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Mark Scheme (Results)

Summer 2019

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

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

Question Number	Answer	Mark
1(b)	An explanation that makes reference to two of the following points: • photosynthesis (1) • (light energy to) chemical 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 / decomposition (1)	Excreted as faeces = 1	**3**

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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 *A is incorrect because grass is not hunted by predators* *B is incorrect because the owl is a predator* *D is incorrect because the snake is a predator*	**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

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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 *A is incorrect because germination rate is not measured in the investigation* *C is incorrect because pollution is the independent variable* *D is incorrect because time after germination is an independent variable*	**1**

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

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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

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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 phototrophic	**6**

Total 6 marks

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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 *B is incorrect because mineral ions are not insoluble* *C is incorrect because mineral ions are not large* *D is incorrect because mineral ions are not large and insoluble*	**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**

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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

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

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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) • high blood pressure (1) • obesity (1) • high carbohydrate diet / eq (1) • diabetes (1) • genes / genetics / eq (1)	Allow family history / inheritance	**2**

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Question Number	Answer	Additional guidance	Mark
5(d)	An explanation that makes reference to four of the following points: • vasodilation (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

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Question Number	Answer	Additional guidance	Mark
6(a)	• *Lactobacillus / Lactobacillus bulgaricus / L. bulgaricus / Streptococcus / Streptococcus thermophilus / S. thermophilus* (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 ÷ 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

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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><tr><th></th><th>Mode</th><th>Median</th></tr><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></table> (1) (1)	**2**

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**

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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) • DNA test / genetic test (1)	If (both) parents don't have white patch it is vitiligo / not piebaldism = 2	**2**

Total 11 marks

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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**

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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

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Question Number	Answer	Additional guidance	Mark
9(a)	$6CO_2 + 6H_2O \longrightarrow C_6H_{12}O_6 + 6O_2$ (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> / de<u>starch</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 *A is incorrect because iodine is not white in colour* *C is incorrect because starch is not present* *D is incorrect because iodine is not brick-red in colour*	**1**

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Question Number	Answer	Mark
9(c)(ii)	C blue-black *A is incorrect because starch is not white when iodine is added* *B is incorrect because starch is not orange when iodine is added* *D is incorrect because starch is not brick-red when iodine is added*	**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 / CO_2 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

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Question Number	Answer	Additional guidance	Mark
10(a)	A description that makes reference to the following points: • carbohydrate for energy / respiration (1) • lipid / fat for energy / storage / insulation / myelin / hormones / protecting organs (1) • protein for growth / repair / (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 / red 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**

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Question Number	Answer	Mark
10(c)(i)	(70 × 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 ÷ 84 percentage increase = 83 ÷ 84 × 100 or 167 × 80 = 13360 84 × 80 = 6720 6640 ÷ 6720 = 0.98809 × 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

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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

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