



Cambridge
International
AS & A Level

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Cambridge International Advanced Subsidiary and Advanced Level

BIOLOGY

9700/31

Paper 3 Advanced Practical Skills 1

October/November 2016

MARK SCHEME

Maximum Mark: 40

Published

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This document consists of **6** printed pages.

Page 2	Mark Scheme	Syllabus	Paper
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Question	Answer	Mark
1(a)(i)	<i>(decisions on serial dilutions)</i> - correct concentrations of 0.5, 0.25, 0.125, 0.0625 + % ; - shows transfer of 10 cm³ of 1% to next dilution + 10 cm³ transferred from 2nd to 3rd beaker and from 3rd to 4th and from 4th to 5th + cm³ ; - adds 10 cm³ of water to each beaker ;	3
1(a)(ii)	<i>(decision)</i> volume of Benedict's solution equal to or greater than 2 cm³ of reducing sugar ;	1
1(a)(iii)	<i>(recording results)</i> - table drawn + heading, percentage concentration of reducing sugar ; - heading, time + seconds ; - times recorded as whole seconds ;	3
1(a)(iv)	<i>(calculation)</i> - shows 1 divided by 42 ; - correct answer as 0.024 ;	2

Page 3	Mark Scheme	Syllabus	Paper
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Question	Answer	Mark
1(a)(v)	<i>(decisions)</i> <i>two from</i> - states volume of Benedict's solution ; - states volume of M1 + M2 ; - states temperature of water-bath ;	2
1(a)(vi)	<i>(recording results)</i> records time in seconds for M1 + M2 ;	1
1(a)(vii)	<i>(interpretation)</i> - states percentage concentration of reducing sugar for M1 (either known concentration or between known concentrations) ; - states percentage concentration of reducing sugar for M2 (either known concentration or between known concentrations) ;	2
1(a)(viii)	<i>(conclusion)</i> M2 + no or very little reducing sugar ;	1

Page 4	Mark Scheme	Syllabus	Paper
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Question	Answer	Mark
1(b)(i)	<i>(layout of data)</i> 1 (x-axis) time after drinking milk containing lactose / minutes + (y-axis) concentration of hydrogen in exhaled air / ppm ; 2 (scale on x-axis) 20 to 2 cm, labelled at least each 2 cm + (scale on y-axis) 20 to 2 cm, labelled at least each 2 cm ; 3 correct plotting of five points with a small cross or dot in circle ; 4 five plots either joined point to point or as a smooth curve, drawn as a thin line ;	4
1(b)(ii)	<i>(plan drawing)</i> 1 large size + no shading ; 2 no cells + correct section drawn + appropriate detail of inner section ; 3 outermost layer drawn as two lines ; 4 draws gap between outer and inner layer ;	4
	Total:	23

Page 5	Mark Scheme	Syllabus	Paper
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Question	Answer	Mark
2(a)(i)	<i>(layout of drawing)</i> 1 quality of line for outer wall of cells thin and sharp + minimum size at least 40 mm across largest cell ; 2 only three cells drawn + each cell touching at least one of the other cells ; 3 draws contents in at least one cell ; 4 uses one label line + one label to cell wall ;	4
2(a)(ii)	<i>(conclusion)</i> <i>(function)</i> photosynthesis ; <i>(feature)</i> chloroplasts ;	2
2(b)	<i>(observable differences)</i> organises comparison into three columns with one column for features, one headed J1 and one headed Fig. 2.1 ; any three observable differences of comparison ; ; ;	4
2(c)(i)	<i>(diameter of field of view)</i> records measurement within range ;	1
2(c)(ii)	<i>(fraction of the diameter of the field of view)</i> estimates within range ;	1

Page 6	Mark Scheme	Syllabus	Paper
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Question	Answer	Mark
2(c)(iii)	<i>(depth of midrib)</i> 1 shows answer to (c)(i) multiplied by answer to (c)(ii) ; 2 decision to multiply by 1000 (to convert to μm) ;	2
2(c)(iv)	<i>(improvements)</i> 1 reference to eyepiece graticule + stage micrometer ; 2 measurement of midrib using eyepiece graticule ; 3 reference to calibration of eyepiece graticule ;	3
	Total:	17