec for each jump; equal numbers of male and female students; idea of same students in each exercise;	2							
2(a)(iii)	to allow pulse rate to recover / return to normal (before doing another exercise); so the effect of the two exercises can be compared;	1							
2(a)(iv)	<table><tr><th>variable</th><th>effect on results</th></tr><tr><td>idea of effort put into exercise / height</td><td>more effort would make pulse rate increase more ;</td></tr><tr><td>idea of fitness;</td><td>pulse would increase less for fitter students;</td></tr></table>	variable	effect on results	idea of effort put into exercise / height	more effort would make pulse rate increase more ;	idea of fitness;	pulse would increase less for fitter students;	2	
variable	effect on results								
idea of effort put into exercise / height	more effort would make pulse rate increase more ;								
idea of fitness;	pulse would increase less for fitter students;								

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Question	Answer	Mark	Guidance
2(b)(i)	A(xes) – labelled with units on y axis; S(cale) – suitable even linear scale and plots to fill more than half of the printed grid; P(lot) – all points plotted accurately $\pm \frac{1}{2}$ square; B(ars) – have a gap between each component;	4	R if line graph drawn
2(b)(ii)	<i>similarity</i> any 1 from: exercise increases (average) pulse rate; (idea of) more intense the exercise the more increase in (average) pulse rate; <i>difference</i> jumping produces greater increase in males than females; jumping and moving arms produces greater increase in females than males;	2	
2(c)(i)	O outline – single clear lines; S size – occupies at least half of the space provided; D detail – to show at least 2 layers and wavy lining;	3	

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Question	Answer	Mark	Guidance
2(c)(ii)	diameter of lumen = 47 ± 1 mm; diameter of drawing = $X \pm 1$ mm; correct magnification;	3	
		Total: 19	