

Question Number	Answer	Acceptable answers	Mark
<b>1(a)</b>	<b>A</b> differentiate into any type of cell		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(b)</b>	<p>Any <b>two</b> structures from the list with at least <b>one</b> matched adaptation:</p> <p>Structures (maximum of 2)</p> <ul style="list-style-type: none"> <li>• biconcave shape (1)</li> <li>• no nucleus (1)</li> <li>• thin membrane (1)</li> <li>• flexible / small (1)</li> <li>• contains haemoglobin (1)</li> </ul> <p>(matched) adaptation (maximum of 2)</p> <ul style="list-style-type: none"> <li>• large surface area / increase oxygen uptake (1)</li> <li>• to increase amount of haemoglobin / oxygen-carrying capacity (1)</li> <li>• so short distance for diffusion (1)</li> <li>• to get through capillaries (1)</li> <li>• to bind oxygen (1)</li> </ul>		<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>1(c)</b>	<p>A description including <b>two</b> of the following points</p> <ul style="list-style-type: none"> <li>• clotting / to seal a wound / scab formed (1)</li> <li>• stop bleeding (1)</li> <li>• prevent infection / entry of microbes (1)</li> <li>• fibrin (1)</li> </ul>		<b>(2)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>1(d)</b>	<p>A comparison between mitosis and meiosis including</p> <p><b>Mitosis</b></p> <ul style="list-style-type: none"> <li>• (genetically) identical cells produced</li> <li>• two daughter cells</li> <li>• one division</li> <li>• diploid daughter cells</li> <li>• identical set of chromosomes</li> <li>• occurs in the formation of body cells</li> <li>• for growth and repair (of body tissues)</li> </ul> <p><b>Meiosis</b></p> <ul style="list-style-type: none"> <li>• (genetically) non-identical cells</li> <li>• four daughter cells</li> <li>• 2 divisions</li> <li>• haploid daughter cells</li> <li>• half the number of chromosomes</li> <li>• occurs in the formation of gametes</li> <li>• for sexual reproduction</li> <li>• results in genetic variation</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content	
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>• a limited description including two points on either meiosis or mitosis there maybe confusion between the two but this does not negate the level</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>	
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• a simple description including one comparison of meiosis and mitosis or a detailed description of either mitosis or meiosis</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>	
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• a detailed comparison of both meiosis and mitosis – at least two correct comparisons made</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>	

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(i)</b>	0.5 / 0.5 picogram	Accept: 0.5 picograms  accept: the same (mass) as the sperm cell	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(ii)</b>	<b>C</b> haploid		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(iii)</b>	thymine with adenine, cytosine with guanine		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a)(iv)</b>	weak hydrogen bonds / hydrogen bonds / hydrogen (1)	H (bond)	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)(i)</b>	A description including <b>three</b> of the following points: <ul style="list-style-type: none"> <li>• cell divides / cell division / cell splits(1)</li> <li>• two cells produced (1)</li> <li>• (both) diploid (1)</li> <li>• (both) cells are <u>genetically</u> identical (1)</li> </ul>	credit correct reference to stages of mitosis: DNA replication / chromosomes duplicate (1) Chromosomes line up along the equator / middle of the cell (1) chromosomes pulled to either end of cell (1) cytokinesis / cytoplasm splits (1)	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)(ii)</b>	<p>A description including <b>three</b> of the following points:</p> <ul style="list-style-type: none"> <li>• ref (to many) cell divisions / eq (1)</li> <li>• growth (1)</li> <li>• ref to differentiation / specialisation (1)</li> <li>• ref to stem cells (1)</li> </ul>	<p>accept: gets bigger / larger</p> <p>accept: become specific cells</p>	<b>(3)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)(i)</b>	Correct substitution i.e. $(-0.5 \div 10.3) \times 100$ (1)  - 4.85 / - 4.9	Accept data correctly put into other acceptable methods.  Accept answer with more decimal places eg: - 4.8543 / - 4.854368932  Full marks for correct bald answer award max of one mark if negative is not written eg 4.85 / 4.9	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)(ii)</b>	better / easier / more valid comparison can be made between values /can make more valid conclusion / because the original / starting masses of potato were not the same / Idea of easier to visualise the size of the change	Ignore makes the results / test reliable / accurate	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(b)</b>	<p>A description including the following:</p> <ul style="list-style-type: none"> <li>• Produce two (daughter) cells</li> <li>• which are <b>genetically</b> identical</li> <li>• and diploid</li> </ul>	<p>Accept DNA for chromosomes throughout</p> <p>Also credit details of the process of mitosis</p> <p>chromosomes replicates (1)</p> <p>spindle fibres form / chromosomes attached to spindle (1)</p> <p>Chromosomes arranged on equator / middle of cell / chromosomes pulled apart /pulled to poles /separation of sets of chromosomes (1)</p> <p>Idea of nucleus reforming / New cell wall formed (to divide cell) / cytokinesis / description of cytokinesis (1)</p>	<b>(3)</b>

Question Number	Indicative Content	Mark
<b>QWC</b>	<p><b>*3(c)</b></p> <p>A explanation to include some of the following points</p> <ul style="list-style-type: none"> <li>• active transport requires energy</li> <li>• (active transport moves mineral ions) from the soil into root (hair cells)</li> <li>• reference to pumps (in the cell membranes)</li> <li>• from a low concentration to a high concentration/against their concentration gradient</li>   <li>• reference to mineral ions / mineral salts accept named minerals eg nitrates</li>   <li>• diffusion is a passive process</li> <li>• gases diffuse from high to low concentration/down their concentration gradient</li>   <li>• gas exchange in the leaf occurs by diffusion</li> <li>• carbon dioxide diffuses in</li> <li>• to air spaces in leaves / into cells</li> <li>• for photosynthesis / produces glucose</li> <li>• oxygen diffuses in</li> <li>• for respiration</li> </ul>	<b>(6)</b>
<b>Level</b>	<b>0</b>	No rewardable content
<b>1</b>	<b>1 - 2</b>	<ul style="list-style-type: none"> <li>• a limited explanation that gives information about active transport <b>OR</b> diffusion in the correct context e.g. minerals ions are transported into root (hair cells)</li> <li>• the answer communicates ideas using simple language and uses limited scientific terminology</li> <li>• spelling, punctuation and grammar are used with limited accuracy</li> </ul>
<b>2</b>	<b>3 - 4</b>	<ul style="list-style-type: none"> <li>• a simple explanation that gives details of active transport or diffusion transporting materials e.g. carbon dioxide diffuses into leaves down their concentration gradient <b>OR</b> a limited explanation of both active transport and diffusion</li> <li>• the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately</li> <li>• spelling, punctuation and grammar are used with some accuracy</li> </ul>
<b>3</b>	<b>5 - 6</b>	<ul style="list-style-type: none"> <li>• a detailed explanation that describes <b>both</b> processes e.g. active transport requires energy to transport mineral ions into the root hair cell <b>AND</b> carbon dioxide diffuses into the leaf for photosynthesis</li> <li>• the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately</li> <li>• spelling, punctuation and grammar are used with few errors</li> </ul>

**(Total for question 3 = 12 marks)**