UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

9700 BIOLOGY

9700/35 Paper 31 (Advanced Practical Skills 1), maximum raw mark 40

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 must be read in conjunction with the question papers and the report on the examination.

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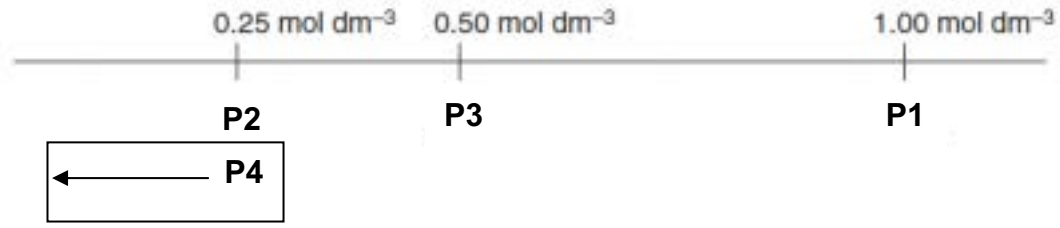
Mark scheme abbreviations:

;	separates marking points
/	alternative answers for the same point
R	reject
A	accept (for answers correctly cued by the question, or by extra guidance)
AW	alternative wording (where responses vary more than usual)
underline	actual word given must be used by candidate (grammatical variants excepted)
max	indicates the maximum number of marks that can be given
ora	or reverse argument
mp	marking point (with relevant number)
ecf	error carried forward
I	ignore
AVP	Alternative valid point (examples given as guidance)

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1 (a) (i)			[1]
ACE interpretation 1		The sample of plant tissue soaked in the highest concentration of sodium chloride solution will have the **most** bend at the start and when placed in water the bend will change the **most**;	
(a) (ii)			[1]
MMO decision 1		length one of 50 or 55 or 60 or 65 or 70 or 75 or 80 or 85 or 90	**AND** units mm;
(a) (iii)			[1]
MMO decision 1		*Idea of* use same pressure **or** repeat readings **or** use more than one piece of plant material*;*	
(a) (iv)			[1]
MMO decision 1		*evenly spaced whole minutes not less than 3 minutes until no further change in bend or until 10 minutes;*	
(b) (i)			[7]
PDO recording 2	**mp 1**	table with all cells drawn	**AND** heading (top or left) sample or plant tissue(s) or solution or conc(entration) ;
	mp 2	(heading) angle of bend degree(s) or °;	
			Do not give mark if • units in cells of column below heading
MMO collection 3	**mp 3**	at 0 time records angles for **P1**, **P2**, **P3**, **P4**;	
	mp 4	highest number in **P1** at first time recorded;	
	mp 5	In **P3** angles of bend decrease when comparing first time and last time;	

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MMO decisions 2	**mp 6**	*shows all angles to same precision i.e. whole or degrees*;	
	mp 7	shows replicate;	
(b) (ii)			[2]
ACE interpretation 1	**mp 1**	correct with **their** results for first time measurement (usually 0) for **P1**, **P2**, **P3**;  	
ACE conclusion 1	**mp 2**	(using first recorded result) **P4** recorded in correct position (below 0.25 or as lowest angle of bend);	
			Do not give mark if • if write a concentration for **P4**
(b) (iii)			[1]
ACE conclusion 1		higher or less negative <u>water potential</u> outside or <u>water potential</u> gradient steeper in 1 mol	**AND** water enters (quicker) by <u>osmosis</u>;
(b) (iv)			[max 2]
ACE interpretation MAX 2		cause of error	WITH idea of error
	mp 1	(dependent variable) pressure	inaccurate / varies / not same;
	mp 2	material	difficult to hold and measure;
	mp 3	(standardised variables) lengths or widths or size or cross sectional area	different / varies / not same;

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(b) (v)			[1]
ACE interpretation 1		+/- 1 degree or °;	
(b) (vi)	note: *reliable: to have results which are as repeatable as possible* *accuracy: change method of measuring to obtain results as close as possible to the true value*		[max 3]
ACE improvements MAX 3		control of any standardised variable s	
	mp 1	same type or source of plant material or same part of root;	
	mp 2	use cork borer or microtome/machine or Vernier calipers;	
	mp 3	test each solution separately;	
	mp 4	volume of water using measuring cylinder or syringe or graduated pipette;	
	mp 5	ref. to improvement of protractor e.g. stabiliser or support for bottom of sample;	
	mp 6	repeat or replicate or obtain average or mean;	
			[Total 20]

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2 (a)					[6]
PDO layout 1	**mp 1**	no shading	**AND** largest cell larger than 30 mm	**AND** clear, sharp, unbroken lines for any outer boundary lines drawn; **Do not give mark if** • less than two outer walls • any ruled lines • any line 1 mm or thicker • any feathery or broken / dashed or gap in line • any 'tail' or overlap with an enclosed area • drawn over the print of question	
MMO collection 3	**mp 2**	only 4 cells drawn		**AND** shows two from each slide; **Do not give mark if** • any ruled lines	
	mp 3	(detail of observable feature) starch grains uneven sizes or drawn as irregular area inside cell;			
	mp 4	cell walls drawn as double lines with middle lamella between each pair of cells;			
PDO recording 1	**mp 5**	annotation with label line or outside drawn area for difference; **S1** starch grains **AND** (iodine) black vs **S2** (methylene blue) clear / white **or S1** starch grains visible / see more vs **S2** starch grains not visible / see few **or** (iodine) single mass vs (methylene blue) separate grains			
MMO decision 1	**mp 6**	labels with a ruled label line one starch grain only;			

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(b) (i) [6]

PDO layout 1	**mp 1**	no shading	**AND** larger than 60 mm across widest point	**AND** clear, sharp, unbroken lines for outermost two lines only ; **Do not give mark if** • less than four hand drawn enclosed areas (not cells) • any line 1mm or thicker • any ruled lines • any feathery or broken / dashed or gap in line • any 'tails' or overlaps • drawn over the print of question
MMO collection 2	**mp 2**	no cells drawn		**AND** whole section;
	mp 3	triangular region shown for thickened cells;		
PDO recording 1	**mp 4**	(outer ring) drawn with two continuous lines		**AND** drawn enclosed area in centre space ;
MMO decision 2	**mp 5**	(except outer layer and centre space) at least three additional enclosed areas;		
	mp 6	correct label, with label line to <u>enclosed</u> area, xylem;		
				Do not give mark if • any label within drawn area

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(b) (ii)			[2]
PDO display 2	**mp 1**	shows addition of at least three lengths and widths measurements	**AND** shows division by number of measurements for both length and width;
	mp 2	shows larger whole number to smaller whole number;	
			Do not give mark if • units in ratio • if not to smallest common denominator
(c) (i)			[4]
PDO layout 4	**mp 1**	*x*-axis time (/) hours or hr(s)	**AND** *y*-axis concentration of sugars (/) $m$mol;
	mp 2	scale as *x*-axis 5 to 2 cm labelled each 2 cm except origin 25	**AND** *y*-axis 0.10 to 2 cm labelled each 2 cm;
	mp 3	correct plotting;	
	mp 4	two lines with five plots with ruled lines point to point	**AND** (quality) smooth line less than 1 mm thick;
			Do not give mark if any extrapolation

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(c) (ii) [2]

ACE interpretation 1

mp 1 *Idea of*
concentration of sugars decreases for 8 hrs or in dark and then increases;

ACE conclusion 1

mp 2 *(explains decrease **and** increase)*

in context of decrease or in dark / no light / night	*in context of increase or in light / sun / day*	
sugars used up	*sugars made*	
only respiration or no photosynthesis	*photosynthesis*	;

[Total: 20]

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