Published

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

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Abbreviations used in the Mark Scheme

- ; separates marking points
- / alternatives
- I ignore
- R reject
- A accept (for answers correctly cued by the question, or guidance for examiners)
- AW alternative wording (where responses vary more than usual)
- AVP any valid point
- ecf credit a correct statement/calculation that follows a previous wrong response
- ora or reverse argument
- ( ) the word/phrase in brackets is not required, but sets the context
- underline actual word given must be used by candidate (grammatical variants excepted)
- max indicates the maximum number of marks that can be given
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| 1(a)(i)  | 1 table drawn with appropriate lines and number of cells;  
          2 column and row headings and appropriate units for each heading;  
          3 correct measurements;  
          4 correct calculations of change in length; | 4 | R units in any data cell  
          A cm or mm (if data correct)  
          A ecf from incorrect data measurements |
| 1(a)(ii) | possible that different initial lengths;  
          ref to percentage change (in length); | 1 | |
| 1(b)(i)  | B D A C ;; | 2 | |
| 1(b)(ii) | 1 B gained, water;  
          2 (because B) was, hard/larger/AW;  
          3 C/A, lost, water;  
          4 (because C) was most, floppy/soft/small/AW;  
          5 D/A, were between B and C in terms of, length/texture;  
          6 A, bent more/smaller than, D; ora  
          7 no (net) movement of water in D; AW | 3 | |
| 1(b)(iii) | 1 reuse of syringe;  
           2 use clean/new, syringes each time;  
           3 water loss from tubes;  
           4 cover tubes (prevent evaporation);  
           5 potatoes may not be same, type/age/AW;  
           6 use same potato/type of potato etc.;  
           7 softness/bending, was not quantified;  
           8 described method to quantify, bending/softness;  
           9 AVP; | 2 | |
| 1(b)(iv) | initial, length/diameter/size/surface area, of potato/type/age/AW, of potato/volume/25 cm³, of (sucrose) solution/soaking time; | 1 | I amount  
          I time unqualified |
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<td>1(c)(i)</td>
<td><em>idea that</em> (mass) change, would be greater/takes a longer time (so easier to measure); allows more time to reach equilibrium;</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1(c)(ii)</td>
<td>Surface water would not affect measurement of length;</td>
<td>1</td>
<td></td>
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| 1(c)(iii)| **Axes** – correct axes with axes labels and units; **Scale** – even scale and points fill more than half of printed grid; **Plotting** - plots all accurate ± half a small square; **Line**; | 4    | A: concentration/ g per dm³ OR concentration/ g dm⁻³  
                      y: percent(age) change in mass OR change in mass/%  
                      R: extrapolation/feathered line |
| 1(c)(iv) | 1 any indication on graph where their expected line intercepts x-axis;  
   2 value from graph in g per dm³; | 2    |          |
<p>| 1(c)(v)  | (potatoes) of different, age/variety/part/AW; to calculate an average/identify anomalies; | 1    | I: mass/size, of potato |</p>
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| 2(a)     | **O** – outline of petals with clear unbroken lines and no shading anywhere ;  
          | **S** – size to fill at least half available space ;  
          | **D** – detail shown ;  
          | **P** – correct proportion ; | 4 |  |
| 2(b)(i)  | 15 (mm) ± 1 ; | 1 | A 1.5 cm |
| 2(b)(ii) | (actual length = 15 ÷ 2)  
          | 7.5 (mm) ;; | 2 | A ecf for measurement |
| 2(c)     | 1 at least 3 different temperatures ;  
          | 2 method described to maintain (range of) temperature(s) ;  
          | 3 suitable named time period to count number of seeds germinated ;  
          | 4&5 named controlled variables ;; | 6 | A record time for all seeds to germinate  
          | A amount of water ; amount oxygen ; humidity ; species / type / variety, of seed ; mass / size / age / number, of seed ; pH ; (measurement) period ;  
          | A e.g. cover dishes / repeat watering regularly  
          | A e.g. repeat experiment near the optimum temperature |
| 2(d)(i)  | cut / mash / crush, the seed (in water) / AW ;  
          | add iodine solution ; | 2 |  |
| 2(d)(ii) | blue-black colour ; | 1 |  |
| 2(d)(iii) | 1 Benedict’s reagent ;  
          | 2 (with Benedict’s reagent) heat ; | 2 |  |