



Mark Scheme (Results)

Summer 2019

Pearson Edexcel International GCSE
In Biology (4BI1) Paper 1BR

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Question Number	Answer	Mark
1(a)	<p>D owl</p> <p><i>A is incorrect because corn is a producer</i></p> <p><i>B is incorrect because the grasshopper is a primary consumer</i></p> <p><i>C is incorrect because the mouse is a primary consumer</i></p>	1

Question Number	Answer	Mark
1(b)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • <u>photosynthesis</u> (1) • (light energy to) <u>chemical</u> energy / ATP (1) • carbohydrate / sucrose / glucose / starch (1) 	2

Question Number	Answer	Additional guidance	Mark
1(c)	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • respiration / movement / heat loss (1) • egested / undigested / faeces / not absorbed / not assimilated (1) • excretion / urine / urea (1) • uneaten / bone / teeth / fur (1) • death / <u>decomposition</u> (1) 	<p>Excreted as faeces = 1</p>	3

Question Number	Answer	Additional guidance	Mark
1(d)(i)	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • hyphae / mycelium (1) • enzymes / named enzyme (1) • extracellular <u>digestion</u> / <u>digestion</u> outside fungus (1) • <u>absorption</u> / <u>absorbed</u> (1) • saprotrophic / saprophytic / saprobiontic (1) 	<p>Ignore breakdown</p> <p>Ignore reabsorbed</p> <p>Allow parasitic</p>	3

Question Number	Answer	Mark
1(d)(ii)	<p>C rabbit</p> <p><i>A is incorrect because grass is not hunted by predators</i></p> <p><i>B is incorrect because the owl is a predator</i></p> <p><i>D is incorrect because the snake is a predator</i></p>	1

Question Number	Answer	Mark
1(e)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> • takes long(er) / increases time / digestion slow(er) (1) • whole mouse has a small(er) surface area (to volume ratio) / <p>chewed mouse has larg(er) surface area (to volume ratio) (1)</p>	2

Total 12 mark

Question Number	Answer	Additional guidance	Mark
2(a)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> • S scale linear and half the grid (1) • L straight lines joining points (1) • A axes correct way around and labelled 'days' and 'number of cells $\times 10^3$' (1) • P points plotted correctly within one square (1) • K key shown (1) 	<p>Allow truncated y axis</p> <p>Bar graph loses S and L</p> <p>Extrapolation to 0 loses L</p> <p>Non-linear scale loses S and P</p>	5

Question Number	Answer	Mark
2(b)	<p>B number of cells</p> <p><i>A is incorrect because germination rate is not measured in the investigation</i></p> <p><i>C is incorrect because pollution is the independent variable</i></p> <p><i>D is incorrect because time after germination is an independent variable</i></p>	1

Question Number	Answer	Mark
2(c)(i)	<ul style="list-style-type: none"> • mitosis 	1

Question Number	Answer	Additional guidance	Mark
2(c)(ii)	<p>An answer that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • temperature (1) • affects enzymes (1) <p>or</p> <ul style="list-style-type: none"> • water / moisture (1) • solvent / activates enzymes / dissolve chemicals / reactions (1) <p>or</p> <ul style="list-style-type: none"> • oxygen (1) • respiration (1) <p>or</p> <ul style="list-style-type: none"> • (sun)light (1) • phytochrome (1) <p>or</p> <ul style="list-style-type: none"> • pH (1) • affects enzymes (1) 	<p>Mp1 Ignore warmth / heat / cold</p> <p>Mp3 Ignore humidity</p>	4

Question Number	Answer	Additional guidance	Mark
2(c)(iii)	<p>An answer that makes reference to the following point:</p> <ul style="list-style-type: none"> • age / species / type / variety / size / mass 	<p>Allow from same plant</p> <p>Ignore microbes / pests</p>	1

Total 12 marks

Question Number	Answer	Additional guidance	Mark
3	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> • <u>tropism(s)</u> / tropic (responses) (1) • to / toward(s) / (move) towards (1) • phototropic / phototropism (1) • auxin / IAA (1) • gravity (1) • negative (1) 	<p>Trophism = 0 Phototropism = 0</p> <p>Mp3 allow phototropic</p>	6

Total 6 marks

Question Number	Answer	Additional guidance	Mark
4(a)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> • amino acids (1) • protein / enzymes (1) • DNA / RNA / ATP / chlorophyll / (1) 	<p>Nitrate contains amino acids / protein = 0</p> <p>Ignore chloroplasts</p>	2

Question Number	Answer	Mark
4(b)	<p>A small and soluble</p> <p><i>B is incorrect because mineral ions are not insoluble</i></p> <p><i>C is incorrect because mineral ions are not large</i></p> <p><i>D is incorrect because mineral ions are not large and insoluble</i></p>	1

Question Number	Answer	Additional guidance	Mark
4(c)(i)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> • fewer plants / fewer algae / less eutrophication (1) • (more) light and (more) photosynthesis (1) • (less) <u>decomposition</u> / <u>decomposed</u> / <u>decomposers</u> (1) • (more) oxygen / not anoxic / less BOD (1) • respiration (ONCE) (1) • (catch) more fish / fewer fish killed / better catch / fish survive / fish do not suffocate / eq (1) 	<p>Allow converse for all Mps</p>	4

Question Number	Answer	Additional guidance	Mark
4(c)(ii)	<p>A description that makes reference to the following points:</p> <ul style="list-style-type: none"> • restriction to (cut / eq) DNA / gene / allele / plasmid (1) • ligase to (join / eq) DNA / gene / allele / plasmid (1) 	Allow restrictive	2

Total 9 marks

Question Number	Answer	Mark
5(a)	<p>D arteries have thicker walls</p> <p><i>A is incorrect because veins transport blood to the heart</i></p> <p><i>B is incorrect because veins have a larger lumen</i></p> <p><i>C is incorrect because veins contain valves</i></p>	1

Question Number	Answer	Additional guidance	Mark
5(b)(i)	<ul style="list-style-type: none"> • correct measurement of lengths • divide decrease in diameter by diameter of lumen • multiplication to get percentage <p>42 / 41.7 / 41.67 / 41.667 / 41.6 recurring (3)</p>	<p>Award full marks for correct numerical answer without working</p> <p>36 and 15 or 36 and 21</p> <p>36 – 21 = 15 15 ÷ 36 = 0.42</p> <p>x 100 = 42</p> <p>One mark for 36 and 15 or 36 and 21 or 3.6 and 1.5 or 3.6 and 2.1</p> <p>One mark for ÷ 36 or 3.6 or their measured diameter within range 35 to 45 or 3.5 to 4.5</p>	3

Question Number	Answer	Mark
5(b)(ii)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> • becomes anaerobic (1) • (less) oxygen (1) 	2

Question Number	Answer	Additional guidance	Mark
5(c)	<p>An answer that makes reference to two the following points:</p> <ul style="list-style-type: none"> • smoking / nicotine (1) • lack of exercise / sedentary lifestyle (1) • salt (1) • stress (1) • alcohol (1) • sex (1) • age (1) • <u>high</u> blood pressure (1) • obesity (1) • high carbohydrate diet / eq (1) • diabetes (1) • genes / genetics / eq (1) 	<p>Allow family history / inheritance</p>	2

Question Number	Answer	Additional guidance	Mark
5(d)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • <u>vasodilation</u> (1) • (more) blood to surface / skin (1) • heat loss / cooling / prevents overheating (1) • radiation / convection (1) • affect enzymes (1) 	<p>Allow converse</p> <p>Mp2 blood vessel moves close to surface = 0</p>	4

Total 12 marks

Question Number	Answer	Additional guidance	Mark
6(a)	<ul style="list-style-type: none"> <i>Lactobacillus</i> / <i>Lactobacillus bulgaricus</i> / <i>L. bulgaricus</i> / <i>Streptococcus</i> / <i>Streptococcus thermophilus</i> / <i>S. thermophilus</i> (1) 	Allow phonetic spelling	1

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

Question Number	Answer	Additional guidance	Mark
6(c)(i)	<ul style="list-style-type: none"> readings from graph line divide by number of hours <p>0.2 (2)</p>	<p>Award full marks for correct numerical answer without working</p> <p>$0.7 - 0.3 = 0.4$</p> <p>$0.4 \div 2 = 0.2$</p> <p>Allow one mark if 0.7 and 0.3 in working</p>	2

Question Number	Answer	Mark
6(c)(ii)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> fast(er) production at higher temperature / at 43°C / more produced in stated time (1) fast(er) production at low oxygen / more produced in stated time (1) no effect in first hour / no difference up to one hour / both same in first hour / both similar in first hour / both reach 0.29 after one hour (1) 	<p>3</p> <p>Allow converse for Mp1 and Mp2</p>

Total 7 marks

Question Number	Answer	Additional guidance	Mark
7(a)(i)	many/multiple/lots of genes	<p>Allow more than one gene / two or more genes</p> <p>Many genes and the environment / many characteristics by many genes = 0</p> <p>Ignore many alleles</p>	1

Question Number	Answer	Mark									
7(a)(ii)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Mode</th> <th>Median</th> </tr> </thead> <tbody> <tr> <td>females</td> <td>163 to 164</td> <td>163 to 164</td> </tr> <tr> <td>males</td> <td>176 to 178</td> <td>176 to 178</td> </tr> </tbody> </table> <p style="text-align: center;">(1) (1)</p>		Mode	Median	females	163 to 164	163 to 164	males	176 to 178	176 to 178	2
	Mode	Median									
females	163 to 164	163 to 164									
males	176 to 178	176 to 178									

Question Number	Answer	Mark
7(a)(iii)	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • genes / alleles / chromosome (1) • (difference in) nutrition / diet / quality of food / quantity of food (1) • (difference in) <u>metabolism</u> / <u>metabolic rate</u> / <u>respiration</u> (1) • hormones / named hormone (1) • osteoporosis / less bone mass (in women) (1) 	2

Question Number	Answer	Additional guidance	Mark
7(b)(i)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • parents both Hh (1) • gametes are H and h (1) • offspring are HH, Hh, (Hh) and hh (1) • first child is hh / second child is HH or Hh (1) 	<p>Allow use of different letter</p> <p>Allow Mps 1, 2 and 3 from Punnett square</p> <p>Allow ecf for gametes only</p>	4

Question Number	Answer	Additional guidance	Mark
7(b)(ii)	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • pedigree / family history / ancestors / family tree / check parents (1) • born with condition / always had it / condition developed later in life / not born with it (1) • <u>DNA test</u> / <u>genetic test</u> (1) 	<p>If (both) parents don't have white patch it is vitiligo / not piebaldism = 2</p>	2

Total 11 marks

Question Number	Answer	Additional guidance	Mark
8(a) (i)	pull (rubber) sheet <u>down</u> / pull ring <u>down</u>	Blowing into tube and pulling sheet down = 0 Pull up and down = 0	1

Question Number	Answer	Additional guidance	Mark
8(a)(ii)	An explanation that makes reference to three of the following points: <ul style="list-style-type: none"> • increase in <u>volume</u> (1) • decrease in pressure (1) • pressure (inside) lower than atmospheric (outside) (1) • air in (1) 	Mp1 Ignore balloons Mp4 Ignore inflate / blown in	3

Question Number	Answer	Mark
8(b)	<p>An answer that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • reference to diaphragm (1) • balloons represent lungs (1) • reference to trachea / windpipe / bronchus (1) • reference to ribs / ribcage / movement of chest / ribcage / bell jar does not move (1) • reference to <u>intercostal</u> muscles (1) 	4

Question Number	Answer	Additional guidance	Mark
8(c)(i)	<p>An answer on that makes reference to the following points:</p> <ul style="list-style-type: none"> • increase diameter / width / expands the airways / bronchi / bronchioles (1) • air / oxygen into lungs / alveoli 	<p>Mp1 Ignore dilate Mp1 Allow trachea</p>	2

Question Number	Answer	Mark
8(c)(ii)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • need <u>oxygen</u> / getting less <u>oxygen</u> / short of <u>oxygen</u> / eq (1) • respiration (1) • (removal of) carbon dioxide (1) 	2

Total 12 marks

Question Number	Answer	Additional guidance	Mark
9(a)	$6\text{CO}_2 + 6\text{H}_2\text{O} \longrightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \text{ (2)}$	<p>Award no marks for word equation</p> <p>One mark for correct equation but not balanced</p> <p>Respiration equation = 0</p> <p>Ignore light / chlorophyll</p>	2

Question Number	Answer	Additional guidance	Mark
9(b)(i)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • (no) photosynthesis (1) • remove <u>starch</u> / <u>destarch</u> / cannot make <u>starch</u> (1) • respiration (1) 	Mp1 less = 0	2

Question Number	Answer	Mark
9(b)(ii)	remove carbon dioxide / remove CO ₂	1

Question Number	Answer	Mark
9(c)(i)	<p>B orange</p> <p><i>A is incorrect because iodine is not white in colour</i></p> <p><i>C is incorrect because starch is not present</i></p> <p><i>D is incorrect because iodine is not brick-red in colour</i></p>	1

Question Number	Answer	Mark
9(c)(ii)	<p>C blue-black</p> <p><i>A is incorrect because starch is not white when iodine is added</i></p> <p><i>B is incorrect because starch is not orange when iodine is added</i></p> <p><i>D is incorrect because starch is not brick-red when iodine is added</i></p>	1

Question Number	Answer	Mark
9(d)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> • control (1) • carbon dioxide not absorbed / plant has carbon dioxide / CO₂ in bell jar / carbon dioxide needed for photosynthesis <p>show <u>bell jar</u> allows photosynthesis / <u>bell jar</u> allows starch production (1)</p>	2

Total 9 marks

Question Number	Answer	Additional guidance	Mark
10(a)	<p>A description that makes reference to the following points:</p> <ul style="list-style-type: none"> • <u>carbohydrate</u> for energy / respiration (1) • lipid / fat for energy / storage / insulation / myelin / hormones / protecting organs (1) • protein for <u>growth</u> / <u>repair</u> / (named) enzyme / hormones / antibodies / neurotransmitter (1) • water as solvent / transport / reactions / temperature regulation / prevent constipation / help egestion (1) • fibre / roughage for peristalsis / move food / prevent constipation / help egestion (1) 	<p>Allow correct named hormone for Mp2 and Mp3</p> <p>Mp3 Ignore skin / nails / hair / bones</p> <p>Ignore prevents cancer</p>	5

Question Number	Answer	Additional guidance	Mark
10(b)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • vitamin A for (foetus) eyes / vision / sight (1) • vitamin C for (foetus) skin / (connective) tissue (1) • vitamin D for (foetus) bones / teeth / calcium absorption (1) • calcium for (foetus) bones / teeth / milk (1) • iron for (foetus) haemoglobin / Hb / <u>red</u> blood cells (1) • phosphate for (foetus) ATP / bones / DNA / RNA (1) 	<p>Answer makes no mention of foetus / embryo / baby = max 3</p> <p>Mp2 Ignore scurvy</p> <p>Mp3 Ignore rickets</p> <p>Allow other vitamins and minerals eg. vitamin B for nerve development</p>	4

Question Number	Answer	Mark
10(c)(i)	(70 × 126 =) 8820	1

Question Number	Answer	Additional guidance	Mark
10(c)(ii)	<ul style="list-style-type: none"> determine difference in energy requirement multiplication to get percentage <p>98.8 / 98.81 / 99 (2)</p>	<p>Award full marks for correct numerical answer without working</p> <p>overweight 84 and underweight 167 $167 - 84 = 83$ $\div 84$ percentage increase = $83 \div 84 \times 100$</p> <p>or</p> <p>$167 \times 80 = 13360$ $84 \times 80 = 6720$</p> <p>$6640 \div 6720 = 0.98809 \times 100$</p> <p>Allow one mark for 83 and 84 or 13360 and 6720</p>	2

Question Number	Answer	Additional guidance	Mark
10(c)(iii)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> use lipid / fat / glycogen / protein (1) <u>respiration</u> (1) 	Mp1 Ignore idea of not having enough lipid / protein = 0	2

Total 14 marks

Question Number	Answer	Additional guidance	Mark
11	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> • C venom and no venom / different concentration / different volumes / different amounts of venom (1) • O same species / sex / age / size of wasp (1) • R repeat / group / eq (1) • M1 number of wasps / count wasps (1) • M2 in stated time period (1) • S1 + S2 same volume of solutions / venom from same source / venom same distance from wasps / same size of container / same size dish / same temperature / light / time of day / time of year / weather / wind / other scents / eq (2) 	S2 Ignore carbon dioxide / oxygen / prey	6

Total 6 marks

