

BIOLOGY

9700/34 May/June 2016

Paper 3 Advanced Practical Skills 2 MARK SCHEME Maximum Mark: 40

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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| Mark scheme abbreviations: | | | | | | | | |
| • | separates marking points | | | | | | | |
| 1 | alternative answers for the same point | | | | | | | |
| R | reject | | | | | | | |
| Α | accept (for answers correctly cued by the question, or by extra g | uidance) | | | | | | |
| AW | alternative wording (where responses vary more than usual) | , | | | | | | |
| underline | rline 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) | (decides sampling times) (0) 5 + 10 + 15 + or every 5 + minutes ; | [1] |
| | | (ii) | (decides on reagent and method to test for starch) iodine solution or I + add to sample + orange/yellow/brown if starch absent or (blue-)black if starch present ; | [1] |
| | (b) | (ris (ac | <i>k assessment)</i> id/amylase/potassium manganate(VII)) harmful or irritant + medium or high ; | [1] |
| | (c) | (i) | <i>(collects room temperature)</i> records whole number or to 1 decimal place + °C ; | [1] |
| | | (ii) | (recording results) 1. table drawn + heading (sample time) + minutes ; 2. appropriate heading for raw results ; 3. appropriate colours recorded for starch test for at least four times including 20 minutes ; 4. correct pattern of results ; 5. processed times recorded as whole seconds ; | [5] |
| | | (iii) | (<i>interpretation of significant error</i>) correct calculation of difference + not significant ; A significant <i>if difference 5</i> °C <i>or more</i> | [3] |
| | | (iv) | (conclusions) 1. (more heat energy/higher temperature) idea of (more/increase in) kinetic/movement energy; 2. (more heat energy/higher temperature) idea of more successful collisions between S and E or more active sites bind/join with substrate or more enzyme substrate complexes/ESCs; 3. (at high temperature or increasing by 30 °C or above the optimum) idea of denatured or active site changes shape (so fewer ESCs); | [3] |
| | | (v) | (modifications) 1. at least five pH or five examples ; 2. use of <u>buffers</u> ; 3. remove sample after set time/example of time or test with iodine and <i>idea of</i> looking for a colour change or test with potassium manganate(VII) and time taken to decolourise ; | ıd [3] |
| | (d) | (i) | (line graph) 1. (x-axis) percentage concentration of starch + (y-axis) initial rate of reaction of amylase/arbitrary units; 2. (scale on x-axis) 1.0 to 2 cm + labelled at least every 2 cm + (scale on y-axis) 100.0 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 + thin line drawn; | [4] |

| Ρ | age | 4 | Mark Scheme | Syllabus | Paper |
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| | | (ii) | (display of calculations) 1. shows on the graph V_{max} line at top of curve to the <i>y</i>-axis from t maximum rate of reaction; 2. shows on the graph how K_m is read off at half V_{max}; 3. correct answer for K_m from candidate's graph; | he | [3] [Total: 23] |
| 2 | (a) | (i) | (plan diagram) 1. plan diagram of appropriate size + no shading; 2. no cells + only two whole vascular bundles + epidermis drawn; 3. epidermis shown by two lines in the correct proportions; 4. all vascular bundles divided into at least three regions; 5. uses one label line + one label to xylem in any on vascular bundles | ; dle ; | [5] |
| | | (ii) | (drawing) 1. quality of line for outer wall of cells + size at least 40 mm across cell; 2. draws only four whole cells + each cell of the group must touch at least two other cells; 3. at least one intercellular space; 4. cell walls drawn as two lines close together; 5. uses one label line + one label to cell wall; | s largest | [5] |
| | (b) | (i) | (calculation) 1. collects correct measurement of length of scale bar + length of drawn across cell X + correct units ; 2. displays correct method for calculation ; 3. correct answer to calculation ; | line | [3] |
| | | (ii) | (observable difference between stem on N1 and root in Fig. 2.1) organises comparison into three columns with one column for featu one headed N1 and one headed Fig. 2.1 ; <i>any three</i> observable differences of comparison ;;; e.g. N1 has smaller xylem vessels than Fig 2.1 | res, | [4] [Total: 17] |
| | | | | | [|