CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the October/November 2014 series

9700 BIOLOGY

9700/36 Paper 3 (Advanced Practical Skills 2), 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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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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 accepted)
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

1 (a) (i) at least 4 further concentrations of **E** + % ;

at least 3 correct volumes for **E** + cm^3 ;

for at least three concentrations of **E** final volumes add up to 20 + cm^3 ; [3]

(ii) 1 organised into table
all columns separated by a line + all headings underlined ;

2 headings (top or to left of data) percentage concentration of **E** +
(any column / row headed) time (/)s or seconds ;

3 whole seconds for at least three concentrations of **E** ;

4 highest concentration of **E** recorded in shorter time than next concentration ;

5 records in multiples of 30 seconds ; [5]

(iii) (dependent variable) colour or end-point + idea of judging / determining ; [1]

(iv) replicates or put **E** / **M** in water-bath (to reach temperature) ; [1]

(b) (i) 1 selects temperature + pH ;

2 temperature + use thermostatically controlled water-bath ;

3 pH + use buffers ; [3]

(ii) 0.250 ;

0.019 ; [2]

(iii) 1 (*x*-axis time / min(utes) + (*y*-axis) mass of glucose / mg ;

2 (*x*-axis) 2 cm to 5 minutes labelled each 2 cm except origin and 20 minutes
+ (*y*-axis) 2 cm to 1 mg each 2 cm except origin and 5 ;

3 correct plotting of five points as small cross or dot in circle or cross ;

4 five plots + ruled sharp lines exactly point to point
or
ruled line of best fit + sharp smooth line ; [4]

(iv) (between 0 and 12 minutes)
many enzyme substrate complexes / ESCs / binding / fitting of substrate / enzyme ;

(between 12 and 20 minutes) fewer ESCs or less substrate can bind ; [2]

[Total: 21]

2 (a) (i) central stele / vascular tissue ; [1]

(ii) 1 at least 2 lines + size at least 100 mm across diameter + no shading ;

2 no cells + half drawn ;

3 endodermis shown by 2 lines ;

4 correct proportion stele compared to cortex ;

5 label + line to xylem ; [5]

(ii) 1 at least 6 cells + size at least 40mm across largest cell at widest point + sharp continuous lines ;

2 only 6 whole cells drawn + as two groups of touching cells ;

3 cell wall of xylem cells drawn correctly (angular) ;

4 cell walls as double lines with middle lamella between ;

5 label + line to lumen ; [5]

(b) measures line **Y** within range + mm + to 0.5 ; *(range 86–88 mm)*

measures line **Z** within range + mm + to 0.5 ; *(range 14–16 mm)*

answer as larger whole number to smaller whole number to simplest ratio ; [3]

(c) 1 organise as table with 3 columns headed feature + **M1** + **Fig. 2.2** ;

2 only observable differences recorded ;

max 3 for differences – see table below:

mp	point of comparison	Fig 2.1	Fig 2.2
3	*stele shape* vascular bundle / vascular tissue / xylem / phloem	cross (do not accept irregular / central)	round / circular / scattered ;
4	*stele* layers around stele endodermis	1 or 2 layers / fewer layers / thin	2 or 3 layers / more layers / thick ;
5	*stele* size <u>in relation to diameter</u> of root / size of specimen	small(er)	larg(er) ;

mp	point of comparison	Fig 2.1	Fig 2.2
6	*cortex* air spaces shape of cells length of cells	 air spaces absent round / circular / oval small / short(er)	 air spaces present elongated / long / rectangular large / long(er) ;
7	*cortex* number of cells in cortex *(must refer to cortex)* packing	 filled with cells / more / many cells more packed	 not filled with cells / less / few(er) less packed ;
8	*epidermal layer* red stained cells (near epidermis)	 one layer / thin(ner) absent	 several layers / thick(er) present ;
9	total number of layers	less / few(er) layers or expressed as a number of layers, e.g. 5	more layers or expressed as a number of layers, e.g. 8 ;

[max 5]

[Total: 19]