

Mark Scheme (Results)

Summer 2021

Pearson Edexcel International GCSE In Biology (4BI1) Paper 2B

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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)	An answer that makes reference to two of the following points: • so that sperm can swim / can reach egg / otherwise they cannot swim / otherwise they cannot reach egg / eq (1) • can fertilise egg / fertilisation can occur / (if abnormal) will not fertilise egg (1) • so (initial) fertility is not reduced / or (if abnormal) fertility of these men will (already) be reduced (1)	**2**

Question Number	Answer	Mark
1(b)(i)	An explanation that makes reference to two of the following points: • thickens / maintains, uterine wall / lining / endometrium / maintains pregnancy / eq (1) • inhibits FSH production / prevents more eggs maturing / eq (1) • inhibits LH production / prevents ovulation / eq (1)	**2**

Question Number	Answer	Mark
1(b)(ii)	• male sex hormone / increase male hormone level (1) • because progestin reduces testosterone / eq (1)	**1**

Question Number	Answer	Mark
1(b)(iii)	• testes / testicles (1)	**1**

Question Number	Answer	Mark
1(c)(i)	• reduce sperm production / eq (1)	**1**

Question Number	Answer	Mark
1(c)(ii)	• to measure if sperm count fell / below 1 million per cm^3 / fertility dropped / eq (1)	**1**

Question Number	Answer	Mark
1(c)(iii)	• prevent fertilisation / eq, as sperm production may be above 1 million per cm^3 / still high / eq (1)	**1**

Question Number	Answer	Mark
1(d)	• to ensure sperm production stays below 1 million per cm^3 / stays low / eq (1) • to see if, the treatment / progestin works / lowers sperm production (1)	**1**

Question Number	Answer	Additional guidance	Mark
1(e)	• 98.4 x 320/100 = 314.88 • = 320 - 315 • 5 (2) 100 - 98.4 = 1.6 % 1.6 × 320 / 100 = 5.12 = 5 (2)	**Allow** 1 mark for 315 or 1.6 in working **Allow** 5.1 or 5.12 award full marks for correct answer no working	**2**

Question Number	Answer	Mark
1(f)	An answer that includes any 4 of the following points *(For / positive about method)* • reduces pregnancy / 98.4 % work / (very) effective / eq (1) • 75% / most men / partners / couples, happy to continue (1) • do not need to be remember to take / eq (1) • does not require surgery / reversible (1) • no need for women to take hormones (1) *(Against / negative about method)* • side effects / acne / mood disorders / skin infections / skin irritation / eq (1) • does not protect against STI / named disease / eq (1) • suppression phase takes a long time / 26 weeks / eq (1) • may not be reversible / reduce long term male fertility / may take time to reverse / eq (1)	**4**

total =16 marks

Question Number	Answer	Mark
2(a)	An answer that makes reference to two of the following points: • cytoplasm (1) • ribosomes (1) • cell membrane (1) • DNA (1)	**2**

Question Number	Answer	Mark
2(b)(i)	The only correct answer is B bacteria are pathogens *A is not correct because it is not possible to conclude that the bacteria are decomposers* *C is not correct because it is not possible to conclude that the bacteria are microscopic* *D is not correct because it is not possible to conclude that the bacteria are non-living*	**1**

Question Number	Answer	Mark
1(b)(ii)	An answer that makes reference to two of the following points: • vaccination / inoculated (1) • (same) antigens / (same) protein (on bacteria) (1) • <u>secondary</u> immune response (1) • memory cells (1) • (make) <u>large numbers</u> antibodies / (make) antibodies produced <u>fast</u> / <u>soon</u> / eq (1)	**4**

Total = 7 marks

Question Number	Answer	additional guidance	Mark
3(a)(i)	An answer that makes reference to the following points: • extension / pointed / elongated / eq (1) • increased surface area / increased surface area to volume ratio (1)	**Allow** from labelled diagram	**2**

Question Number	Answer	additional guidance	Mark
3(a)(ii)	An answer that makes reference to one of the following points: • involve (movement of) water (only) (1) • must pass through cell membrane (1)	**Allow** converse **Allow** converse	**1**

Question Number	Answer	additional guidance	Mark
3(b)(i)	An explanation that makes reference to three of the following points: • more water taken up in light (1) • more water lost in light (1) • evaporation from leaves creates a transpiration stream / transpiration pull / sets up water potential gradient / eq (1) • stomata open in light (1) • (more water is taken up than lost because) water used to fill cells / growth / turgor/ photosynthesis (1)	**Allow** converse **Allow** converse **Allow** converse Ignore refs to temp	**3**

Question Number	Answer	additional guidance	Mark
3(b)(ii)	An answer that makes reference to two of the following points: • humidity / moisture (1) • temperature (1) • wind / air flow / eq (1) • time (1)	Ignore CO_2	**2**

Question Number	Answer	Mark
3(c)(i)	potometer / bubble potometer / volume potometer (1)	**1**

Question Number	Answer	Additional guidance	Mark
3(c)(ii)	An answer that makes reference to three of the following points: • measure distance bubble moves (1) • calibrate (scale) / calculate volume by multiplying distance by (cross sectional) area / eq (1) • use reservoir to reset / eq (1) • repeats (to calculate mean) (1) • ref to measuring / stated time (1)	• measure volume lost from beaker (1) • use scale on beaker / note volume before and after time period (1)	**3**

Total = 12 marks

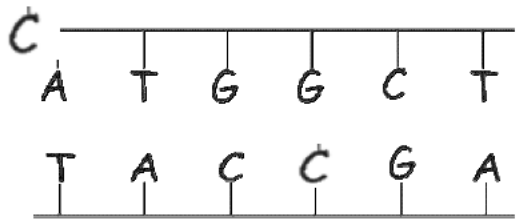
Question Number	Answer	Additional guidance	Mark
4(a)	• unfiltered increase of 28.5g • growth rate in unfiltered 28.5 ÷ 180 = 0.158 • 0.214 - 0.158 = 0.056 (3) or 38.5-28.5 = 10 kg 10 ÷180 = 0.056 allow 0.05 recurring	**Allow** 1 mark for 28.5 or 10 kg **Allow** 1 mark for ÷ 180 **Allow** 0.0556 or 0.055 recurring for 3 marks Award full marks for correct numerical answer without working	**3**

Question Number	Answer	Mark
4(b)	An explanation that makes reference to three of the following points: • (in unfiltered water there is) less growth / eq (1) • less oxygen (1) • less respiration (1) • more disease / damage gills / eq (1)	**3**

Question Number	Answer	Mark
4(c)	• species / type / mass of fish (at start) / eq (1)	**1**

Question Number	Answer	Mark
4(d)	• use a net /cage / shoot predators / make noise / eq (1)	**1**

Total = 8 marks

Question Number	Answer	Mark
5(a)		**1**

Question Number	Answer	Mark
5(b)(i)	The only correct answer is C 7.5 *A is not correct as is not 2.5* *B is not correct as is not 4.5* *D is not correct as is not 8.5*	**1**

Question Number	Answer	Mark
5(b)(ii)	An explanation that makes reference to the following points: • lower / eq (1) • denatured / change in shape of active site / eq (1) • urea does not bind (into active site) / fewer E/S complexes / eq (1)	**2**

Question Number	Answer	additional guidance	Mark
5(c)	A description that makes reference to five of the following points: • nitrogen fixing / fixation (1) • (nitrogen fixing / fixation) nitrogen gas to ammonia (1) • nitrifying / nitrification (1) • (nitrifying / nitrification) ammonia to nitrite / nitrite to nitrate / ammonia to nitrate (1) • denitrifying /denitrification (1) • (denitrifying /denitrification) nitrate to nitrogen gas / reduces nitrogen available to plants / eq (1)	**Allow** nitrogen to nitrates / amino acids /eq eg nitrifying bacteria convert nitrate to nitrogen gas scores mp 3 but not mp 4	**5**

Total = 9 marks

Question Number	Answer	Mark
6(a)(i)	The only correct answer is C *A is not correct as ultrafiltration does not take place in A* *B is not correct as ultrafiltration does not take place in B* *D is not correct as ultrafiltration does not take place in D*	**1**

Question Number	Answer	Mark
6(a)(ii)	The only correct answer is D *A is not correct as reabsorption does not take place in A* *B is not correct as reabsorption does not take place in B* *C is not correct as reabsorption does not take place in C*	**1**

Question Number	Answer	Mark
6(b)(i)	• osmoregulation (1)	**1**

Question Number	Answer	additional guidance	Mark
6(b)(ii)	• removal of metabolic waste / waste from chemical reactions (from cells) (1)	Ignore waste removal	**1**

Question Number	Answer	Mark
6(c)	An explanation that makes reference to the following points: • collecting duct (1) • impermeable / less permeable / no change in permeability / eq (1) • less water reabsorbed / water is not reabsorbed / less water back into blood / eq (1) • more urine produced / dilute urine produced / more water lost / dehydration / eq (1) • blood concentration increases / eq (1)	**4**

Question Number	Answer	Mark
6(d)(i)	• increases permeability of collecting duct (wall) / becomes permeable / will now be permeable / eq (1)	**1**

Question Number	Answer	Mark
6(d)(ii)	An answer that makes reference to the following points: • decrease (volume) / less urine / eq (1) • increase concentration / eq (1)	**2**

Total = 11 marks

Question Number	Answer	Mark
7(a)	• population (1)	**1**

Question Number	Answer	Mark
7(b)(i)		**2**

Species	Field A		Field B	
	Number of each plant	**Percentage (%) of each species**	**Number of each plant**	**Percentage (%) of each species**
daisy	19	76	15	**32**
dandelion	**4**	16	18	38
buttercup	**2**	8	14	30
total	25		47	

Scores one mark for 4 and 2 (1)
Scores one mark for 32(%) (1)

Question Number	Answer	additional guidance	Mark
7(b)(ii)	An explanation that makes reference to two of the following points: • (although) both / A and B, have 3 different species / same number of species / eq / (1) • B (is more diverse) because it has more even / similar numbers of each species / eq (1)	**Allow** converse	**2**

Question Number	Answer	additional guidance	Mark
7(c)	An explanation that makes reference to the following points: • named mineral / nitrate / magnesium (1) • correct function / amino acids/ protein / chlorophyll / photosynthesis /eq (1)	 **Allow** other correct named minerals award mp 2 only if correct mineral given **Ignore** nitrogen e.g. Nitrogen for amino acids is one mark only	**2**

total = 7 marks

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