

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International Advanced Subsidiary and Advanced Level

**MARK SCHEME for the October/November 2015 series****9700 BIOLOGY****9700/31**

Paper 3 (Advanced Practical Skills 1), maximum raw mark 40

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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:

<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) draws at least 3 additional beakers ;  
shows 4 concentrations of **S**, 1 + 0.1+ 0.01+ 0.001+ % ;  
shows transfer of 2 cm<sup>3</sup> solution from previous beaker to next beaker ;  
shows addition of 18 cm<sup>3</sup> of water to each beaker ; [4]
- (ii) states volume + cm<sup>3</sup> + *ref. to* covering potato ; [1]
- (iii) mp1 table drawn + heading for percentage concentration + **S** ;  
mp2 heading for colour ;  
mp3 uses scale (e.g. +++) to record intensity of colour ;  
mp4 result for 10% sodium chloride solution is the highest intensity + water  
is the lowest intensity ; [4]
- (iv) low or medium ; [1]
- (v) to show that the results were due to sodium chloride solution and not any  
other factor ; [1]
- (vi) *ref. to* other more significant errors than measuring to accuracy of 0.01 cm<sup>3</sup> ; [1]
- (b) (i) mp1 (x-axis) time in sodium chloride solution / days  
+ (y-axis) mean length of roots / mm ;  
mp2 (x-axis) 2 cm to 2, labelled each 2 cm, except origin and 10  
+ (y-axis) 2 cm to 5, labelled each 2 cm, except 55 or 60, with 30 or 35 at origin ;  
mp3 for 1 mM sodium chloride solution, correct plotting of five points as small cross or  
dot in circle ;  
mp4 for 1 mM sodium chloride solution, five plots + ruled sharp lines exactly  
point to point ; [4]
- (ii) shows 39.5 – 38 divided by 2 ;  
0.75 ; [2]
- (iii) correct *ref. to* water potential ;  
*ref. to* movement of water entering cells ; [2]
- (iv) uses at least 5 temperatures ;  
(controls temperature by) greenhouse / incubator / temperature controlled room ;  
*ref. to* how standardisation of other variable carried out ; [3]

**[Total: 23]**

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- 2 (a) (i) mp1 size at least 70 mm + no shading ;  
 mp2 no cells + at least 3 lines + correct section drawn ;  
 mp3 shows end of the leaf curving inwards ;  
 mp4 uses label line + label to cuticle/trichome/folding of leaf ;  
 mp5 feature annotated (cuticle – reduces water loss by evaporation, trichome and folding – reduces diffusion gradient) ; [5]
- (ii) mp1 at least 4 cells + size at least 40mm + sharp continuous lines ;  
 mp2 4 cells drawn + each cell touching at least 2 of the other cells ;  
 mp3 cell walls drawn as double lines + middle lamella between ;  
 mp4 correct proportion of width of cell wall to cell ;  
 mp5 uses label line + label to cytoplasm ; [5]
- (b) (i) uses label line + label 'X' to xylem tissue ; [1]
- (ii) shows correct number of eyepiece graticule units for line Y (40 – 44) ;  
 shows multiplication by 12 ;  
 shows correct answer ; [3]
- (c) organised as table with 3 columns or rows + headed for, feature + J1 + Fig. 2.2 ;  
 2 observable differences between J1 and Fig. 2.2 ; [3]

**[Total: 17]**