Cambridge International AS & A Level

Cambridge International Examinations
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

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 will not enter into discussions about these mark schemes.

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

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

Question	Answer	Mark
1(b)(i)	*(layout of data)* 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)	*(plan drawing)* 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**

Question	Answer	Mark
2(a)(i)	*(layout of drawing)* 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)	*(conclusion)* *(function)* photosynthesis **;** *(feature)* chloroplasts **;**	**2**
2(b)	*(observable differences)* 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)	*(diameter of field of view)* records measurement within range **;**	**1**
2(c)(ii)	*(fraction of the diameter of the field of view)* estimates within range **;**	**1**

Question	Answer	Mark
2(c)(iii)	*(depth of midrib)* 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)	*(improvements)* 1 reference to eyepiece graticule **+** stage micrometer **;** 2 measurement of midrib using eyepiece graticule **;** 3 reference to calibration of eyepiece graticule **;**	**3**
	Total:	**17**