

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

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

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

Question Number	Answer	Acceptable answers	Mark
<b>1(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>1(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>2(a) (i)</b>	<b>B</b> <input checked="" type="checkbox"/> courtship		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(a) (ii)</b>	avoid injury / do not waste energy	avoid a fight idea of dominance / submission feels threatened  Ignore : female will pick the biggest antlers / respect	<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(b)</b>	An explanation linking <ul style="list-style-type: none"> <li>• protection (of female during birth / of young) / concealment (1)</li> <li>• from predators / until strong enough (to fend for itself) (1)</li> </ul>	safer camouflaged  weather	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c) (i)</b>	A description including two of the following <ul style="list-style-type: none"> <li>• can eat plants which contain tannins (1)</li> <li>• larger food supply (1)</li> <li>• plants not consumed by other herbivores / less competition from other herbivores / animals (1)</li> </ul>	get more food / less likely to starve / won't starve	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>2(c) (ii)</b>	<p>A description including</p> <ul style="list-style-type: none"> <li>• (flower) attracts insects (1)</li> <li>• which pollinate the flower (1)</li> <li>• Idea that insect - flower relationship is specific (1)</li> </ul>	<p>attraction can be specific in terms of colour, size or scent or nectar or pollen</p> <p>fertilise / reproduce for pollinate</p> <p>e.g. bee and bee orchid</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>3(a)</b>	<p>A description including four of the following points</p> <ul style="list-style-type: none"> <li>• ref to meiosis (1)</li> <li>• 4 cells produced (from one parent cell) (1)</li> <li>• haploid (cells) / cells have half the number of chromosomes (1)</li> <li>• cells are genetically different (1)</li> </ul>	<p>do not accept if there is a 't'</p> <p>cells have one set of chromosomes / 23 chromosomes</p>	<b>(4)</b>

Question Number		Indicative Content	Mark
<b>QWC</b>	<b>*3(b)</b>	<p>A description including</p> <ul style="list-style-type: none"> <li>• fertilisation of egg by sperm</li> <li>• ref to fusion of nuclei</li> <li>• forming diploid cell</li> <li>• ref to zygote</li>   <li>• (zygote) divides by mitosis</li> <li>• to form identical cells</li> <li>• several mitotic divisions</li> <li>• growth of foetus</li> <li>• examples of how fetus grows eg in height, mass</li>   <li>• stem cells in embryo</li> <li>• specialisation / differentiation of (stem) cells into different cell types</li> <li>• examples of different cell types eg neurones, skin cells</li> <li>• development of fetus</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 2 or more comments about one process</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 2 or more comments on 2 processes</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 description including 2 or more comments on all 3 processes</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>3(c)</b>	<p>Any <b>two</b> from the following:</p> <ul style="list-style-type: none"> <li>sexual reproduction involves two parents but asexual reproduction only involves one (organism / parent / cell) (1)</li> <li>sexual reproduction needs gametes / sex cells but asexual reproduction does not (1)</li> <li>sexual reproduction produces genetically different organisms but asexual reproduction produces genetically identical offspring / clones (1)</li> </ul>	<p>ignore any reference to meiosis or mitosis</p> <p>sexual reproduction results in variation but asexual reproduction does not</p>	<b>(2)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4(a)</b>	<b>D</b> haploid and haploid		<b>(1)</b>

Question Number	Answer	Acceptable answers	Mark
<b>4 (b)</b>	<p>A description linking three of the following</p> <p>(DNA is a) double helix (1)</p> <p>the sides of DNA are made from (alternating) sugars and phosphate (molecules) / sugar phosphate backbone (1)</p> <p>{ paired / complementary } bases / A (joins to) T and C (joins to) G (1)</p> <p>(bases joined by/strands held together by) hydrogen bonds (1)</p>	<p>Accept H bonds Ignore h or H<sub>2</sub> bonds</p>	<b>(3)</b>



Question Number	Answer	Acceptable answers	Mark
<b>4(c)</b>	<p>A description including four of the following:</p> <p>(the process is) translation (1)</p> <p>(mRNA ) leaves the nucleus / enters the cytoplasm (1)</p> <p>(mRNA joins to) ribosomes(1)</p> <p>tRNA carries amino acids (1)</p> <p>tRNA joins to mRNA / bases on tRNA matches bases on mRNA (1)</p> <p>(bases read as) {sets of three / triplets / idea of codons} (1)</p> <p>(ribosome / mRNA holds tRNA so) amino acids are joined together / to make polypeptides (1)</p>		<b>(4)</b>

Total for Question 4 = 8 marks

Question number	Answer	Mark
<b>5(a)</b>	An explanation that combines identification – understanding (1 mark) and reasoning/justification – understanding (1 mark): <ul style="list-style-type: none"> <li>• Mendel crossed homozygous tall and homozygous short pea plants and produced all tall offspring (1)</li> <li>• therefore all the offspring had a heterozygous genotype with one tall and one short allele showing that the tall allele is dominant (1)</li> </ul>	<b>(2)</b>

Question number	Answer	Mark
<b>5(b)(i)</b>	An explanation that combines identification – application of knowledge (1 mark) and reasoning/justification – application of understanding (1 mark): <ul style="list-style-type: none"> <li>• asexual reproduction is a rapid reproduction technique allowing the production of more plants</li> <li>• as there is no requirement for cross pollination/higher crop yield/increased profit</li> </ul>	<b>(2)</b>

Question number	Answer	Mark
<b>5(b)(ii)</b>	An explanation that combines identification – application of knowledge (1 mark) and reasoning/justification – application of understanding (1 mark): <ul style="list-style-type: none"> <li>• introduces variation into the population</li> <li>• which allows for natural selection of fitter plants/increased chance of the population surviving</li> </ul>	<b>(2)</b>

Question number	Answer	Mark
<b>5(c)(i)</b>	C	<b>(1)</b>

Question number	Answer	Mark
<b>5(c)(ii)</b>	An explanation that combines identification via a judgement (1 mark) to reach a conclusion via justification/reasoning (1 mark): <ul style="list-style-type: none"> <li>• genotype is <math>X^D X^d</math>/she must have one dominant and one recessive allele (1)</li> <li>• because her daughter must have received the recessive allele and her son has inherited a dominant allele (1)</li> </ul>	<b>(2)</b>