Mark Scheme (Results)

October 2023

Pearson Edexcel International Advanced Subsidiary Level In Biology (WBI12)
Paper 01
Unit 2: Cells, Development, Biodiversity and Conservation

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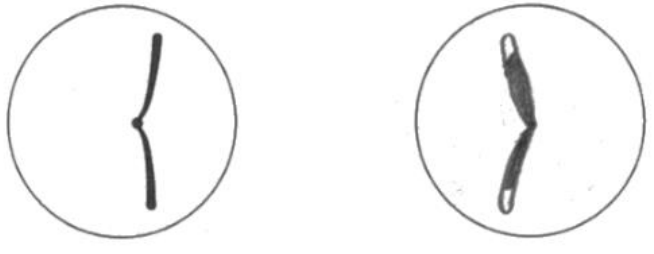
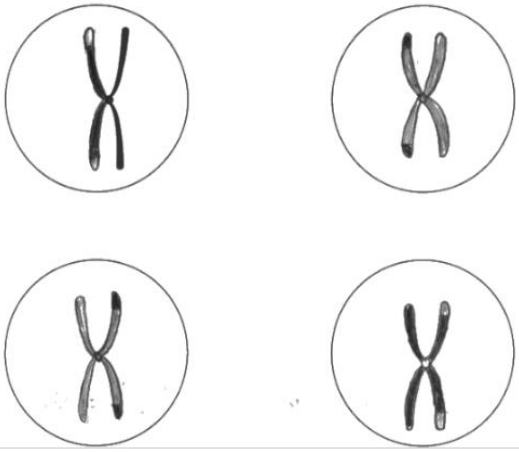
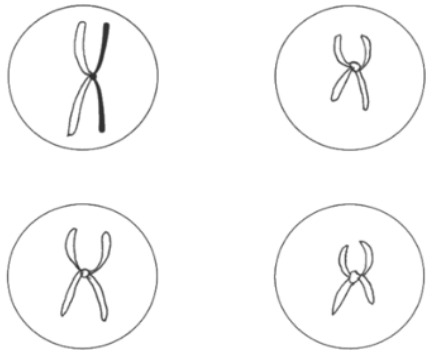
General Marking Guidance

- 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
1(a)	The only correct answer is A centriole *B is not correct because spindle fibres develop from a centriole* *C is not correct because spindle fibres develop from a centriole* *D is not correct because spindle fibres develop from a centriole*	(1)

Question Number	Answer	Additional guidance	Mark
1(b)	An explanation that makes reference to the following points: • {crossing over / recombination} has occurred (1) • (resulting in) B is a recombinant chromatid / chromatid B contains {genetic information/ alleles} from {chromatid D / another chromatid / non-sister chromatid} (1)	accept chromosome for chromatid accept recombinants have formed? accept description of crossing over which isn't specific to A/B accept converse for chromatid A accept gene accept B contains part of {D /another chromatid} ignore exchange of alleles between maternal and paternal {chromatids / chromosomes} ignore (crossing over) of non-sister chromatids unqualified need to be clear which chromatids they are referring to	(2)

Question Number	Answer	Additional guidance	Mark
1(c)	An answer that includes the following points: • one or two cells correct (1) • 3rd cell correct (1)	<u>Example of diagram</u> explain why we are allowing after meiosis I in report  <u>=2</u>  <u>=2</u>	**(2)**

		 0	

Question Number	Answer	Additional guidance	Mark
2(a)	A calculation in which: • conversion of actual length of scale into μm (1) • calculation of magnification to two significant figures (1)	<u>Example of calculation:</u> 29 to 30 mm = 29 000 to 30 000 (μm) (29 000 ÷ 20) = ×1450 = × 1400 OR 1500 incorrect unit = max 1 please note they may convert the 20 μm into mm or cm e.g. measurement ÷ 0.02 ecf for correct measurement incorrectly converted in working, ÷ 20 and then given to 2 sig fig, e.g. 150 ecf for everything correct with an incorrect measurement shown in working (remember 5 is rounded down OR up) Accept correct standard form to 2 sig fig Correct answer scores full marks	(2)

these are most common incorrect responses – but please don't rely on this – always use the MS as your guide

1 mark	2 marks
1450	1400 1.4×10^3
ecf for correct measurement incorrectly converted **in working**, ÷ 20 and then given to 2 sig fig, e.g. 150	
ecf for everything correct with an incorrect measurement shown **in working** (remember 5 is rounded down OR up) e.g. 45 000÷ 20 = 2 300 **OR** e.g. 110 ÷ 0.02 = 5500	1500 1.5×10^3
correct answer with incorrect unit	
29 000 to 30 000 (μm) 2.9×10^4 to 3.0×10^4	

Question Number	Answer	Additional guidance	Mark
2(b)	An explanation that makes reference to three of the following points: • {generative nucleus / it} (divides to) form two (male) {nuclei / gametes} (1) • double fertilisation occurs (1) • one (male) {nucleus / gamete} fuses with {female / egg cell} **nucleus** to result in {an embryo / a zygote} (1) • one (male) {nucleus / gamete} fuses with (two) **polar nuclei** to result in endosperm formation (1)	 ignore sperm cells ignore by meiosis reject generative nucleus reject generative nucleus	**(3)**

Question Number	Answer	Additional guidance	Mark
2(c)(i)	An answer that makes reference to the following point: • (loci of) {the gene**s** / flower colour and pollen grain size (genes)} being on same {chromosome / chromatid} (1)	accept alleles for genes accept these gene**s** inherited {as single unit / together} ignore they are at the same locus	**(1)**

Question Number	Answer	Mark
2(c)(ii)	The only correct answer is A Chi squared *B is not correct because correlation coefficient does not analyse observed phenotype frequencies and expected phenotype frequencies.* *C is not correct because standard deviation does not analyse observed phenotype frequencies and expected phenotype frequencies.* *D is not correct because Student's t-test does not analyse observed phenotype frequencies and expected phenotype frequencies.*	**(1)**

Question Number	Answer	Additional guidance	Mark
3(a)	An answer that makes reference to three of the following: • cell wall with secondary thickening {is thicker / has more layers} (1) • cell wall with secondary thickening contains lignin (1) • cell wall with {secondary thickening / lignin} is {stronger / more supported / less flexible / has pits} (1) • cell wall with {secondary thickening / lignin} is {waterproof / impermeable to water} (1)	accept converse for all mp accept diagram 2 for cell wall with {secondary thickening / lignin} Mark as a whole as some statements may have more than 1 mp in them accept cell wall with secondary thickening has greater diffusion distance accept secondary thickening layer is thinner than **original** cell wall accept stability ignore cellulose giving these properties ignore harder ignore insoluble	**(3)**

Question Number	Answer	Mark
3(b)(i)	The only correct answer is B one *A is not correct because cellulose molecules form microfibrils, molecules do not contain 1,6 glycosidic bonds and do not contain α-glucose* *C is not correct because cellulose molecules form microfibrils, molecules do not contain 1,6 glycosidic bonds and do not contain α-glucose* *D is not correct because cellulose molecules form microfibrils, molecules do not contain 1,6 glycosidic bonds and do not contain α-glucose*	**(1)**

Question Number	Answer	Additional guidance	Mark
3(b)(ii)	An explanation that makes reference to the following points: • (secondary thickening involves addition of) lignin (1) • which results in (increased) strength (1) IMP	ignore cellulose accept lignified / lignification accept more rigid/ rigidity / waterproof / impermeable to water ignore support / harder	**(2)**

Question Number	Answer	Additional guidance	Mark
3(c)	A description that makes reference to the following points: • allows {movement of **named** substances / communication} (1) • between (adjoining) cells / to other tissues / out of xylem / into xylem (1) **IMP**	 e.g. water, inorganic ions, mineral ions ignore nutrients accept {lateral / sideways} movement ignore movement {**up/through}** xylem accept connects xylem vessels lateral movement of water = 2 marks	**(2)**

Question Number	Answer	Additional guidance	Mark
4(a)(i)	• Archaea and Eukarya	mark first 2 answers only both required for the mark irrespective of which line accept eukaryote / eukaryotes/ eukaryota etc accept phonetic spellings	**(1)**

Question Number	Answer	Additional guidance	Mark
4(a)(ii)	A calculation in which: • correct calculation (1) • conversion to standard form (1)	<u>Example of calculation:</u> 20 000 000 ÷ 300 = 66666.66667 or 20 ÷ (3 x10^{-4}) = 66666.66667 mark for either LHS or RHS of calculation watch out as some convert both numbers to a common unit for some reason! = 6.7 × 10^4 / 6.67 × 10^4 / 7 × 10^4 6.667 × 10^4 / 6.6667 × 10^4 are 1mark as too many dp factor of 10 error in standard form = 1 mark (must be 6.7 or 7 x 10^x NOT 0.67/eq) 1 mark for 1.5 x 10^{-5} no credit for any other incorrect answer converted into standard form Correct answer scores full marks	**(2)**

most common responses – but please follow MS at all times for other answers.

0	1	2
6.7	20 000 000 ÷ 300	6.7 × 10^4
7	20 ÷ (3 x10^{-4})	6.67 × 10^4
6.6 x $10^{\text{incorrect number}}$	66666.66667 or correctly rounded to any or no dp e.g.66667 etc	7 × 10^4 OR 7.0 × 10^4
6667	1.5 x 10^{-5}	
	{7 or 6.7 or 6.67 or other correct} x 10^x	
	6.6 × 10^4	
	6.667 × 10^4	
	6.6667 × 10^4	

Question Number	Answer	Additional guidance	Mark
4(b)	An answer that makes reference to the following points: • (because circular DNA) contains {genes / alleles/ bases/ genetic information} which will be {copied onto mRNA / transcribed / codes for a protein / codes for a sequence of amino acids} (1) • (because) ribosomes will translate mRNA base sequence into an amino acid sequence (1) • correct role of membrane (1)	allow weird spellings of pepins e.g. pepsin accept where transcription occurs / (pre-) mRNA formation accept contains {genes / alleles/ bases/ genetic information} ignore codes for an amino acid accept translation occurs (at the ribosomes) / description of translation / formation of peptide bonds ignore protein synthesis as in Q stem reject transcription e.g. partially permeable / {compartmentalise / encloses} the {DNA / ribosomes} from the cytoplasm / formation of vesicles / fusing of vesicles to release proteins / control what {enters/leaves} (**pepins)** unqualified ignore controls what {enters/leaves} **cell** ignore protects {DNA / ribosomes} reject exocytosis out of cell but accept exocytosis unqualified	**(3)**

Question Number	Answer	Additional guidance	Mark
4(c)(i)	An explanation that makes reference to the following points: • (optimum temperature) for fastest {enzyme / metabolic} reaction (1) • (water) for {hydrolysis (reactions) / solvent / prevent dehydration} (1)	accept {fast**er**/optimum/ increase? / more / peak} {enzyme rate of reaction / product formation / collisions between enzyme and substrate} ignore for enzyme reactions to occur unqualified accept prevent denaturing ignore transport ignore photosynthesis / respiration accept contains (dissolved) oxygen accept maintain {turgidity / rigidity}	**(2)**

Question Number	Answer	Additional guidance	Mark
4(c)(ii)	An explanation that makes reference to three of the following points: • as oxygen percentage increases the growth rate of A decreases whereas B increases (1) • (B growth rate increases because) it is an (obligate) aerobe} / performs aerobic respiration / it requires oxygen for (aerobic) respiration / (1) • Growth rate of type B levels off because {oxygen is in excess / another factor is limiting growth} (1) • (A growth rate decreases because) it is an anaerobe / A respires anaerobically / high oxygen percentage {inhibits growth (of A) / is toxic (to A)} / (1)	piece together accept converse for lower oxygen concentrations accept correct correlations ignore requires oxygen {unqualified / for growth} accept A is outcompeted by B ignore does not require oxygen {unqualified / for growth} ignore doesn't need oxygen for metabolic reactions ignore it lives in anaerobic conditions	**(3)**

Question Number	Answer	Mark
5(a)(i)	The only correct answer is D xylem *A is not correct because magnesium ions are transported in the xylem* *B is not correct because plasmodesmata is not a tissue* *C is not correct because magnesium ions are transported in the xylem*	**(1)**

Question Number	Answer	Additional guidance	Mark
5(a)(ii)	An explanation that makes reference to the following points: • magnesium (ions) are needed for the formation of {chlorophyll / chloroplasts} (1) • (yellow leaves are due to) {**fewer / no}** {chlorophyll (molecules) / chloroplasts / green pigments} (1) • (reduced growth is due to) {**reduced / no}** {production of glucose / carbohydrate / photosynthesis} (1) need clear statement	accept magnesium (ions) are needed for {activation of enzymes / protein synthesis} less Mg=less chlorophyll = mp1&2 less chlorophyll linked to magnesium = mp1&2 accept fewer activated enzymes accept {no/reduced} {metabolic reactions / respiration} if linked to the mp1AG only	**(3)**

Question Number	Answer
*5(b)	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. The indicative content below is not prescriptive and candidates are not required to include all the material indicated as relevant. Additional content included in the response must be scientific and relevant. 1&2 • there is (a greater) increase in mean leaf area with eggshells / increase is exponential with eggshells • similar increase in mean leaf area from day 10-17 (for vine plants with and without eggshells) • there is (a greater) increase in {mean shoot length / growth} with eggshells • similar increase in mean shoot length from day 10-25 (for vine plants with and without eggshells) • there is a greater chlorophyll content with eggshells • no data from leaf area / shoot length beyond {52-55} days • relevant comment on {error/SD} bars e.g. overlap between xxx and xxx therefore no significant difference / no overlap between xxx and xxx therefore significant difference / correct comment about error bar size linked to {reliability / validity} 3 • (because crushed eggshells contain) calcium (ions) needed to form calcium pectate • calcium pectate {joins adjacent cells together / involved in forming middle lamella} 4 • greater leaf area results in more {chlorophyll / chloroplasts/ light absorption} • greater leaf area results in increased photosynthesis • more {chlorophyll / light absorption} results in increased photosynthesis • increased {shoot/growth} results in more {light absorption / photosynthesis} • more photosynthesis results in more growth 5 • more {photosynthesis / chlorophyll} results in more {glucose production / chemical energy store} • more glucose results in more growth 6 • {glucose / chemical energy store} can be used in {respiration to provide ATP} / ATP needed for mitosis • glucose can be converted into {amino acids / glycerol} 7 • increased protein synthesis would result in increased {growth / fruit production/chlorophyll production} only need increased once • (increased) calcium pectate would result in (increased) {growth of {plant / leaves} / support / strength / stability} 8 • cost of adding eggshells / comparison of cost with traditional fertiliser • eggshells {more sustainable (as using waste product) / renewable resource / biodegradable} / deter pests such as slugs

			(6)
			Additional guidance
Level 0	0	No awardable content	
Level 1	1-2	Demonstrates isolated elements of biological knowledge and understanding to the given context with generalised comments made. Vague statements related to consequences are made with limited linkage to a range of scientific ideas, processes, techniques and procedures. The discussion will contain basic information with some attempt made to link knowledge and understanding to the given context.	description of data 1 mark – description of at least one graph 2 marks – description of at least two graphs
Level 2	3-4	Demonstrates adequate knowledge and understanding by selecting and applying some relevant biological facts / concepts. Consequences are discussed which are occasionally supported through linkage to a range of scientific ideas, processes, techniques and procedures. The discussion shows some linkages and lines of scientific reasoning with some structure.	Level 1 plus linkages of chlorophyll content/leaf area/shoot length to light absorption or photosynthesis plus linkage of calcium ions to calcium pectate
Level 3	5-6	Demonstrates comprehensive knowledge and understanding by selecting and applying relevant biological facts / concepts. Consequences are discussed which supported throughout by sustained linkage to a range of scientific ideas, processes, techniques and procedures. The discussion shows a well-developed and sustained line of scientific reasoning which is clear and logically structured.	Level 2 plus consideration of the benefits of increased {glucose/protein/calcium pectate} to the plant and the cost involved / other benefits of eggshells

Question Number	Answer	Additional guidance	Mark
6(a)(i)	• role of an organism in its {environment / habitat / ecosystem} (1)	accept species/octopus etc for organism ignore animal ACCEPT niche includes all of the abiotic and biotic aspects of the (organisms) habitat (1)	**(1)**

Question Number	Answer	Additional guidance	Mark
6(a)(ii)	• anatomical / physiological (1)	accept phonetic spellings accept anatomic ignore physical	**(1)**

Question Number	Answer	Additional guidance	Mark
6(a)(iii)	An answer that makes reference to the following points: • (looking like a flat fish) therefore {more likely to catch prey / reduce risk of predation / camouflaged} (1) • (looking like a venomous sea snake) reduced predation / less likely to be eaten / predators would avoid venomous prey (1)	accept {predators / prey} will not {see / recognise} them / hide from predators / blend into environment / lure prey / enter flat openings accept they can get among flat fish to prey on them ignore reduce {competition / predation} from flat fish ignore hide unqualified accept protection from {predators / sea snakes} increase survival chance accept scare predators away / deter predators / look like a predator instead of prey ignore defending themselves with venom/eq **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.	**(2)**

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		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
6(b)(i)	The only correct answer is A control *B is not correct because the current pain-relieving drug is used as a control* *C is not correct because the current pain-relieving drug is used as a control* *D is not correct because the current pain-relieving drug is used as a control*	**(1)**

Question Number	Answer	Additional guidance	Mark
6(b)(ii)	A description that makes reference to four of the following points: • (stage I) testing on healthy {people / volunteers} (without cancer) (1) • (stage III) testing on {1000 to 3000 / large number of} **cancer** patients (1) • double blind trial (1) even if in stage II • analysis of results with (appropriate) statistical test / test for significant difference / review by independent {scientists / medics/FDA} (to see if work can progress to next stage) (1) • identification of appropriate {concentrations / dosage} (1)	accept computer modelling accept testing on {human cells / human tissues / animals} ignore patients unqualified ignore patients with {pain/ disease} accept description of double blind accept peer review by scientists ignore {comparing results / analysis} unqualified accept {identification of / rule out} {side effects / adverse reactions / toxicity / how drug is metabolised}	**(4)**

Question Number	Answer	Additional guidance	Mark
6(c)	An answer that makes reference to four of the following points: • idea that both drugs provide pain relief / current drug provides 35 hours of pain relief / tetrodoxin provides 460(+) hours of pain relief / few patients experience the longest pain relief (1) • tetrodoxin more effective pain relief drug / converse (1) • consideration of subjective nature of {pain / duration of pain relief} (1) • {small sample size / no repeats / no SD / no error bars / no statistical test} **linked** to {validity/reliability/ significance} (1) • no information on age / sex / lifestyle / type of cancer / dosage / side effects etc (1)	Piece together accept {same trend / largest decrease} {at the beginning / suitable stated time} accept linear decrease for current pain-reliving drug whereas {non-linear / exponential} decrease for tetrodoxin accept tetrodoxin {has longer period of pain relief / lasts longer / is better pain relief drug} / converse awarding mp2 means mp1 as well e.g. different people have different pain tolerance accept carried out on (only) {100 to 500} (cancer) patients / each group contained (only) {50 to 250) (cancer) patients ignore no information about sample size accept gender	**(4)**

Question Number	Answer	Mark
7(a)(i)	The only correct answer is D a solid ball of totipotent cells *A is not correct because a morula is not a hollow balls of cells* *B is not correct because a morula is not a hollow balls of cells* *C is not correct because a morula contains totipotent cells*	**(1)**

Question Number	Answer	Additional guidance	Mark
7(a)(ii)	An answer that makes reference to the following points: • (source of) {fatty acids / glycerol / lipids / amino acids / substrate / glucose / energy / ATP} **<u>for</u>** {respiration / metabolic reactions / protein synthesis / growth of embryo / development of embryo / new cells / mitosis}	candidates may refer to morula / blastocyst / zygote / embryo ignore nutrients / food accept a source or store of something relevant and then a relevant reason why Please note energy & ATP could be in LHS or RHS bracket e.g. energy for mitosis / lipids as a source of energy	**(1)**

Question Number	Answer	Additional guidance	Mark
7(b)	A description that makes reference to five of the following points: • differential gene expression occurred (1) • only genes needed for **skeletal muscle** cell formation are {active / switched on} (1) • due to {epigenetic modification / histone modification / DNA methylation} (1) • only {active / switched on/ skeletal muscle} genes are transcribed (into mRNA) (1) • translation (of mRNA) occurs (at the ribosome) (1) • (resulting in) formation of proteins needed in {skeletal **muscle** cells / mitochondria / muscle contraction} (1)	accept muscle cells for skeletal muscle cells accept genes not required in **skeletal muscle** cells are switched off accept transcription factors accept description e.g. acetyl group added to histone accept correct references to splicing of pre-mRNA accept responses which merge mp3 and mp4 together correctly e.g. acetylation of the gene allows it to be transcribed accept named {proteins / structures} in skeletal muscle cells accept proteins produced (permanently) modify the cell into a **skeletal muscle cell**	**(5)**

Question Number	Answer	Additional guidance	Mark
7(c)(i)	A calculation in which: • reading value from graph and subtracting (1) • calculation of number of cells in interphase	<u>Example of calculation:</u> 100 – 5 = 95 **or** 5% of 2000 =100 (95÷ 100) × 2000 = 1900 1832 = 1 mark (for correct calculation done with OVCAR5 value) ecf for wrong number from graph between 4.8 to 5.2 = 1896 to 1904 Correct answer scores full marks	**(2)**

These are the most common credit worthy responses – but please follow the MS at all times for other responses

1	2
100	1900
95	
1832	
1896	
1897	
1898	
1899	
1901	
1902	
1903	
1904	

Question Number	Answer	Mark
7(c)(ii)	The only correct answer is A HOC8 *B is not correct because OVCAR5 does not have the highest mitotic index* *C is not correct because OVCAR8 does not have the highest mitotic index* *D is not correct because SKOV3 does not have the highest mitotic index*	**(1)**

Question Number	Answer	Additional guidance	Mark
7(c)(iii)	An explanation that makes reference to the following points: • (use of embryonic stem cells) means destruction of an embryo (1) • (which some people consider to be) an {ethical / moral} issue (1) IMP	accept (use of embryonic stem cells) means the {embryo / potential life} is killed ignore harmed ignore embryo is a potential life unqualified accept the candidate's view that it is unethical / morally wrong accept the embryos cannot give consent accept {for religious reasons / against their beliefs}	**(2)**

Question Number	Answer	Additional guidance	Mark
8(a)(i)	• Z		**(1)**

Question Number	Answer	Additional guidance	Mark
8(a)(ii)	• cortical granule(s)	Mark 1st answer accept cortical vesicle accept phonetic spellings ignore contractile granules ignore cortical enzymes	**(1)**

Question Number	Answer	Mark
8(b)(i)	The only correct answer is B one *A is not correct because the acrosome is a membrane bound sac containing digestive enzymes* *C is not correct because mitochondria perform aerobic respiration and the nucleus contains linear DNA* *D is not correct because mitochondria perform aerobic respiration and the nucleus contains linear DNA*	**(1)**

Question Number	Answer	Additional guidance	Mark
8(b)(ii)	4.48 : 1 / 4.5:1	accept answer in range 4.3 to 4.7 ignore 4:1	**(1)**

Question Number	Answer	Additional guidance	Mark
8(b)(iii)	An answer that makes reference to the following points: • the (mean) swimming speed (of sperm cells) increases as width of helical membrane increases (1) • **Reed bunting** males (need sperm cells with faster swimming speeds as they) compete with other males / the female **Reed bunting** mates with more than one male (1) • {faster swimming sperm cells / larger helical membranes} are more likely to {**fertilise** egg cells / form a zygote / have their alleles inherited} (before other males' sperm) (1) • males with larger acrosome (to nucleus ratio are more likely to) {have a quicker acrosome reaction / digest the zona pellucida (more) quickly} (1)	max 3 without reference to reed bunting or nuthatch accept swimming speed increases as membrane increases / converse accept wide helical membrane increases swimming speed / converse accept Reed bunting sperm cells will have a fast (mean) swimming speed / converse for Nuthatch accept converse for **Nuthatch** accept converse accept selection pressure linked to either graph /table info ignore reaching egg cell first accept larger acrosome (to nucleus ratio) have more digestive enzymes	**(4)**

Question Number	Answer	Additional guidance	Mark
8(c)	An answer that makes reference to the following points: • can reproduce with any blue dragon they encounter / in any one encounter both can have fertilised eggs (1) • increased number of {offspring produced / population} (in a certain time period) (1) IMP • (sexual reproduction) increases genetic {variation / diversity} (1)	ignore can mate with both males and females accept both can be fertilised / higher chance of {finding a mate / reproduction} ignore self-fertilisation accept increased {chance of fertilisation / reproductive success / fertilised gametes} accept low risk of extinction / increase chance of survival (of species) **do not award mp2 in context of self-fertilisation** accept (sexual reproduction) allows genetic {diversity / variation} accept genetic variation means less susceptible to environmental changes ignore increased biodiversity unqualified ignore inbreeding	**(3)**

Question Number	Answer	Additional guidance	Mark
8(d)	• calculation of q (1) • calculation of number of cats with genotype BB (1) • calculation of number of cats with genotype Bb (1)	√0.16 = 0.4 (or if you see 0.6 in working) $(0.6^2) \times 100 = 36$ $(2 \times 0.4 \times 0.6) \times 100 = 48$ both correct cat numbers scores full marks no ecf	**(3)**

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