Mark Scheme (Results)

Summer 2021

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

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

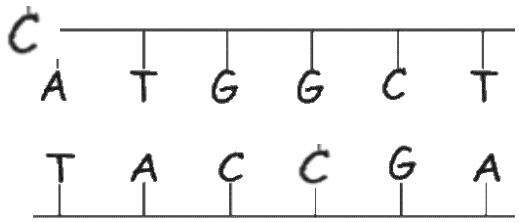
Question Number	Answer	Additional guidance	Mark
4(a)	• unfiltered increase of 28.5g • growth rate in unfiltered 28.5 ÷ 180 = 0.158 • 0.214 - 0.158 = 0.056 (3) or 38.5-28.5 = 10 kg 10 ÷180 = 0.056 allow 0.05 recurring	**Allow** 1 mark for 28.5 or 10 kg **Allow** 1 mark for ÷ 180 **Allow** 0.0556 or 0.055 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)	<table><tr><td rowspan="2">Species</td><td colspan="2">Field A</td><td colspan="2">Field B</td></tr><tr><td>**Number of each plant**</td><td>**Percentage (%) of each species**</td><td>**Number of each plant**</td><td>**Percentage (%) of each species**</td></tr><tr><td>daisy</td><td>19</td><td>76</td><td>15</td><td>**32**</td></tr><tr><td>dandelion</td><td>**4**</td><td>16</td><td>18</td><td>38</td></tr><tr><td>buttercup</td><td>**2**</td><td>8</td><td>14</td><td>30</td></tr><tr><td>total</td><td>25</td><td></td><td>47</td><td></td></tr></table> Scores one mark for 4 <u>and</u> 2 (1) Scores one mark for 32(%) (1)	**2**

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