
BIOLOGY

9700/32

Paper 32 (Advanced Practical Skills 2)

May/June 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 |

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| Question | Answer | Marks |
|-----------|---|----------|
| 1(a)(i) | 1 correct concentrations $0.03 (3 \times 10^{-2})$, $0.003 (3 \times 10^{-3})$, $0.0003 (3 \times 10^{-4})$, $0.00003 (3 \times 10^{-5})$ + % at least once ; 2 shows transfer of 1 cm^3 of 0.3% from 2nd to 3rd beaker and transfer of 1 cm^3 of 0.03% from 3rd to 4th beaker and transfer of 1 cm^3 of 0.003% from 4th to 5th beaker + cm^3 ; 3 adds 9 cm^3 of water to each beaker ; | 3 |
| 1(a)(ii) | 1 table drawn + heading, percentage concentration of S ; 2 heading, time + seconds ; 3 records time for W + times for at least four concentrations of molecule S ; 4 correct pattern of results, the time for the highest concentration of molecule S recorded as the longest time compared to the other concentrations of molecule S ; 5 times recorded as whole seconds ; | 5 |
| 1(a)(iii) | 1 reference to inhibition ; 2 reference to substrate unable to bind to active site ; 3 fewer, enzyme-substrate complexes / ESCs, formed ; | 3 |
| 1(a)(iv) | records time to reach end-point for solution X ; | 1 |
| 1(a)(v) | correct estimate according to results ; | 1 |
| 1(a)(vi) | appropriate error with reason, e.g. colour change of litmus paper + difficult to judge ; | 1 |
| 1(a)(vii) | 1 increase number of concentrations (of S) or examples of concentrations ; 2 between named concentrations (of S) or use simple / proportional dilution to make concentrations ; 3 reference to drawing a graph and reading off estimate of the concentration of S in solution X or replication of new procedure ; | 3 |

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| Question | Answer | Marks |
|-----------------|---|--------------|
| 1(b)(i) | 1 (x-axis) organism + (y-axis) mercury concentration in tissue samples / ppm ; 2 even width of bars + scale on y-axis: 10 to 2cm, labelled at least each 2cm ; 3 correct plotting of five bars in the order of the table ; 4 five bars drawn with thin lines + labelled as named organism in table ; | 4 |
| 1(b)(ii) | correct calculation of mean (19.1); | 1 |
| | Total: | 22 |

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| Question | Answer | Marks |
|-----------------|--|--------------|
| 2(a)(i) | 1 minimum size at least 90 mm + at least 3 vascular bundles drawn ; 2 no cells + at least one enclosed area beneath epidermis with each end of enclosed area touching epidermis + only 3 vascular bundles drawn ; 3 decides to subdivide vascular bundle into at least two areas ; 4 epidermis drawn as two lines ; 5 uses one label line + one label to xylem ; | 5 |
| 2(a)(ii) | 1 quality of line for outer wall of cells (thin line) + minimum size at least 40 mm across largest cell + no shading ; 2 only four cells drawn, each cell touching at least two other cells ; 3 cell walls drawn as two lines close together ; 4 at least one cell drawn with at least five sides ; 5 uses one label line + one label to cell wall ; | 5 |
| 2(b)(i) | 1 organises comparison into three columns with one column for features, one column headed M1 and one column headed Fig. 2.1 ; 2, 3, 4 any three observable differences of comparison ;;; | 4 |
| 2(b)(ii) | 1 shows squares counted on Fig. 2.2 ; 2 uses correct units (cm ²) for area of xylem tissue and area of vascular bundle ; | 2 |
| 2(b)(iii) | 1 shows value for area of xylem tissue divided by value for area of vascular bundle × 100 ; 2 shows answer to appropriate degree of accuracy ; | 2 |
| | Total: | 18 |