

(c) Describe how DNA sequencing of pathogens may help doctors to prescribe antibiotics more effectively.

(2)

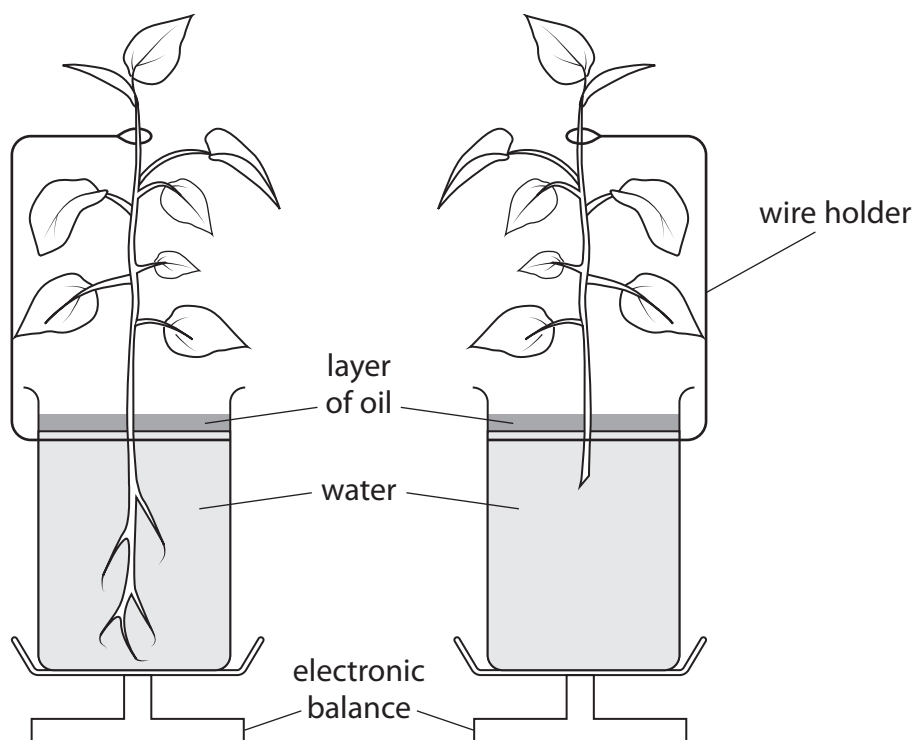
(Total for Question 1 = 8 marks)

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3 A student investigated the rate of water loss by a seedling.

The diagram shows the apparatus used in this investigation.



The student recorded the mass of each apparatus every 10 minutes for three hours.

(a) (i) State the hypothesis being tested by the investigation.

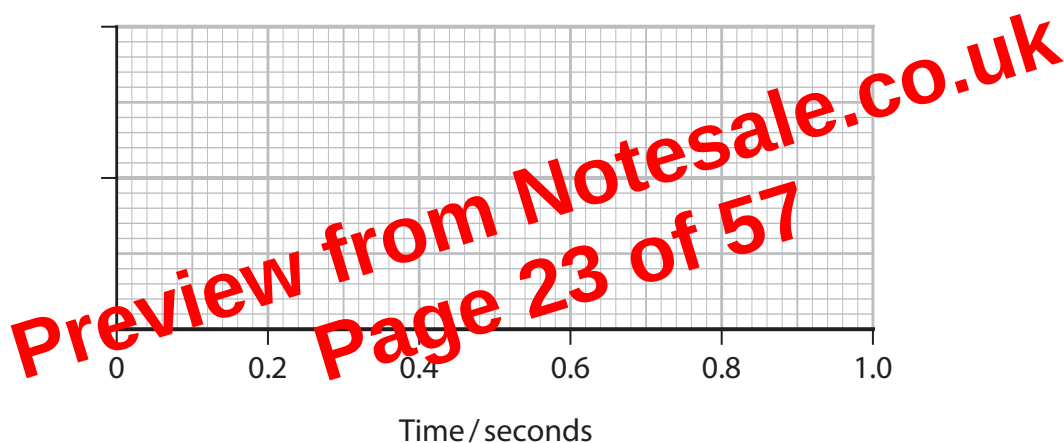
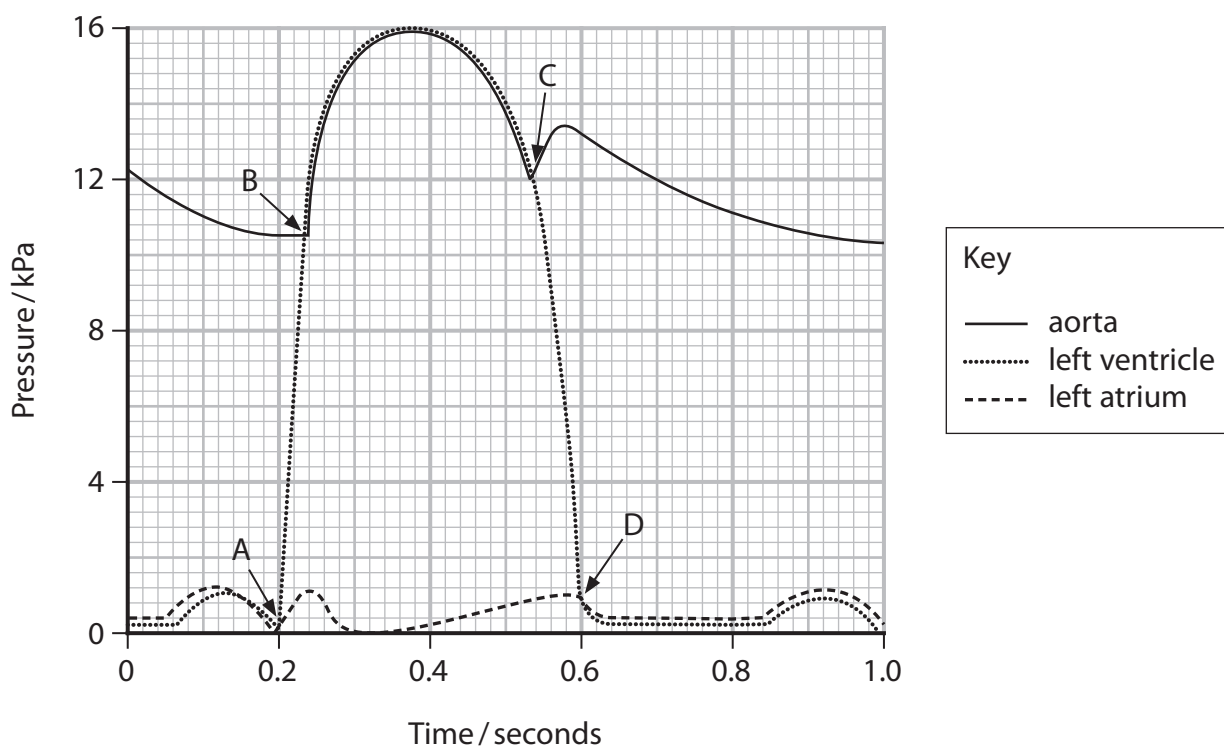
(1)

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(ii) Explain **one** feature of the plants that should be controlled in this investigation.

(2)

- 7 The graph shows the pressure changes in the left side of the heart and in the aorta during the cardiac cycle.



- (a) (i) Draw, on the blank grid, an ECG recording for this cardiac cycle and label the parts P, Q, R, S and T.

(2)

- (ii) Determine how many cardiac cycles there are in one minute, using the graph.

(1)

Answer .....

- 8 (a) Describe **three** named methods of passive transport by which substances can enter or leave a cell.

(3)

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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

| Question Number | Answer                                                                                                                                                                                                                                                                                                                                                                                                    | Mark |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 2(b)(i)         | <p><b>The only correct answer is</b></p> <p><b>B transport mineral ions from roots to growing regions</b></p> <p><b>A</b> is not correct the xylem does not transport amino acids to growing regions</p> <p><b>C</b> is not correct because xylem does not transport sucrose from leaves to growing regions</p> <p><b>D</b> is not correct because xylem does not transport water from leaves to stem</p> | (1)  |

| Question Number | Answer                                                                                                                                                                                                                                                                                                                                                        | Mark |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 2(b)(ii)        | <p><b>The only correct answer is</b></p> <p><b>D the movement of substances is upwards and downwards</b></p> <p><b>A</b> is not correct the movement of substances is not downwards only</p> <p><b>B</b> is not correct the movement of substances is not a passive process</p> <p><b>C</b> is not correct the movement of substances is not upwards only</p> | (1)  |

| Question Number | Answer                                                                                    | Additional guidance                | Mark       |
|-----------------|-------------------------------------------------------------------------------------------|------------------------------------|------------|
| <b>3(a)(i)</b>  | <ul style="list-style-type: none"> <li>(removing) roots affects water loss (1)</li> </ul> | Accept null hypothesis or question | <b>(1)</b> |

| Question Number | Answer                                                                                                                                                                                                                                                                                                    | Additional guidance                                  | Mark       |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------------|
| <b>3(a)(ii)</b> | <p>An explanation that refers to two of the following</p> <ul style="list-style-type: none"> <li>same <u>species</u> / same <u>surface area</u> of leaves / size of leaves (1)</li> <li>so same density / number of stomata (1)</li> <li>therefore same rate of transpiration / water loss (1)</li> </ul> | Not type of plant / size of plant / number of leaves | <b>(2)</b> |

| Question Number   | Answer                                                                                                                              | Mark       |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>3(a) (iii)</b> | <ul style="list-style-type: none"> <li>prevent <u>evaporation</u> / water loss from surface of water / surface of beaker</li> </ul> | <b>(1)</b> |

| Question Number | Indicative content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5(b)            | <p>Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme.</p> <p>The indicative content below is not prescriptive and candidates are not required to include all the material which is indicated as relevant. Additional content included in the response must be scientific and relevant.</p> <p><b>Reference to changes in number of blood cells</b></p> <ul style="list-style-type: none"> <li>• Condition A too few</li> <li>• Condition B too many</li> <li>• Condition C too few</li> <li>• Condition D too many</li> <li>• notes that normal range is very wide</li> <li>• small change can lead to condition being diagnosed</li> </ul> <p><b>Reference to symptoms</b></p> <ul style="list-style-type: none"> <li>• Condition A cannot prevent /defend against infection as too few antibodies produced</li> <li>• Condition B causing swelling as overproduction of lymphocytes and antibodies</li> <li>• Condition C unable to produce (nonspecific) immune response so less phagocytosis /bacteria in gut body mouth not destroyed engulfed</li> <li>• Condition D too many phagocytes produced in response to infection</li> </ul> |

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