

Cambridge
International
AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

BIOLOGY

9700/33

Paper 3 Advanced Practical Skills

March 2017

MARK SCHEME

Maximum Mark: 40

Published

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| Question | Answer | Marks |
|-----------------|--|--------------|
| 1(a)(i) | (decisions) 1 decides on a least 3 temperatures (other than room temperature and 40) + °C at least once ; 2 suitable even range ; | 2 |
| 1(a)(ii) | (collects data) 1 colours for each temperature using the letters in the key ; 2 results, for 15 second intervals, until no colour change ; 3 letters in correct order ; | 3 |
| 1(a)(iii) | (recording results) 1 table drawn + headings + temperature + °C + time + seconds ; 2 records times for at least four temperatures ; 3 times the same as recorded for raw results ; 4 recorded times same as on spotting tile ; | 4 |
| 1(a)(iv) | (sources of error with reason) 1 appropriate error with reason e.g. colour + difficult to judge ; 2 appropriate error with reason e.g. lowering of temperature when test-tube removed from water-bath ; | 2 |
| 1(a)(v) | (conclusions) 1 reference to optimum temperature of enzyme ; 2 reference to optimum temperature higher than human body temperature ; | 2 |

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| Question | Answer | Marks |
|-----------------|--|--------------|
| 1(a)(vi) | <p>(modification to investigate another variable)</p> <p>1 (to standardise temperature) use of a thermostatically-controlled water-bath ;</p> <p>2 (changes the new independent variable – concentration of enzyme solution) makes at least five enzyme concentrations ;</p> <p>3 (method) uses proportional or simple or serial dilution ;</p> | 3 |
| 1(b)(i) | <p>(layout of data)</p> <p>1 (x-axis) temperature / °C + (y-axis) activity of enzyme / arbitrary units ;</p> <p>2 (scale on x-axis) 5.00 to 2 cm, labelled at least each 2 cm + (scale on y-axis) 5.00 to 2 cm, labelled at least each 2 cm ;</p> <p>3 correct plotting of five points with a small cross or dot in circle ;</p> <p>4 five plots either joined point to point or as a smooth curve, drawn as a thin line ;</p> | 4 |
| 1(b)(ii) | <p>(interpretation of the effect of temperature on the activity of the enzyme)</p> <p>as temperature rises the activity of the enzyme decreases ;</p> | 1 |
| | Total: | 21 |

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| Question | Answer | Marks |
|-----------------|--|--------------|
| 2(a)(i) | <p>(plan diagram of P1, Ranunculus root)</p> <ol style="list-style-type: none"> 1 minimum size at least 90 mm + no shading ; 2 no cells drawn + correct half of the root drawn ; 3 stele shown in correct proportion to width of root ; 4 shape of xylem drawn correctly ; 5 uses one label line + one label to xylem ; | 5 |
| 2(a)(ii) | <p>(layout of drawing)</p> <ol style="list-style-type: none"> 1 quality of line for outer wall of each cell, thin and sharp + minimum size of cell at least 40 mm ; 2 only four cells drawn + each cell touching at least two other cells ; 3 cell wall drawn as two lines ; 4 one cell drawn with at least five sides ; 5 uses one label line + one label to cell wall ; | 5 |
| 2(b)(i) | <p>(conclusion)</p> <p>Fig. 2.2 identified as a stem + appropriate feature e.g. vascular bundles peripheral ;</p> | 1 |

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| Question | Answer | Marks |
|-----------------|---|--------------|
| 2(b)(ii) | (calculation of magnification) 1 measures length of line Z + units ; 2 shows multiplication of length of line Z (mm) by 1000 to convert to μm ; 3 shows division of length of line Z by 4500 ; 4 final answer to appropriate degree of accuracy ; | 4 |
| 2(b)(iii) | (observable differences between the root on P1 and the organ in Fig. 2.2) 1 organises comparison into three columns with one column for features, one headed P1 and one headed Fig. 2.2 ; 2, 3, 4 any three observable differences of comparison ; ; ; | 4 |
| | Total: | 19 |