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Mark Scheme (Results)

January 2020

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

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Question Number	Answer	Mark
1(a)	liver	**1**

Question Number	Answer	Mark
1(b)	B ovary (1) *A is incorrect because the brain does not produce progesterone* *C is incorrect because the pituitary does not produce progesterone* *D is incorrect because the testis does not produce progesterone*	**1**

Question Number	Answer	Mark
1(c)	D yes yes (1) *A is incorrect because both organs excrete* *B is incorrect because the kidney excretes* *C is incorrect because the skin excretes*	**1**

Question Number	Answer	Additional guidance	Mark
1(d)	A description that makes reference to three of the following points: • protease / pepsin / peptidase (1) • digest / breaks down <u>protein</u> (1) • hydrochloric acid (1) • kill pathogens / eq / optimum pH ignore germs (1) • churning/ mechanical digestion (1)	**Allow** lipase digest lipid as alternative to mp1 and 2	**3**

Total = 6 marks

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Question Number	Answer	Mark
2(a)(i)	B P and S *A is incorrect because Q contains oxygenated blood* *C is incorrect because R contains oxygenated blood* *D is incorrect because Q and R contain oxygenated blood* /	**1**

Question Number	Answer	Mark
2(a)(ii)	An explanation that makes reference to two of the following points: • prevent backflow / blood returning (1) • to heart / ventricles (1) • blood transported to lungs / body (1) • pressure in ventricles drop / artery pressure is greater than ventricle pressure (1)	**2**

Question Number	Answer	Additional guidance	Mark
2(b)(i)	An answer that makes reference to the following points: • heart disease increases with age / older people more likely to have heart disease / more over 75 /eq (1) • males more at risk than females / men more at risk than women (1)	**Allow** converse	**2**

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Question Number	Answer	Additional guidance	Mark
2(b)(ii)	• 32 500 000 ÷ 1000 = 32 500 • 32 500 × 5 = 162 500 (2)	Award full marks for correct numerical answer without working one mark for x 5 or 32 500 000 or 32 500	**2**

Question Number	Answer	Additional Guidance	Mark
2(c)	An explanation that makes reference to three of the following points: • blockage of (coronary) artery / less blood to heart (1) • cholesterol / fatty deposits (1) • less oxygen / out of breath / breathless /eq (1) • less (aerobic) respiration / less energy /unable to exercise / eq (1) • heart stops beating / heart contracts less / heart attack / death (1)	**Ignore** causes heart disease	**3**

Total = 10 marks

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Question Number	Answer	Mark
3(a)	• lung(s) (1)	**1**

Question Number	Answer	Mark
3(b)	• 5.0×10^6 or 5×10^6	**1**

Question Number	Answer	additional guidance	Mark
3(c)	An explanation that makes reference to three of the following points: • (concentration) gradient (1) • more oxygen in alveoli than in blood / more carbon dioxide in blood than in alveoli (1) • diffusion (into / out of blood) (1) • thin wall / one cell thick / moist (1) • blood moves / flow (1)	**Ignore** references to high surface area as question refers to one alveolus	**3**

Question Number	Answer	Additional guidance	Mark
3(d)(i)	An answer that makes reference to two of the following points: • as surface area increases respiration rate increase (1) • bigger animals respire more (1) • bigger animals have more surface area of alveoli (1)	**Allow** converse for all	**2**

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Question Number	Answer	Additional guidance	Mark
3(d)(ii)	An explanation that makes reference to two of the following points: • humans have a small(er) surface area to volume ratio (1) • less heat loss (1) • (less respiration is required) to maintain body temperature / eq (1)	**Allow** converse for mice mice have a larger surface to volume area mice have more heat loss in mice, (more) respiration is required to maintain body temperature	**2**

Question Number	Answer	Additional guidance	Mark
3(e)	An explanation that makes reference to three of the following points: • measure / record distance moved by coloured liquid / record starting position and final position of liquid on scale / eq (1) • ref to time (1) • use syringe to reset liquid / eq (1) • repeat (1)	**Allow** bubble for liquid	**3**

Total 12 marks

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Question Number	Answer	Mark
4(a)	plasmid	**1**

Question Number	Answer	Additional Guidance	Mark
4(b)	An explanation that makes reference to three of the following points: • mutation (1) • survive/ not killed (1) • reproduce / multiply / eq (1) • pass on DNA / allele / gene (1)	**Ignore** pass on characteristics alone	**3**

Question Number	Answer	Additional guidance	Mark
4(c)(i)	10 – 0.7 = 9.3 10 000 000 – 700 000 = 9 300 000 9.3 ÷ 0.7 x 100 9 300 000 ÷ 700 000 × 100 1329 % allow 1328.6 or 1328.57 (2)	award full marks for correct numerical answer without working one mark for 9.3 or 9 300 000	**2**

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Question Number	Answer	Additional guidance	Mark
4(c)(ii)	An answer that makes reference to four of the following points: • stopping antibiotics allows non-resistant bacteria to increase / grow / no more increase in resistance **or** antibiotics allow resistant bacteria to increase / grow (1) • less selection pressure (for antibiotic resistance) / competition (for resources) (1) • most infections (would now be) caused by non-resistant bacteria (1) • antibiotics will be effective in most cases / against more bacteria (1) • use new / different antibiotics (instead of not using any) (1) • some patients may die / suffer / eq if not given antibiotics / from other things (1)	**Allow** converse	**4**

Total = 10 marks

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Question Number	Answer	Mark
5(a)(i)	respiration / fermentation	**1**

Question Number	Answer	Mark
5(a)(ii)	A carbon dioxide *B is incorrect because the gas is not nitrogen* *C is incorrect because the gas is not oxygen* *D is incorrect because the gas is not water vapour*	**1**

Question Number	Answer	additional guidance	Mark
5(b)(i)	An answer that makes reference to the following points: S scale linear and half the axes (1) L lines straight and through each point (1) A1 axes correct way (1) A2 axes labelled <u>temperature in ^{0}C</u> **and** <u>bubbles per min(ute)</u> (1) P points plotted accurately (1)	 bar charts / extrapolations: no L mark no P mark if data plotted for 50	**5**

Question Number	Answer	Mark
5(b)(ii)	An explanation that makes reference to two of the following points: • enzymes denatured (1) • changes shape of active site (1) • substrate can no longer fit / E/S complexes do not form / eq (1)	**2**

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Question Number	Answer	Mark
5(c)	A description that makes reference to two of the following points: • measure / collect volume / cm^3 / eq (1) • readings at smaller intervals (of temperature) / (1) • between **40** and **55** (1)	**2**

Total = 11 marks

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Question Number	Answer	Mark
6(a)	respiration / heat loss	**1**

Question Number	Answer	Mark
6(b)	1122	**1**

Question Number	Answer	Additional guidance	Mark
6(c)(i)	A description that makes reference to two of the following points: • digest / break down (1) • dead organisms / waste / faeces / organic matter / eq (1) • use extracellular enzymes / secrete enzymes / release enzymes onto / eq (1)	**Ignore** feed	**2**

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Question Number	Answer	Mark
6(c)(ii)	A description that makes reference to three of the following points: • producers / plants contain cellulose (1) • less energy in producers absorbed / transferred to (primary) consumers / eq (1) • (more) producers / plants are undigested / not digested / not eaten / eq (1) • decomposers can digest cellulose / eq (1) • (primary) consumers lose more energy in respiration / respire more / more heat loss (1) • (primary) consumers lose more energy in movement / eq (1)	**3**

Total 7 marks

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Question Number	Answer	Additional guidance	Mark
7(a)	• $6CO_2 + 6H_2O \longrightarrow C_6H_{12}O_6 + 6O_2$ (2)	award one mark for correct but unbalanced equation no credit for word equation	**2**

Question Number	Answer	Mark
7(b)(i)	An explanation that makes reference to four of the following points: • place plant in dark (for 24 hours) (1) • to remove starch / destarch (1) • place plant in light (1) • test leaf no CO_2 / from flask <u>and</u> normal / control leaf (1) • sodium hydroxide removes CO_2 • using iodine solution / iodine test (1) • to show presence of starch (1)	**4**

Question Number	Answer	Mark
7(b)(ii)	An answer that makes reference to two of the following points: • fewer plants needed (1) • more students can do test / repeats / identify anomalies (1) • different shapes can be used to distinguish no CO_2 from control (1)	**2**

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Question Number	Answer	Mark
7(c)	An explanation that makes reference to three of the following points: • keep all leaves in normal atmosphere / no NaOH (1) • use variegated leaf / eq / use a leaf with chlorophyll and one without (1) • compare blue black / starch areas with green areas / areas with chlorophyll / eq (1)	**3**

Total 11 marks

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Question Number	Answer	Mark
8(a)	An answer that makes reference to the following points: • A iris (1) • B cornea (1) • C pupil (1) • D lens (1)	**4**

Question Number	Answer	Mark
8(b) (i)	An explanation that makes reference to four of the following points: • ciliary muscles relax (1) • suspensory ligaments taut increased tension / taut / tight /eq (1) • lens less curved / thinner (1) • light refracted / bent less (1) • pupil dilates / expands / widens (1)	**4**

Question Number	Answer	Mark
8(b) (ii)	An answer that make reference to two of the following points: • loss of vision / sight / go blind / can't see / eq (1) • in centre of visual field (1) • loss of detail / colour (1)	**2**

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Question Number	Answer	Mark
8(b) (iii)	An answer that makes reference to two of the following points: • repeat with more patients / different patients / eq (1) • longer study / for a greater period / more years / monitor the progress of the patients / eq (1) • see if treatment causes damage / side effects	**2**

Total 12 marks

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Question Number	Answer	Additional guidance	Mark
9 (a)(i)	An answer that makes reference to the following points: • parents dd and Dd (1) • gametes d and D or d (1) • (child) genotype(s) dd (1) • child without syndactyly identified as dd (1) Also **allow** sex linkage cross as below: (i) Use a genetic diagram to show the genotypes of the parents, the possible gametes and the genotype and phenotype of their child. Use D to represent the dominant allele and d to represent the recessive allele. (4) Man (Father) Women (Mother) Genotype X^dY X^DX^d Gametes (X^d) (Y) (X^D) (X^d) Phenotype of their child X^d Y X^D X^DX^d X^DY X^d X^dX^d X^dY X^DX^d - Female girl child with syndactyly X^DY - Male child with syndactyly X^dX^d - Female child with no syndactyly X^dY - Male child with no syndactyly	**allow** ECF for max of 2 allow mp 1 2 3 4 from Punnett square	**4**

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Question Number	Answer	Additional guidance	Mark
9 (a)(ii)	• probability of having syndactyly = 0.5 • probability of being female = 0.5 • = 0.25 (2) allow 25% or 1/4	award full marks for correct numerical answer without working one mark for 0.5 or 50% or 1/2	**2**

Question Number	Answer	Additional guidance	Mark
9(b)	An explanation that makes reference to three of the following points: • dominant allele is always expressed (in phenotype) / only requires one allele / recessive allele requires two copies to be expressed / recessive alleles are only expressed when homozygous / eq (1) • dominant condition more common / frequent / high probability of passing on / eq (1) • recessive condition has carriers (1) • recessive version can appear when both parents unaffected / skips generations / eq (1)	**Allow** converse **Allow** converse for dominant	**3**

Question Number	Answer	Additional guidance	Mark
9(c)	A description that makes reference to two of the following points: • polygenic (1) • many genes /more than one gene (controlling one phenotype) (1) • each has small effect (1)	**Ignore** alleles	**2**

Total 11 marks

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Question Number	Answer	Additional guidance	Mark
10 (a)(i)	60 ÷ (1.65 X 1.65) 60 ÷ 2.7225 = 22.0 (2)	award full marks for correct numerical answer without working one mark for 1.65 **Allow** 20	**2**

Question Number	Answer	Additional guidance	Mark
10(a)(ii)	healthy or whatever indicated in 10(a) (i)	**Allow** TE from 10 ai	**1**

Question Number	Answer	Mark
10(b)	A increase your BMI *B is incorrect because fat does not decrease BMI* *C is incorrect because fat does affect BMI* *D is incorrect because cannot have a negative BMI*	**1**

Question Number	Answer	Mark
10(c) (i)	An explanation that makes reference to the following points: • (carbohydrate and lipid) are (high) energy molecules (1) • energy intake is less than energy use (1) • stored fat / glycogen / carbohydrate is <u>respired</u> / eq (1)	**3**

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Question Number	Answer	Mark
10(c) (ii)	An explanation that makes reference to the following points: • muscle (contraction) (1) • exercise requires / uses energy (1) • from respiration (1)	**3**

Total 10 marks

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Question Number	Answer	Mark
11(a)(i)	carbon (cycle)	**1**

Question Number	Answer	Mark
11(a)(ii)	A *B is incorrect because it is decomposition increases CO_2* *C is incorrect because it is combustion increases CO_2* *D is incorrect because respiration increases CO_2*	**1**

Question Number	Answer	Mark
11(a)(iii)	An answer that includes two from: • bacteria / named correct genus / but not named bacteria (1) • fungi / *Mucor* / mould / named genus / but not named fungus (1)	**2**

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Question Number	Answer	Mark
11(b)	An answer that makes reference to six of the following points: • C use at least two different stated temperatures (1) • O use same species of bacteria / fungi / same species of plant material (1) • R repeat each temperature / eq (1) • M1 measure change in mass / area of plant material / collect volume of gas / carbon dioxide /methane (1) • M2 measure after stated time (1) • S1 use same mass / volume / age / of plant material (1) • S2 use same moisture / humidity / oxygen / pH / soil / water / eq (1)	**6**

Total 10 marks

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