
BIOLOGY

9700/31

Paper 3 Advanced Practical Skills 1

October/November 2017

MARK SCHEME

Maximum Mark: 40

Published

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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 |

| Question | Answer | Marks |
|-----------|--|----------|
| 1(a)(i) | lose + less ; | 1 |
| 1(a)(ii) | completes Fig. 1.3 drawing all three directions correctly (up + level + down) ; | 1 |
| 1(b)(i) | for at least 4 suitable concentrations of S ; e.g. 0.8, 0.6, 0.4 and 0.2 decides correct volume of sucrose volumes for selected concentrations ; decides correct total volumes (40 cm ³) for each concentration ; | 3 |
| 1(b)(ii) | decides appropriate length of potato pieces ; e.g. 4.0 cm | 1 |
| 1(b)(iii) | 1 table drawn + heading, concentration of sucrose solution / mol dm ⁻³ ; 2 heading, direction of movement ; 3 records speed of movement in an appropriate way ; 4 decides to do repeated drops ; 5 results for at least 4 concentrations of sucrose ; 6 correct sequence of directions ; | 6 |

| Question | Answer | Marks |
|------------|--|----------|
| 1(b)(iv) | correct estimate of concentration of sucrose according to results in (b)(iii) ; | 1 |
| 1(b)(v) | identifies one significant source of error ; e.g. difficulty of measuring and cutting pieces of potato to correct dimensions | 1 |
| 1(b)(vi) | uses increased number of concentrations of sucrose solution ; between 2 stated concentrations appropriate to candidate's results ; read off from graph of results or replicate ; | 3 |
| 1(b)(vii) | no net movement of water or reference to dynamic equilibrium ; | 1 |
| 1(b)(viii) | shows on graph reading at 0.3 mol dm^{-3} to estimate the water potential ; correct estimate for water potential $+ \text{ kPa} \cdot 10^2$; | 2 |

| Question | Answer | Marks |
|----------|--|----------|
| 2(a)(i) | 1 quality of line (thin and continuous) for at least 6 grains drawn ; 2 draws only 3 starch grains from F + only 3 starch grains from G ; 3 grains not overlapping ; 4 starch grains from F drawn as oval shapes + starch grains from G drawn as angular shapes ; 5 uses one label line + one label, X , to identify surface markings on grains ; | 5 |
| 2(a)(ii) | correct annotations describing observable differences between the starch grains from F and G ;;; e.g. size of grains from F larger than grains from G | 3 |
| 2(b)(i) | 1 (x-axis) time / minutes + (y-axis) reducing sugar concentration / ∞ M ; 2 (scale on x-axis) 10.0 to 2 cm, labelled at least each 2 cm + (scale on y-axis) 2.0 to 2 cm, labelled at least each 2 cm ; 3 correct plotting of six points with a small cross or dot in circle ; 4 six plots, joined plot to plot + thin line drawn ; | 4 |
| 2(b)(ii) | 1 states correct reducing sugar concentration at 35 minutes (x) and 15 minutes (y) ; 2 shows x minus y ; 3 shows answer to mp2 divided by y and multiplied by 100 ; | 3 |

| Question | Answer | Marks |
|-----------------|--|--------------|
| 2(c) | <ol style="list-style-type: none">1 plan diagram of appropriate size + no cells + no shading ;2 correct section drawn + draws only 3 vascular bundles ;3 draws epidermis as 2 lines ;4 draws at least one vascular bundle divided into at least 3 sections ;5 uses one label line + one label to identify phloem ; | 5 |