



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)



EXAM PAPERS PRACTICE

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



Question number	Answer	Mark
6(a)(i)	An answer including: <ul style="list-style-type: none">• select large chickens /chicks from larger chickens (1)• breed together (1)• repeat over (many) generations / long period of time (1)	(3)

Question number	Answer	Mark
6(a)(ii)	Benefit <ul style="list-style-type: none">• produces more food / fewer chickens needed for the same amount of meat (1) Risk <ul style="list-style-type: none">• less variation /losing useful genes (from the gene pool) / losing traits which may be desirable in the future / health issues related to larger bodies (1)	(2)

Question number	Answer	Mark
6(b)(i)	39 / thirty-nine	(1)

Question number	Answer	Additional guidance	Mark
6(b)(ii)	meiosis / meiotic cell division	reject mitosis / mitotic cell division	(1)



Question number	Answer	Mark
6(c)(i)	<p>C all the genetic material of an organism</p> <p>The only correct answer is C</p> <p><i>A is not correct because a genome is not all the cells of an organism</i></p> <p><i>B is not correct because a genome is not all the enzymes of an organism</i></p> <p><i>D is not correct because a genome is not all the cytoplasm of an organism</i></p>	(1)

Question number	Answer	Mark
6(c)(ii)	<p>Any two from:</p> <ul style="list-style-type: none">• identify useful genes (1)• track evolution/ identify new species to show which species are more closely related (1)• understand diseases (of crop plants and animals) (1)• discover new medicines / find a cure for diseases (1)• identify the sequences that allow some plants and animals to cope with environmental change (1)	(2)

(Total for question 5 = 10 marks)