

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

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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) |
| <u>underline</u> | 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 |

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- 1 (a) (i) at least 4 further concentrations of **E** + % ;
 at least 3 correct volumes for **E** + cm³ ;
 for at least three concentrations of **E** final volumes add up to 20 + cm³ ; [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]

| | | | |
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- 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 40 mm 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 | <i>stele shape</i> vascular bundle/ vascular tissue/ xylem/phloem | cross (do not accept irregular/central) | round/circular/scattered ; |
| 4 | <i>stele</i> layers around stele endodermis | 1 or 2 layers/fewer layers/thin | 2 or 3 layers/more layers/thick ; |
| 5 | <i>stele</i> size <u>in relation to</u> <u>diameter</u> of root/size of specimen | small(er) | larg(er) ; |

| | | | |
|--------|--|----------|-------|
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| mp | point of comparison | Fig 2.1 | Fig 2.2 |
|----|--|---|--|
| 6 | <i>cortex</i> 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 | <i>cortex</i> number of cells in cortex (<i>must refer to cortex</i>) packing | filled with cells / more / many cells more packed | not filled with cells / less / few(er) less packed ; |
| 8 | <i>epidermal layer</i> 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]