



Mark Scheme (Results)

November 2023

Pearson Edexcel International GCSE
In Biology (4BI1) Paper 1B and Science Double
Award (4SD0) Paper 1B

Question Number	Answer	Mark
1(a)(i)	<p>The only correct answer is</p> <p>C (oak tree)</p> <p>A is not the answer as caterpillar is not a producer</p> <p>B is not the answer as earthworm is not a producer</p> <p>D is not the answer as stoat is not a producer</p>	1

Question Number	Answer	Mark
1(a)(ii)	<p>The only correct answer is</p> <p>D (ladybird)</p> <p>A is not the answer as caterpillar is not a secondary consumer</p> <p>B is not the answer as earthworm is not a secondary consumer</p> <p>C is not the answer as fox is not a secondary consumer</p>	1

Question Number	Answer	Mark
1(a)(iii)	<p>The only correct answer is</p> <p>A (blackbird)</p> <p>B is not the answer as earthworm is not a secondary and a tertiary consumer</p> <p>C is not the answer as fox is not a secondary and a tertiary consumer</p> <p>D is not the answer as stoat is not a secondary and a tertiary consumer</p>	1

Question Number	Answer	Additional guidance	Mark
1 (b) (i)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none"> • fewer blackbirds / numbers fall / population reduces / die / migrate / eq (1) • less food (for blackbirds) fewer (caterpillars) to eat / fewer ladybirds / eq (1) • less food for ladybirds / fewer greenfly for ladybirds to eat/ eq (1) • (blackbirds) will eat more earthworms / will eat only earthworms / eq (1) • blackbirds consume pesticide / bioaccumulation / pesticide kills blackbirds / eq (1) 	Allow might / may fall	3

Question Number	Answer	Mark
1 (b) (ii)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none"> • <u>biological control</u> (1) • introduce predator / increase ladybirds / eq (1) • to eat / consume / prey on greenfly / eq (1) 	3

Total 9 marks

Question Number	Answer	Mark
2(a)	4 (1)	1

Question Number	Answer	additional guidance	Mark
2(b)	<p>An explanation that makes reference to two of the following</p> <ul style="list-style-type: none"> • remove surface moisture / liquid / eq (1) • that would add / alter / affect mass / affect results / eq (1) • so valid comparison can be made between with pre-solution dried cylinder / eq(1) 	<p>Ignore water</p> <p>Ignore reliable / accurate</p>	2

Question Number	Answer	additional guidance	Mark
2(c)(i)	<p>change in mass $2.3 - 2.2 = 0.1\text{g}$</p> <p>$\% = 0.1 \div 2.2 \times 100$</p> <p>$= 4.5$ (2)</p>	<p>allow 1 mark for 0.1</p> <p>full marks for correct answer no working</p> <p>allow 4.55 or 4.545</p> <p>allow 4.54 dot / recurring etc</p>	2

Question Number	Answer	additional guidance	Mark
2(c)(ii)	<p>An answer that makes reference to five of the following</p> <ol style="list-style-type: none"> 1. loses mass in high(er) (sucrose) concentration / 1.0 / 0.8 / eq (1) 2. gains mass in low(er) (sucrose) concentration/ 0.0 / 0.2 / 0.4/ eq (1) 3. as water exits / enters / eq (1) 4. by osmosis / eq (1) 5. from higher water potential / to low water potential / eq (1) 6. no change in mass / no (net) movement of water in 0.6 / eq (1) 7. potato has same water potential / same concentration / isosmotic / eq (1) 	<p>allow weight</p> <p>As conc increases mass decreases</p> <p>As conc decreases mass of potato increases</p> <p>Allow dilute to more concentrated / from higher water conc to lower /eq</p>	5

Total 10 marks

Question Number	Answer	Additional guidance	Mark
3(a)(i)	<ul style="list-style-type: none"> limewater / hydrogen carbonate indicator/ sodium hydrogen carbonate / sodium bicarbonate / bicarbonate indicator /eq 	allow calcium hydroxide for limewater	1

Question Number	Answer	Additional Guidance	Mark
3(a)(ii)	<p>An explanation that makes reference to three of the following:</p> <ul style="list-style-type: none"> tube A (stays) clear / (stays) red / (stays) orange / no change /eq (1) tube B goes cloudy / milky / yellow /eq (1) (more) carbon dioxide in exhaled air / in tube B /eq (1) 	<p>Mp 1-2 Must be true for answer in (a)(i)</p> <p>If (a)(i) blank can only score mp 1 if write no change and mp 3</p> <p>allow tube A changes slowly/eq</p>	3

Question Number	Answer	Additional guidance	Mark
3(a)(iii)	<ul style="list-style-type: none"> warmer / less oxygen / more water (vapour) /eq (1) 	allow converse	1

Question Number	Answer	Mark
3(b)(i)	<ul style="list-style-type: none"> duration (of exercise)/ time / eq (1) 	1

Question Number	Answer	additional guidance	Mark
3(b)(ii)	<p>An answer that includes</p> <ul style="list-style-type: none"> • Scales linear and at least 2 big squares on y and 3 on x (1) • Lines straight and through all points (1) • Axis correct way round (duration on x and breathing rate y)(1) • Units labelled with duration/ exercise in seconds/s and breathing rate in breaths per minute / breathing rate/min eq (1) • Points correctly plotted within a small square (1) 	<p>allow truncated y</p> <p>even if unlabelled</p> <p>Bar chart max 3 no S no L</p>	5

Question Number	Answer	Additional guidance	Mark
3(b)(iii)	<p>A description that includes two of the following points:</p> <ul style="list-style-type: none"> • breathing rate increases until 180 seconds / up to 42 (breathes)/ eq (1) • decreases slightly (between 180 -210) / eq (1) • (then) levels out / becomes constant / eq (1) 	<p>Need number ref for mp 1 but not for mp 2 mp3</p> <p>Increases decreases then constant scores =2</p>	2

Question Number	Answer	Mark
3(b)(iv)	<ul style="list-style-type: none"> • repeat / use more students / people / eq (1) 	1

Total 14 marks

Question Number	Answer	additional guidance	Mark
4(a)	<p>An answer that makes reference to two of the following</p> <ul style="list-style-type: none"> • more red cells / erythrocytes / eq (1) • fewer lymphocytes / eq (1) • fewer monocytes / eq (1) • fewer neutrophils / eq (1) 	<p>Allow converse for condition</p> <p>fewer (in condition)</p> <p>more lymphocytes</p> <p>more monocytes</p> <p>more neutrophils</p> <p>if no ref to named wbc allow fewer wbc for 1</p>	2

	Answer	additional guidance	Mark
4(b)	<p>line length = 14 (mm)</p> <p>14 mm = 14 × 1000</p> <p>magnification = 14 000 ÷ 25</p> <p>= × 560 (2)</p> <p>Allow range 520 - 600</p>	<p>1 mark for correct length and units</p> <p>13-15mm or 1.3-1.5cm</p> <p>OR</p> <p>÷ 25</p>	2

	Answer	additional guidance	Mark
4(c)	<p>$5.0 \times 10^9 \times 1000$</p> <p>$5.0 \times 10^{12}$</p> <p>$5.0 \times 5.0 \times 10^{12}$</p> <p>= 2.5×10^{13} (2)</p>	<p>allow 1 mark for 25 etc in answer</p>	2

Question Number	Answer	additional guidance	Mark
4(d)	<p>An answer that makes reference to four of the following</p> <ol style="list-style-type: none"> 1. less haemoglobin (1) 2. less (transport of) oxygen /eq(1) 3. less energy / less ATP / respiration / eq (1) 4. tired / out of breath / lactic acid build up / eq (1) 5. more immune response / greater immunity / more memory cells/ eq (1) 6. more antibodies / eq (1) 7. more phagocytosis / eq (1) 8. less infection / may be infected / eq (1) 	<p>allow more anaerobic respiration</p> <p>allow pathogens present</p>	4

Total 10 marks

Question Number	Answer	Mark
5(a)	<ul style="list-style-type: none"> (alternative) form / version of a gene /eq (1) 	1

Question Number	Answer	additional guidance	Mark
5(b)(i)	<p>An answer that makes reference to the following</p> <ul style="list-style-type: none"> genotypes of parents Ss and Ss (1) gametes formed S and s S and s (1) genotypes of offspring SS Ss ss(1) phenotypes of offspring stated or ratio 3 short to 1 long / eq (1) 	<p>Allow any symbols including different letters but not X or Y</p> <p>AB x AB</p> <p>A or B</p> <p>AA 2AB BB</p> <p>allow all marks from Punnet square</p> <p>allow te for incorrect parents 2 max gametes and offspring</p>	4

Question Number	Answer	additional guidance	Mark
5(b)(ii)	An answer that makes reference to the following <ul style="list-style-type: none"> • prob of male 0.5 / prob of short hair 0.75 • combined prob = 0.375 (2) 	allow 1 mark for 0.5 or $\frac{1}{2}$ or 0.75 $\frac{3}{4}$ allow 37.5% or $\frac{3}{8}$	2

Question Number	Answer	additional guidance	Mark
5(b)(iii)	An explanation that makes reference to two of the following <ul style="list-style-type: none"> • cross with long-haired / ss / homozygous recessive / eq (1) • if SS/ homozygous / all offspring short-haired / no long-haired / eq (1) • if Ss/ heterozygous some long-haired / eq (1) 	allow other letters	2

Question Number	Answer	additional guidance	Mark
5(c)	A description that makes reference to four of the following <ul style="list-style-type: none"> • mutation / eq (1) • variation (in behaviour) / eq (1) • (guinea pigs) not eaten / survive not noticed by predators / eq (1) • reproduce / eq (1) • pass on <u>allele</u> / <u>gene</u> to offspring / eq (1) 	allow converse	4

Total 13 marks

Question Number	Answer	Mark
6(a)(i)	<p>The only correct answer is A (L)</p> <p>B is not the answer as P is not the sensory receptor</p> <p>C is not the answer as Q is not the sensory receptor</p> <p>D is not the answer as S is not the sensory receptor</p>	1

Question Number	Answer	Mark
6(a)(ii)	<p>The only correct answer is D (P)</p> <p>A is not the answer as L is not the cell body of the relay neurone</p> <p>B is not the answer as N is not the cell body of the relay neurone motor neurone</p> <p>C is not the answer as M is not the cell body of the relay neurone</p>	1

Question Number	Answer	Mark
6(a)(iii)	<p>The only correct answer is C (R)</p> <p>A is not the answer as L is not the motor neurone</p> <p>B is not the answer as M is not the motor neurone</p> <p>D is not the answer as S is not the motor neurone</p>	1

Question Number	Answer	Mark
6(a)(iv)	The only correct answer is D (S) A is not the answer as L is not the effector B is not the answer as M is not the effector C is not the answer as Q is not the effector	1

Question Number	Answer	additional guidance	Mark
6(b)(i)	180 cm = 1.8m time = $1.8 \div 50$ = 0.036 or 3.6×10^{-2} (2)	allow 1 mark for $\div 50$ or $\div 5000$ allow full marks for correct answer alone	2

Question Number	Answer	additional guidance	Mark
6(b)(ii)	An explanation that makes reference to four of the following 1. response time slower / longer / delay / (more) time taken / eq (1) 2. (delay / transmission) between neurones / in between neurones / not just speed along neurones / eq (1) 3. (includes time) to generate impulse (in receptor) / (time) for muscle to contract / eq (1) 4. chemical coordination / diffusion / eq (1) 5. <u>synapse</u> (1) 6. <u>neurotransmitter</u> / named neurotransmitter (1)	ignore impulse travels faster synapses between neurones scores mp 2 and 5	4

Total 10 marks

Question Number	Answer	Mark
7(a)	<ul style="list-style-type: none"> • single / one / unicellular (1) • wall (1) • photosynthesis (1) • decomposers / saprophytic / saprophytes/ saprotrophic (1) • chromosome / nucleoid (1) • plasmids (1) • <i>Lactobacillus</i> / <i>Streptococcus</i> (1) • pathogens / pathogenic (1) 	8

Question Number	Answer	additional guidance	Mark
7(b)	<p>A description that makes reference to four of the following points</p> <ul style="list-style-type: none"> • yeast respire (aerobically) / eq (1) • yeast (then) <u>respire anaerobically</u> / eq (1) • converts starch to maltose / maltose to glucose / starch to glucose / eq (1) • using amylase / maltase /eq (1) • releases carbon dioxide /eq(1) • causes (dough / bread) to rise / bubbles trapped / volume increases /eq (1) 	<p>allow fermentation</p> <p>allow gets bigger</p>	4

Total 12 marks

Question Number	Answer	Mark
8(a)(i)	<p>The only correct answer is C (U)</p> <p>A is not the answer as R does not produce gametes</p> <p>B is not the answer as S does not produce gametes</p> <p>D is not the answer as X does not produce gametes</p>	1

Question Number	Answer	Mark
8(a)(ii)	<p>The only correct answer is A (R)</p> <p>B is not the answer as S is not the site of fertilisation</p> <p>C is not the answer as W is not the site of fertilisation</p> <p>D is not the answer as X is not the site of fertilisation</p>	1

Question Number	Answer	Mark
8(a)(iii)	<p>The only correct answer is D (X)</p> <p>A is not the answer as R is not where the placenta usually develops</p> <p>B is not the answer as S is not where the placenta usually develops</p> <p>C is not the answer as W is not where the placenta usually develops</p>	1

Question Number	Answer	additional guidance	Mark
8(b) (i)		any cut of both sperm ducts / in or out of scrotum eq	1

Question Number	Answer	additional guidance	Mark
8(b)(ii)	<p>An explanation that makes reference to two of the following</p> <ul style="list-style-type: none"> • no sperm in semen / no sperm released / eq (1) • in / from urethra / penis no sperm ejaculated / (1) • transferred to female / eq (1) • egg not fertilised /no fertilisation /eq (1) 	<p>ignore sperm not produced</p> <p>ignore no semen released/ ejaculated</p>	2

Question Number	Answer	additional guidance	Mark
8(c)	<p>An answer that makes reference to four of the following</p> <ol style="list-style-type: none"> 1. easier / simpler operation / testes scrotum outside/ less invasive / eq (1) 2. large study / reliable /significant / valid / eq (1) 3. no deaths in males / eq (1) 4. fewer complications in male / eq (1) 5. fewer failures in male / more successful / eq (1) 6. cheaper in male / eq (1) 7. no data on age / illness / medical conditions / mass / eq (1) 	<p>allow converse</p> <p>ignore risky / safe / dangerous</p> <p>ignore fewer deaths in males</p> <p>allow some deaths / more deaths in females</p>	4

Total 10 marks

Question Number	Answer	additional guidance	Mark
9(a)	<p>An explanation answer that makes reference to three of the following:</p> <ul style="list-style-type: none"> • plants produce many more (seeds) / offspring / more yield / eq (1) • quicker to reach maturity / quicker to develop / shorter life cycle / eq (1) • plants can be self-pollinated / eq (1) • easier to control plants environment / eq (1) 	<p>allow converse</p> <p>allow grow fully not just reproduce quicker</p>	3

Question Number	Answer	Additional guidance	Mark
9(b)	<p>A description that makes reference to four of the following:</p> <ul style="list-style-type: none"> • select / choose / mate breed bulls / fathers that produce daughters / have mothers/ sisters with highest milk yield / selecting for twins / eq (1) • select choose / mate breed cows / mothers that have highest milk yield / or from mothers / have sisters with highest milk yield / eq (1) • select choose / mate breed offspring (cows) that have highest milk yield of all (female) offspring / eq (1) • repeat for many generations /eq (1) 	<p>Ignore cattle allow male</p> <p>Inseminate allow female / cow</p>	4

Question Number	Answer	Mark
9(c)(i)	<p>An answer that makes reference to two of the following:</p> <ul style="list-style-type: none"> • cows easier to manage / move around farm / milk / eq (1) • cows less likely to fight / harm farmer / harm other animals /eq (1) • cows less lightly to run around /eq(1) • more energy used in growth/ more milk production / more yield / eq (1) 	2

Question Number	Answer	Mark
9(c)(ii)	<p>A description that makes reference to four of the following:</p> <ol style="list-style-type: none"> 1. produced by adrenal glands (1) 2. causes heart rate to increase /eq (1) 3. prepares body for fight / flight / fright / eq (1) 4. increases blood flow to muscles / blood diverted from intestines/eq (1) 5. increases breathing rate / depth / eq (1) 6. converts glycogen into glucose / increase blood glucose /increase blood sugar / eq (1) 7. pupils dilate / eq (1) 8. reactions are faster / eq (1) 	4

Question Number	Answer	Additional guidance	Mark
9(c)(iii)	<p>A description that makes reference to three of the following:</p> <ul style="list-style-type: none"> • allows <u>diffusion</u> (1) • provides oxygen / glucose / amino acids / nutrients / vitamins / minerals /eq/(1) • provides antibodies (1) • removes of carbon dioxide / urea / eq (1) • secretes hormones / progesterone / eq (1) 	<p>Must indicate direction named vitamin / mineral ignore food alone</p> <p>Must indicate direction ignore waste allow oestrogen</p>	3

Total 16 marks

Question Number	Answer	Additional guidance	Mark
10	<p>C use light bulbs / lamps different colours / wavelengths / eq (1)</p> <p>O of same species (of water) plant / age / size / condition / eq (1)</p> <p>R repeat / (calculate mean for each different colour) / eq (1)</p> <p>M1 measure volume of oxygen evolved / count bubbles /eq</p> <p>M2 in stated time period / minutes / eq (1)</p> <p>S1 at same temperature / same distance /same light intensity / same bulb / eq</p> <p>S2 same carbon dioxide concentration / same mineral ions / same pH /eq (1)</p>	<p>allow change in suitable indicator / allow testing leaves for starch</p>	6

Total 6 marks