



Mark Scheme (Results)

Summer 2019

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

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Summer 2019

Publications Code 4BI1_1BR_msc_20190822

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

Question Number	Answer	Mark
1(b)	An explanation that makes reference to two of the following points: • <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)	An explanation that makes reference to three of the following points: • 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)	Excreted as faeces = 1	3

Question Number	Answer	Additional guidance	Mark
1(d)(i)	An explanation that makes reference to three of the following points: • 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)	Ignore breakdown Ignore reabsorbed Allow parasitic	3

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

Question Number	Answer	Mark
1(e)	An explanation that makes reference to the following points: • takes long(er) / increases time / digestion slow(er) (1) • whole mouse has a small(er) surface area (to volume ratio) / chewed mouse has larg(er) surface area (to volume ratio) (1)	2

Total 12 mark

Question Number	Answer	Additional guidance	Mark
2(a)	An answer that makes reference to the following points: • 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)	Allow truncated y axis Bar graph loses S and L Extrapolation to 0 loses L Non-linear scale loses S and P	5

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

Question Number	Answer	Mark
2(c)(i)	• mitosis	1

Question Number	Answer	Additional guidance	Mark
2(c)(ii)	An answer that makes reference to four of the following points: • temperature (1) • affects enzymes (1) or • water / moisture (1) • solvent / activates enzymes / dissolve chemicals / reactions (1) or • oxygen (1) • respiration (1) or • (sun)light (1) • phytochrome (1) or • pH (1) • affects enzymes (1)	Mp1 Ignore warmth / heat / cold Mp3 Ignore humidity	4

Question Number	Answer	Additional guidance	Mark
2(c)(iii)	An answer that makes reference to the following point: • age / species / type / variety / size / mass	Allow from same plant Ignore microbes / pests	1

Total 12 marks

Question Number	Answer	Additional guidance	Mark
3	An answer that makes reference to the following points: • <u>tropism(s)</u> / tropic (responses) (1) • to / toward(s) / (move) towards (1) • phototropic / phototropism (1) • auxin / IAA (1) • gravity (1) • negative (1)	Trophism = 0 Phototropism = 0 Mp3 allow phototropic	6

Total 6 marks

Question Number	Answer	Additional guidance	Mark
4(a)	An explanation that makes reference to the following points: • amino acids (1) • protein / enzymes (1) • DNA / RNA / ATP / chlorophyll / (1)	Nitrate contains amino acids / protein = 0 Ignore chloroplasts	2

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

Question Number	Answer	Additional guidance	Mark
4(c)(i)	An answer that makes reference to the following points: • 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)	Allow converse for all Mps	4

Question Number	Answer	Additional guidance	Mark
4(c)(ii)	A description that makes reference to the following points: • 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)	D arteries have thicker walls <i>A is incorrect because veins transport blood to the heart</i> <i>B is incorrect because veins have a larger lumen</i> <i>C is incorrect because veins contain valves</i>	1

Question Number	Answer	Additional guidance	Mark
5(b)(i)	• correct measurement of lengths • divide decrease in diameter by diameter of lumen • multiplication to get percentage 42 / 41.7 / 41.67 / 41.667 / 41.6 recurring (3)	Award full marks for correct numerical answer without working 36 and 15 or 36 and 21 36 – 21 = 15 15 ÷ 36 = 0.42 x 100 = 42 One mark for 36 and 15 or 36 and 21 or 3.6 and 1.5 or 3.6 and 2.1 One mark for ÷ 36 or 3.6 or their measured diameter within range 35 to 45 or 3.5 to 4.5	3

Question Number	Answer	Mark
5(b)(ii)	An explanation that makes reference to the following points: • becomes anaerobic (1) • (less) oxygen (1)	2

Question Number	Answer	Additional guidance	Mark
5(c)	An answer that makes reference to two the following points: • 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)	Allow family history / inheritance	2

Question Number	Answer	Additional guidance	Mark
5(d)	An explanation that makes reference to four of the following points: • <u>vasodilation</u> (1) • (more) blood to surface / skin (1) • heat loss / cooling / prevents overheating (1) • radiation / convection (1) • affect enzymes (1)	Allow converse Mp2 blood vessel moves close to surface = 0	4

Total 12 marks

Question Number	Answer	Additional guidance	Mark
6(a)	<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)	lactic / lactate	1

Question Number	Answer	Additional guidance	Mark
6(c)(i)	- readings from graph line - divide by number of hours 0.2 (2)	Award full marks for correct numerical answer without working $0.7 - 0.3 = 0.4$ $0.4 \div 2 = 0.2$ Allow one mark if 0.7 and 0.3 in working	2

Question Number	Answer	Mark
6(c)(ii)	An answer that makes reference to the following points: - 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)	3 Allow converse for Mp1 and Mp2

Total 7 marks

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

Question Number	Answer	Mark									
7(a)(ii)	<table border="1"> <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> (1) (1)		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)	An answer that makes reference to two of the following points: - genes / alleles / chromosome (1) (difference in) nutrition / diet / quality of food / quantity of food (1) (difference in) <u>metabolism</u> / <u>metabolic</u> rate / <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)	An explanation that makes reference to four of the following points: • 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)	Allow use of different letter Allow Mps 1, 2 and 3 from Punnett square Allow ecf for gametes only	4

Question Number	Answer	Additional guidance	Mark
7(b)(ii)	An answer that makes reference to two of the following points: • 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)	If (both) parents don't have white patch it is vitiligo / not piebaldism = 2	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: • 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)	An answer that makes reference to four of the following points: • 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)	An answer on that makes reference to the following points: • increase diameter / width / expands the airways / bronchi / bronchioles (1) • air / oxygen into lungs / alveoli	Mp1 Ignore dilate Mp1 Allow trachea	2

Question Number	Answer	Mark
8(c)(ii)	An explanation that makes reference to two of the following points: • 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)	$6\text{CO}_2 + 6\text{H}_2\text{O} \longrightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \text{ (2)}$	Award no marks for word equation One mark for correct equation but not balanced Respiration equation = 0 Ignore light / chlorophyll	2

Question Number	Answer	Additional guidance	Mark
9(b)(i)	An explanation that makes reference to two of the following points: • (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)	B orange <i>A is incorrect because iodine is not white in colour</i> <i>C is incorrect because starch is not present</i> <i>D is incorrect because iodine is not brick-red in colour</i>	1

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

Question Number	Answer	Mark
9(d)	An explanation that makes reference to the following points: • control (1) • carbon dioxide not absorbed / plant has carbon dioxide / CO₂ in bell jar / carbon dioxide needed for photosynthesis show <u>bell jar</u> allows photosynthesis / <u>bell jar</u> allows starch production (1)	2

Total 9 marks

Question Number	Answer	Additional guidance	Mark
10(a)	A description that makes reference to the following points: • <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)	Allow correct named hormone for Mp2 and Mp3 Mp3 Ignore skin / nails / hair / bones Ignore prevents cancer	5

Question Number	Answer	Additional guidance	Mark
10(b)	An explanation that makes reference to four of the following points: • 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)	Answer makes no mention of foetus / embryo / baby = max 3 Mp2 Ignore scurvy Mp3 Ignore rickets Allow other vitamins and minerals eg. vitamin B for nerve development	4

Question Number	Answer	Mark
10(c)(i)	$(70 \times 126 =) 8820$	1

Question Number	Answer	Additional guidance	Mark
10(c)(ii)	- determine difference in energy requirement - multiplication to get percentage 98.8 / 98.81 / 99 (2)	Award full marks for correct numerical answer without working overweight 84 and underweight 167 $167 - 84 = 83$ $\div 84$ percentage increase = $83 \div 84 \times 100$ or $167 \times 80 = 13360$ $84 \times 80 = 6720$ $6640 \div 6720 = 0.98809 \times 100$ Allow one mark for 83 and 84 or 13360 and 6720	2

Question Number	Answer	Additional guidance	Mark
10(c)(iii)	An explanation that makes reference to two of the following points: - 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	An answer that makes reference to the following points: • 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

