

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

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	C haploid		(1)

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

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

Question Number	Answer	Acceptable answers	Mark
1(b)(i)	A description including three of the following points: <ul style="list-style-type: none"> • cell divides / cell division / cell splits(1) • two cells produced (1) • (both) diploid (1) • (both) cells are <u>genetically</u> identical (1) 	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)	(3)

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

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

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

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

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

Question Number	Answer	Acceptable answers	Mark
2(c) (ii)	<p>A description including</p> <ul style="list-style-type: none"> • (flower) attracts insects (1) • which pollinate the flower (1) • Idea that insect - flower relationship is specific (1) 	<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>	(2)

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

Question Number		Indicative Content	Mark
QWC	*3(b)	<p>A description including</p> <ul style="list-style-type: none"> • fertilisation of egg by sperm • ref to fusion of nuclei • forming diploid cell • ref to zygote • (zygote) divides by mitosis • to form identical cells • several mitotic divisions • growth of foetus • examples of how fetus grows eg in height, mass • stem cells in embryo • specialisation / differentiation of (stem) cells into different cell types • examples of different cell types eg neurones, skin cells • development of fetus 	(6)
Level	0	No rewardable content	
1	1 - 2	<ul style="list-style-type: none"> • a limited description including 2 or more comments about one process • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy 	
2	3 - 4	<ul style="list-style-type: none"> • a simple description including 2 or more comments on 2 processes • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy 	
3	5 - 6	<ul style="list-style-type: none"> • a detailed description including 2 or more comments on all 3 processes • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors 	

Question Number	Answer	Acceptable answers	Mark
3(c)	<p>Any two from the following:</p> <ul style="list-style-type: none"> • sexual reproduction involves two parents but asexual reproduction only involves one (organism / parent / cell) (1) • sexual reproduction needs gametes / sex cells but asexual reproduction does not (1) • sexual reproduction produces genetically different organisms but asexual reproduction produces genetically identical offspring / clones (1) 	<p>ignore any reference to meiosis or mitosis</p> <p>sexual reproduction results in variation but asexual reproduction does not</p>	(2)

Question Number	Answer	Acceptable answers	Mark
4(a)	D haploid and haploid		(1)

Question Number	Answer	Acceptable answers	Mark
4 (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 H₂ bonds</p>	(3)

Question Number	Answer	Acceptable answers	Mark
4(c)	<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>		(4)

Total for Question 4 = 8 marks

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

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

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

Question number	Answer	Mark
5(c)(i)	C	(1)

Question number	Answer	Mark
5(c)(ii)	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"> • genotype is $X^D X^d$/she must have one dominant and one recessive allele (1) • because her daughter must have received the recessive allele and her son has inherited a dominant allele (1) 	(2)