



# Mark Scheme (Results)

Summer 2019

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

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Question Number	Answer	Additional guidance	Mark
<b>1(a)</b>	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>• (burning) <u>fossil</u> fuels / use <u>fossil</u> fuels / use coal / use oil / use gas / eq (1)</li> <li>• deforestation / cutting down trees (1)</li> <li>• increasing population / eq (1)</li> </ul>	Ignore more cars / factories	<b>2</b>

Question Number	Answer	Mark
<b>1(b)</b>	<p>An answer makes reference to one of the following points:</p> <ul style="list-style-type: none"> <li>• wind blows CO<sub>2</sub> away / eq (1)</li> <li>• (computer) maintain / control / alter CO<sub>2</sub> concentration (1)</li> <li>• (wind affects) stomatal opening / transpiration / concentration gradient / absorption of CO<sub>2</sub> / eq (1)</li> </ul>	<b>1</b>

Question Number	Answer	Additional guidance	Mark
<b>1(c)</b>	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> <li>• (more valid) as similar to natural world / nature / eq (1)</li> <li>• different plants / ecosystem / more species / community / eq (1)</li> <li>• temperature / humidity / rain / light not maintained / controlled (1)</li> </ul>	<p>Allow converse for all Mps</p> <p>Mp 2 Ignore larger scale</p> <p>Mp3 Ignore wind direction / wind speed / monitored / pH / ions</p>	<b>3</b>

Question Number	Answer	Additional guidance	Mark
<b>1(d)</b>	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>• CO<sub>2</sub> used / required / needed / taken in / absorbed / reactant for / eq (1)</li> <li>• produce carbohydrate / starch / glucose / sugar / eq (1)</li> <li>• low concentration limits (photosynthesis) / is limiting factor / eq (1)</li> </ul>	<p>Mp1 and Mp2 Allow if in equation</p>	<b>2</b>

Question Number	Answer	Additional guidance	Mark
<b>1(e)</b>	<p>A description that makes reference to four of the following points:</p> <ul style="list-style-type: none"> <li>• (weight / bubble) potometer / eq (1)</li> <li>• measure bubble movement / original and final position / change in mass / weigh and reweigh / eq (1)</li> <li>• reference to time / eq (1)</li> <li>• control of named abiotic factor / light / temperature / humidity (1)</li> <li>• repeat / obtain average (1)</li> </ul>	<p>Mp 4 Ignore cover soil or plant with polythene</p>	<b>4</b>

Question Number	Answer	Mark
<b>1(f)</b>	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>• affects CO<sub>2</sub> absorption / eq (1)</li> <li>• affects water loss / transpiration / eq (1)</li> </ul>	<b>2</b>

Question Number	Answer	Mark
1(g)	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> <li>• use renewable energy / wind / solar / eq (1)</li> <li>• use less <u>fossil</u> fuel / coal / oil / gas / eq (1)</li> <li>• use public transport / cycling / road tax / hybrid / electric cars / less cars / less vehicles / eq (1)</li> <li>• prevent deforestation / plant trees / eq (1)</li> <li>• fewer cattle (1)</li> <li>• less rice farming / paddy fields (1)</li> <li>• less CFC / methane (CH<sub>4</sub>) / nitrous oxide (N<sub>2</sub>O) / ozone (O<sub>3</sub>) / chlorofluorocarbons (CFCs) / hydrofluorocarbons (HCFCs and HFCs) / air conditioning / refrigerator / aerosols / eq (1)</li> </ul>	3

Total 17 marks

Question Number	Answer	Additional guidance	Mark
2(a) (i)	<ul style="list-style-type: none"> <li>number of / amount / all of a species / one species / an organism (in an area / habitat) (1)</li> </ul>	Ignore group	1

Question Number	Answer	Mark
2(a) (ii)	(different/all) species / types / organisms / populations (in a habitat / area / place / environment / ecosystem)	1

Question Number	Answer	Additional guidance	Mark
2(a) (iii)	(all) organisms / community / (different / all) species / biotic factors <b>and</b> environment / area / habitat / abiotic factors / non-living factors / physical factors (1)	Ignore animals and plants	1

Question Number	Answer	Mark
2(b)	<p>The only correct answer is D acidity of soil</p> <p><i>A is not correct as availability of mates is not an abiotic factor</i></p> <p><i>B is not correct as number of pathogens is not an abiotic factor</i></p> <p><i>C is not correct as number of predators is not an abiotic factor</i></p>	1

Question Number	Answer	Mark
2©	<p>The only correct answer is B    quadrat</p> <p><i>A is not correct as a potometer is not suitable</i></p> <p><i>C is not correct as a spotting tile is not suitable</i></p> <p><i>D is not correct as a sweep net is not suitable</i></p>	1

Question Number	Answer	Additional guidance	Mark
2(d)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> <li>• more (biodiversity) in woodland (1)</li> <li>• more species / different organisms / different types / different plants / greater variety of species / more species rich / eq (1)</li> </ul>	<p>Allow converse for wheat field</p>	2

Total 7 marks

Question Number	Answer	Mark
<b>3(a)</b>	<p>The only correct answer is A cortex</p> <p><i>B is not correct as it is not in the collecting duct</i></p> <p><i>C is not correct as it is not in the loop of Henle</i></p> <p><i>D is not correct as it is not in the medulla</i></p>	<b>1</b>

Question Number	Answer	Additional guidance	Mark
<b>3(b)</b>	64 to 66 (1)	Allow mark if seen on graph	<b>1</b>

Question Number	Answer	Mark
<b>3(c)</b>	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> <li>• protein large (molecule) (1)</li> <li>• cannot enter Bowman's capsule / cannot leave blood / cannot pass through glomerulus / basement membrane / capillaries (1)</li> <li>• glucose (re)absorbed / glucose into blood / glucose into capillaries (1)</li> <li>• proximal convoluted tubule / by active transport / diffusion (1)</li> <li>• urea concentration higher / increased (1)</li> <li>• because water (re)absorbed / water into blood / water into capillaries / urea secreted / urea added to urine (1)</li> </ul>	<b>4</b>

Total 6 marks



Question Number	Answer	Additional guidance	Mark
4(a)(i)	<p>An answer that makes reference to two the following points:</p> <ul style="list-style-type: none"> <li>more poisonous / toxic / dangerous to a cat / cats are more susceptible / cats more easily poisoned / smaller amount needed to poison cat / less required to poison cats / eq (1)</li> <li>by 6 times / 600% / over 1000 / 1065 mg more (1)</li> </ul>	<p>Ignore just quoting figures alone</p> <p>Ignore immunity</p> <p>Allow converse</p>	2

Question Number	Answer	Additional guidance	Mark
4(a)(ii)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>they would need to eat 350 bars (2)</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>(for a 70 kg person) each bar provides only 2.86 (mg per kg) (2)</li> </ul>	<p>Allow full marks for correct answer without working</p> <p>calculation <math>1000 \times 70 = 70\ 000</math></p> <p><math>70000 \div 200 = 350</math></p> <p>OR</p> <p><math>200 \div 70 = 2.86</math></p> <p>1 mark for <b>200</b> (mg) (less than) <b>70 000</b></p>	2

Question Number	Answer	Additional guidance	Mark
4(b)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> <li>• osmoregulation / homeostasis (1)</li> <li>• collecting duct (1)</li> <li>• less / not permeable (1)</li> <li>• less water (re)absorbed / less water in <u>blood</u> / blood more concentrated / dehydration (1)</li> <li>• more urine / more water in urine / dilute urine / urine not concentrated (1)</li> </ul>		4

Question Number	Answer	Additional guidance	Mark
4(c)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>• (same) volume / <math>\text{cm}^3</math> / mass / g of water (1)</li> <li>• temperature change / rise / before and after (burning) (1)</li> <li>• (same) mass of chocolate / food (1)</li> <li>• mass <b>of water</b> (<math>\text{g}/\text{cm}^3</math>) <math>\times</math> temperature rise (<math>^{\circ}\text{C}</math>) (<math>\times 4.2</math>) <math>\div</math> mass of chocolate (g)</li> </ul>	<p>Allow Mps 1 2 and 3 in formula Mp 1 Ignore amount</p> <p>Reject unexplained symbols</p> <p>Mp 4 mass of chocolate not needed if same mass of chocolate</p>	4

Total 12 marks

Question Number	Answer	Additional guidance	Mark
5(a)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>(less) oxygen (transported) (1)</li> <li>respiration / more <u>anaerobic</u> respiration (1)</li> </ul>	Less aerobic respiration = 2	2

Question Number	Answer	Mark								
5(b)	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Genotype of parents</th> <th>Percentage of offspring likely to have PFK</th> </tr> </thead> <tbody> <tr> <td>both homozygous dominant</td> <td>0</td> </tr> <tr> <td>heterozygous x heterozygous</td> <td>25 (1)</td> </tr> <tr> <td>heterozygous x homozygous recessive</td> <td>50 (1)</td> </tr> </tbody> </table>	Genotype of parents	Percentage of offspring likely to have PFK	both homozygous dominant	0	heterozygous x heterozygous	25 (1)	heterozygous x homozygous recessive	50 (1)	2
Genotype of parents	Percentage of offspring likely to have PFK									
both homozygous dominant	0									
heterozygous x heterozygous	25 (1)									
heterozygous x homozygous recessive	50 (1)									

Question Number	Answer		Mark
5(c)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>(all) offspring are homozygous dominant / none with recessive allele / none with affected allele / none heterozygous / none are carriers (1)</li> <li>all offspring normal / no offspring have PFK (1)</li> </ul>	Ignore less likely	2

Question Number	Answer	Mark
5(d)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>offspring all healthy/none have PFK means dog is homozygous (dominant) / no recessive allele (1)</li> <li>offspring 50% healthy/some have PFK means dog is heterozygous / carrier / has recessive allele (1)</li> </ul>	2

Question Number	Answer	Mark
<b>5(e)(i)</b>	<p>The only correct answer is D    GUCCAUACC</p> <p><i>A is not correct as the sequence CAGGTATGG is wrong</i></p> <p><i>B is not correct as the sequence CAGGUAUGG is wrong</i></p> <p><i>C is not correct as the sequence GTCCATAACC is wrong</i></p>	<b>1</b>

Question Number	Answer	Mark
<b>5(e)(ii)</b>	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> <li>• T replaces G / G is replaced by T / GTA to TTA (1)</li> <li>• different mRNA / codon (1)</li> <li>• (different) tRNA / anticodon (1)</li> <li>• different amino acid(s) (1)</li> </ul>	<b>3</b>

Total 12 marks

Question Number	Answer	Mark
<b>6(a)(i)</b>	<ul style="list-style-type: none"> <li>LH / luteinising hormone (1)</li> </ul>	<b>1</b>

Question Number	Answer	Mark
<b>6(a)(ii)</b>	<ul style="list-style-type: none"> <li>release of <u>egg</u> / <u>ovum</u> / <u>ova</u> (1)</li> </ul>	<b>1</b>

Question Number	Answer	Mark
<b>6(b)</b>	<ul style="list-style-type: none"> <li>progesterone (1)</li> </ul>	<b>1</b>

Question Number	Answer	Mark
<b>6(c)</b>	<ul style="list-style-type: none"> <li>ovary / ovaries / corpus luteum / placenta / follicle (1)</li> </ul>	<b>1</b>

Total 4 marks

Question Number	Answer	Additional guidance	Mark
<b>7(a)(i)</b>	<ul style="list-style-type: none"> <li>• <math>56 \div 146 \times 100</math></li> <li>• <math>74 \div 167 \times 100</math></li> <li>• <math>44 - 38 = 6\%</math></li> </ul> <p>5.9 to 6.0 (3)</p>	<p>award full marks for correct numerical answer without working</p> <p>Allow one mark for 38 to 38.4 in working</p> <p>Allow one mark for 44 to 44.31 in working</p>	<b>3</b>

Question Number	Answer	Additional guidance	Mark
<b>7(a)(ii)</b>	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> <li>• increase in (total) supply (1)</li> <li>• increase in farmed (1)</li> <li>• no / little change in wild fish / decrease and increase in wild fish / wild fish fluctuates / wild fish increases <u>slightly</u> / eq (1)</li> </ul>	Ignore quoting values alone	<b>3</b>

Question Number	Answer	additional guidance	Mark
<b>7(b)</b>	<p>An answer that makes reference to six of the following points:</p> <ul style="list-style-type: none"> <li>• selective breeding / GM (1)</li> <li>• separate sizes / ages / sex (1)</li> <li>• use nets / cages / cover / eq (1)</li> <li>• control amounts of food / frequency of feeding / protein rich (1)</li> <li>• remove uneaten food / waste / filter / change water / remove faeces / eq (1)</li> <li>• antibiotics / fungicide / vaccination / remove dead fish / biological control / wrasse / pesticide (1)</li> <li>• oxygen / aerate / use paddles / flowing water (1)</li> <li>• growth hormone / oestrogen(s) (1)</li> </ul>	<p>Mp 5 Ignore clean alone</p> <p>Mp6 Ignore medicine</p>	<b>6</b>

Total 12 marks

