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Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the October/November 2014 series

9700 BIOLOGY

9700/33 Paper 3 (Advanced Practical Skills 1), 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)
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

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1 (a) (i) **3** directions / arrows correct **;** [1]

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

headings solution **+** direction of movement **;**

results for **S1** 'down' or downward arrow **+ S2** 'up' or upward arrow **;** [3]

(iii) **P** is …'**more**' concentrated than 0.10 mol dm^{-3} (**S1**)
+ **P** is '**less**' concentrated than 1.00 mol dm^{-3} (**S2**)
+ estimate of **P** is less than 1/**S1** or more than 0.1/**S2 ;** [1]

(iv) **S2** or 1.0 mol dm^{-3} **;**

(concentration of) **P**, was less concentrated than **S2**/1.0 mol dm^{-3} **;** [2]

(v) records at least 4 concentrations of sucrose solutions **+** mol dm^{-3} **;**

for at least 3 concentrations of sucrose records volumes of sucrose solutions **+** cm^3 **;**

for 3 concentrations final volume makes 40 **+** cm^3 **;** [3]

(vi) records directions for at least 3 concentrations of sucrose **;**

records correct trend **+** directions in continuous order **;**

shows results for repeated drops **;** [3]

(vii) correct estimate of **P** with their results **;** [1]

(viii) 1 hydrolysis of sucrose solutions or described **;**

2 heat Benedict's solution to stated temperature (e.g. 70°, 75°, 80°, 85°, 90°, 95°) or to 100 °C or boiling water **;**

3 comparing colours of sucrose solutions **+ P ;**

4 same or stated volume of sucrose solutions (e.g. 2 cm^3)
+ same or stated volume of **P** (e.g. 2 cm^3) **;** [max 3]

[Total: 17]

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2 (a) (i) 1.232 **+** 1.601 **;** [1]

(ii) 0.975 **;** [1]

(iii) label on *x*-axis (different) ages of aphid **+** label on *y*-axis rate of flow of sap / $\mu l\, h^{-1}$ **;**

(*x*-axis) bars of equal width and equal distance apart, using more than 4 cm **+** scale on *y*-axis is 0.5 to 2 cm **+** labelled each 2 cm (except origin and 2.0) **;**

correct plotting of each bar in the order of the table (**H**, **J**, **K**, **L**, **M**) **;**

sharp vertical lines and horizontal lines (less than line thickness on grid) **+** labels for **H**, **J**, **K**, **L**, **M** directly below bar **;** [4]

(iv) as the age of the aphid increases the rate of flow of sap increases **;** [1]

(v) as aphids become older the stylets become larger **;**

as aphids become older access to larger phloem sieve tubes **;** [2]

(b) (i) 1 at least 4 lines **+** size at least 60 mm across radius **+** no shading **;**

2 no cells drawn **+** correct quarter drawn **;**

3 at least 5 layers (6 lines drawn) **;**

4 epidermis drawn as two lines **;**

5 label **+** label line to pith **;** [5]

(ii) 1 at least 3 cells **+** size at least 40 mm across largest cell at widest point **+** (quality of outer lines) sharp continuous line for each cell **;**

2 only 3 cells drawn **+** as one group of touching cells **;**

3 cell walls drawn as double lines (for at least 2 cells) with middle lamella between **;**

4 drawn an air space between cells **;**

5 label **D** **+** label line to cell structure **;** [5]

(c) measures line **R** to **T** within range **+** units mm / cm **;**

converts to μm by multiplying by 1000 (if **R**/**T** in mm) or 10 000 (if **R**/**T** in cm) **;**

shows division by 120 **;**

correct significant figures for answer **;** [4]

[Total: 23]

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