

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

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:

<b>;</b>	separates marking points
<b>/</b>	alternative answers for the same point
<b>R</b>	reject
<b>A</b>	accept (for answers correctly cued by the question, or by extra guidance)
<b>AW</b>	alternative wording (where responses vary more than usual)
<b><u>underline</u></b>	actual word given must be used by candidate (grammatical variants accepted)
<b>max</b>	indicates the maximum number of marks that can be given
<b>ora</b>	or reverse argument
<b>mp</b>	marking point (with relevant number)
<b>ecf</b>	error carried forward
<b>I</b>	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  $0.10 \text{ mol dm}^{-3}$  (**S1**)  
+ **P** is 'less' concentrated than  $1.00 \text{ mol dm}^{-3}$  (**S2**)  
+ estimate of **P** is less than  $1/\text{S1}$  or more than  $0.1/\text{S2}$  ; [1]
- (iv) **S2** or  $1.0 \text{ mol dm}^{-3}$  ;  
  
(concentration of) **P**, was less concentrated than **S2**/ $1.0 \text{ mol dm}^{-3}$  ; [2]
- (v) records at least 4 concentrations of sucrose solutions +  $\text{mol dm}^{-3}$  ;  
  
for at least 3 concentrations of sucrose records volumes of sucrose solutions +  $\text{cm}^3$  ;  
  
for 3 concentrations final volume makes  $40 + \text{cm}^3$  ; [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.  $70^\circ$ ,  $75^\circ$ ,  $80^\circ$ ,  $85^\circ$ ,  $90^\circ$ ,  $95^\circ$ ) or to  $100^\circ\text{C}$  or boiling water ;  
3 comparing colours of sucrose solutions + **P** ;  
4 same or stated volume of sucrose solutions (e.g.  $2 \text{ cm}^3$ )  
+ same or stated volume of **P** (e.g.  $2 \text{ cm}^3$ ) ; [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 /  $\mu\text{l h}^{-1}$  ;
- (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  $\mu\text{m}$  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]**