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Mark Scheme (Results)

November 2024

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

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November 2024
Question Paper Log Number P73491RA
Publications Code 4BI1_1B_2411_MS
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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

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Question Number	Answer	Mark
1(a)(i)	**D (T and U)** A is not the answer as P and Q are not both the male parts B is not the answer as P and R are not both the male parts C is not the answer as S and T are not both the male parts	**1**

Question Number	Answer	Mark
1(a)(ii)	**A (P)** B is not the answer as pollen grains do not germinate on R C is not the answer as pollen grains do not germinate on S D is not the answer as pollen grains do not germinate on T	**1**

Question Number	Answer	Mark
1(a)(iii)	**C (R)** A is not the answer as P does not become the seed B is not the answer as Q does not become the seed D is not the answer as T does not become the seed	**1**

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Question Number	Answer	additional guidance	Mark
1(b)(i)	A description that makes reference to two of the following: • uses runners / stolons / eq (1) • stem / shoot (grows along ground) / eq (1) • breaks off / grows roots / produces new plant / clone / eq (1)	 ignore cuttings	**2**

	Answer	additional guidance	Mark
1(b)(ii)	An answer that description that makes reference to four of the following: 1. (use sexual reproduction) cross with different variety / different plant / selective breeding / eq (1) 2. transfer pollen / cross pollinate / eq (1) 3. to produce different flavour / new flavour / desired flavour / variation / eq (1) 4. (use asexual) / runners / cuttings / micropropagation / eq (1) 5. produces genetically identical plants / clones / eq (1) 6. many offspring produced / large numbers / eq (1)	 method linked to sexual method linked to asexual linked to asexual rapidly alone not enough	**4**

Total 9 marks

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	Answer	additional guidance	Mark
2	1. trachea / windpipe (1) 2. bronchi / bronchus (1) 3. bronchiole(s) (1) 4. alveoli / alveolus (1) 5. diaphragm (1) 6. intercostal (1)	ignore internal / external	**6**

total 6 marks

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Question Number	Answer	Mark
3(a)(i)	**A (P)** B is not the answer as Q is not the oesophagus C is not the answer as R is not the oesophagus D is not the answer as U is not the oesophagus	**1**

Question Number	Answer	Mark
3(a)(ii)	**D (T)** A is not the answer as P is not part of the large intestine B is not the answer as Q is not part of the large intestine C is not the answer as R is not part of the large intestine	**1**

Question Number	Answer	Mark
3(a)(iii)	**C (S)** A is not the answer as Q does not contain villi B is not the answer as R does not contain villi D is not the answer as V does not contain villi	**1**

Question Number	Answer	Mark
3(a)(iv)	**A (Q)** B is not the answer as S is not the stomach C is not the answer as T is not the stomach D is not the answer as V is not the stomach	**1**

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Question Number	Answer	additional guidance	Mark
3(b)	A description that makes reference to the following: • peristalsis (1) • muscles contract (behind food) / muscles push (food along) / muscles squeeze / eq (1)	 ignore muscles move	**2**

	Answer	additional guidance	Mark
3(c)(i)	An answer that makes reference to four of the following: 1. more protein in young dog food as they are growing more / for growth / eq (1) 2. amino acids for protein synthesis / eq (1) 3. more fat in young dog food as more active / for growth / eq (1) 4. more fat for energy / for respiration / eq (1) 5. more calcium in young dog food as more bone and teeth growth / eq (1) 6. more phosphate for bones / ATP / DNA /eq (1) 7. **all** components higher in young dog food / total percentage higher / eq (1)	allow converse for adult stated not cumulative if mp 1-6 not credited **allow one mark max** for one correct difference eg more protein in	**4**

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		young dog food	

	Answer	additional guidance	Mark
3(c)(ii)	An answer that makes reference to three of the following: 1. excess carbohydrates / starch / glucose / energy converted to fat / eq (1) 2. may gain (too much) mass / become obese / overweight / eq (1) 3. may become diabetic / have heart disease / CHD / eq (1) 4. may fail to thrive / grow / eq (1) 5. as lack protein / eq (1)	ignore become fat	**3**

total 13 marks

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Question Number	Answer	Mark
4(a)(i)	**B (F and H)** A is not the answer as E and J do not refract light C is not the answer as G and K do not refract light D is not the answer as I and J do not refract light	**1**

Question Number	Answer	Mark
4(a)(ii)	**C (G)** A is not the answer as E does not control the amount of light B is not the answer as F does not control the amount of light D is not the answer as H does not control the amount of light	**1**

Question Number	Answer	Mark
4(a)(iii)	**D (K)** A is not the answer as H does not contain light sensitive cells B is not the answer as I does not contain light sensitive cells C is not the answer as J does not contain light sensitive cells	**1**

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Question Number	Answer	Additional guidance	Mark
4(b)	A description that makes reference to four of the following points: 1. the ciliary muscle(s) contract / structure I contract(s) / eq (1) 2. the tension in the suspensory ligament(s) is reduced / loosened / slackens / eq (1) 3. the lens becomes thick(er) / wide(r) / fat(ter) / round(er) / more convex / eq (1) 4. the light is refracted more / bent more / eq (1) 5. accommodation (1)	ignore relax	**4**

Question Number	Answer	Additional guidance	Mark
4(c)(i)	An explanation that makes reference to two of the following points: • lens becomes cloudy / opaque / misty / milky / eq (1) • less light enters eye / eq (1) • image dimmer / not formed / vision blurred / distorted / not clear / blindness / eq (1)	ignore poor vision	**2**

Question Number	Answer	Additional guidance	Mark
4(c)(ii)	• glasses / contact lens / new lens inside eye / eye drops / eq (1)	ignore laser eye surgery	**1**

total 10 marks

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Question Number	Answer	additional guidance	Mark
5(a)(i)	calculation method not marking points change in rate 50-20 = 30 % = 30 ÷20 ×100 = 150% (2)	full marks for correct answer no working allow 1 mark for 30 or 50÷20 or (50-20)÷20	**2**

Question Number	Answer	Additional guidance	Mark
5(a)(ii)	An answer that includes • Scale half grid (at least 2.5 big squares) and linear (1) • Lines straight and through all points (1) • Axis correct way round (time on x and breathing rate y)(1) • Units labelled on each axis breaths per minute or breathes /minute and minutes / eq (1) • Points correctly plotted within half a small square (1)	allow // truncated if start at 0 or y can start at 10/20 Bar chart does not score L If non-linear scale **between points** No P No L if extrapolated even if unlabelled	**5**

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Question Number	Answer	Additional guidance	Mark
5(a)(iii)	An explanation makes reference to three of the following points: 1. (intake of) (more) oxygen /eq (1) 2. releases (more) carbon dioxide eq (1) 3. (provides more oxygen) to red cells / for muscles / for respiration / eq (1) 4. reaches maximum / stops increasing / no change / eq (1) 5. chest cannot inflate and deflate any quicker / eq (1)	ignore slows down	**3**

Question Number	Answer	additional guidance	Mark
5(b)	An explanation makes reference to two of the following points: • (build-up of) lactic acid / lactate (in muscle) / eq (1) • due to anaerobic respiration/ eq (1) • <u>oxygen</u> debt / EPOC / eq (1)	break down lactic acid =MP 1 only <u>oxygen</u> required to break down lactic acid = MP 1 and MP 3 to oxidise lactate = MP 1 and MP 3	**2**

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Question Number	Answer	Additional guidance	Mark
5(c)	An answer that includes : • mouth / nose / face not covered / does not interfere with airflow / breathing / breathe normally / easier to breathe / breathe freely / eq (1) • muscle movement may not be breathing / other movements may be recorded / indirect measurement / shirt may be heavy / uncomfortable / affect performance / sweat may affect sensors / eq (1)	ignore no mask / affect breathing allow movement due to exercise (not breathing)	**2**

Total 14 marks

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Question Number	Answer	Additional guidance	Mark
6(a)	An explanation that makes reference to two of the following points : about reproduction /life cycle • short life span / short generation time / short life cycle / reproduce quickly / eq (1) about results data • can get many repeats / many generations / can get expected / predicted ratios / can get quick / reliable / valid results / eq (1) • have a range of visible characteristics / traits / phenotypes / eq (1) • that are inherited / controlled by genes / eq (1)	not just 10 days not just many offspring	**2**

Question Number	Answer	Additional guidance	Mark
6(b)(i)	An answer that makes reference to • (parent genotypes) Ll and Ll (1) • (offspring genotypes) LL, Ll, ll (1) • (offspring phenotypes) Long and short (1)	allow any symbols allow Ab x Ab allow LS x LS not 4 alleles Ll Ss not X and Y allow parent genotypes from Punnett square allow ECF from incorrect parents allow genotypes and phenotypes	**4**

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	• (phenotype ratio) / 3 long: 1 short / eq (1)	of offspring 1 max	

Question Number	Answer	additional guidance	Mark
6(b)(ii)	calculation method not marking points • prob of male 0.5 / prob of long wing 0.75 • combined prob = 0.375 (2)	full marks for correct answer no working allow 1 mark for 0.5 or 50% or ½ or 0.75 or 75% or ¾ allow 37.5% or 3/8	**2**

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Question Number	Answer	additional guidance	Mark
6(b)(iii)	An answer that makes reference to four of the following points: male to female observed / actual 1. male 155 / female 165 / 48% male / 52% female (1) expect 2. expect 1:1 / 50% / same numbers / even /eq (1) compare 3. almost identical / little difference / (slightly) fewer males / (slightly) more females / eq (1) long to short observed / actual 4. long 241 / short 79 / 75% long / 25% short (1) expect 5. expect 3:1 / 75% long / 25% short (1) compare 6. (almost) 3:1 / little difference / eq (1) long /short /male / female 7. slight difference between long to short in male and female / slightly more long winged males than expected / eq (1) 8. 3.2 :1 for male / 76% long / 24% short (1) 9. 2.9 :1 for female / 75% long / 25% short (1)	No credit for quoting unprocessed data ie 118, 37, 123, 42 slightly fewer long winged females than expected	**4**

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Question Number	Answer	Additional guidance	Mark
6(c)	An explanation makes reference to three of the following points: • short-winged flies cannot fly / feed / mate / can't move as well / cannot escape predators / eq (1) • do not survive / die out / extinct / eq (1) • less reproduction / no alleles passed on (to next generation)/ eq (1) • natural selection / selective disadvantage eq (1)	allow converse throughout for long / normal flies allow genes	**3**

total 15 marks

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Question Number	Answer	Mark
7(a)(i)	• producer / first / one /1 (1)	**1**

Question Number	Answer	Mark
7(a)(ii)	• tertiary consumer / third consumer / fourth / four / 4 (1)	**1**

	Answer	additional guidance	Mark
7(b)(i)	calculation method not marking points diameter = 7.5 cm = 75 mm (allow 7.4-7.6cm or 74-76mm) 75 mm = 75 × 1000 75000 µm magnification = 75000 ÷ 10 µm = × 7500 (2) (allow 7400 to 7600) ignore units in answer line	full marks for correct answer no working 1 mark for correct length <u>with correct units</u> or 1 mark for their measurement in µm ÷ 10 or 1 mark for their measurement in mm ÷ 0.01	**2**

	Answer	additional guidance	Mark
7(b)(ii)	calculation method not marking points radius = 5 4 × (3.14 × 125) / 3 = 523 allow (522 -524)(2)	full marks for correct answer no working allow 1 mark for × 125	**2**

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		if they round 4/3 to 1.33 answer will be =522	

	Answer	additional guidance	Mark
7(b)(iii)	A description that includes two of the following points: • absorbs / traps (sun)light / light energy / eq (1) • photosynthesis / eq (1) • produces glucose / carbohydrate / sugar / starch / eq (1)	 ignore uses converts light energy into chemical energy scores mp 1 and mp 3	**2**

	Answer	Mark
7(b)(iv)	A description that includes the following points: • provides an energy store / energy reservoir / stores carbohydrate / eq (1) • respiration / eq (1)	**2**

	Answer	additional guidance	Mark
7(c)	A description that includes four of the following points: • quadrat (1) • random / eq (1) • coordinates / grid / eq (1) • count number of individuals / plants / eq (1) • repeat / (calculate) mean / average / eq (1) • multiply by size of area / eq (1)	 use quadrats = mp 1 and 5	**4**

Total 14 marks

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<table>
<tr><th>Question Number</th><th>Answer</th><th>Mark</th></tr>
<tr><td>8(a)</td><td>
<table>
<tr><th>Effect</th><th>Name of hormone</th><th>Name of gland</th></tr>
<tr><td>converts blood glucose into glycogen</td><td>insulin (1)</td><td>pancreas</td></tr>
<tr><td>stimulates the development of male secondary sexual characteristics</td><td>testosterone</td><td>testis / eq (1)</td></tr>
<tr><td>Increases heart rate</td><td>adrenaline</td><td>adrenal (1)</td></tr>
<tr><td>maintains the uterus lining</td><td>progesterone</td><td>ovary / corpus luteum/ placenta (1)</td></tr>
</table>
</td><td>4

one mark for each correct row</td></tr>
</table>

Question Number	Answer	additional guidance	Mark
8(b)(i)	An explanation makes reference to four of the following points: 1. stems (grow) towards light / positively phototropic / eq (1) 2. (increase) photosynthesis / eq (1) 3. away from competition / other plants / eq (1) 4. <u>roots</u> (grow) away from light / negatively phototropic /eq (1) 5. into soil / to absorb water / minerals / named mineral / for water / for minerals / for named mineral /eq (1) 6. to anchor plant / eq (1)	allow leaves (face sun) ignore plants	**4**

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Question Number	Answer	additional guidance	Mark
8(b)(ii)	An explanation makes reference to two of the following points: 1. hours of daylight (better) indicator of season / time of year /eq (1) 2. daylight does not vary / temperature can vary (day to day) / eq (1) 3. (more hours of) daylight allow insects to see flowers / eq (1) 4. (more) insect pollination / insects pollinate in daylight / eq (1)	eg more hours/ daylight in summer	**2**

total 10 marks

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Question Number	Answer	additional guidance	Mark
9(a)	An explanation makes reference to two of the following points: • less (leaf) area / surface / fewer leaves / eq (1) • fewer chloroplasts / less chlorophyll /eq (1) • (less) photosynthesis / eq (1) • less carbohydrate / glucose / sugar / eq (1)	 allow damages chloroplasts ignore no photosynthesis	**2**

Question Number	Answer	additional guidance	Mark
9(b)	An explanation makes reference to four of the following points: 1. lasts longer / does not need reapplication / eq (1) 2. specific / does not affect food chain / other organisms / eq (1) 3. no residue on crop / not eaten by humans / does not affect humans /eq (1) 4. no bioaccumulation / biomagnification / eq (1) 5. pest does not become resistant / eq (1)	allow converse ignore cheaper alone ignore immune	**4**

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Question Number	Answer	Mark
9(c)(i)	An explanation that makes reference to three of the following points: 1. moth population rises (up to 6 months) / eq (1) 2. wasp population also rises as more moths / food is available / as eat moths / eq (1) 3. (from 6 months) moth population falls as eaten by wasp / eq (1) 4. wasp population falls as fewer moths to feed on / less food available / eq (1) 5. moth population recovers / repeats months / eq (1)	**3**

	Answer	additional guidance	Mark
9(c)(ii)	calculation method not marking points readings from graph 2150- 850 subtraction = 1300 (2)	full marks for correct answer no working allow 1 mark for one correct value 2150 or 850	**2**

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Question Number	Answer	additional guidance	Mark
9(c)(iii)	An explanation that makes reference to two of the following points: • some moths remain / doesn't kill all moths /eq (1) • delay to act / kill moths / slower (than chemical) / eq (1) • numbers vary with time of year / seasons / eq (1) • wasps are expensive / eq (1) • wasps may become pest / may kill other organisms / may affect food chain / farmers may not want to leave wasps in their fields / may sting farmers / eq (1)	allow converse for chemical	**2**

total 13 marks

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Question Number	Answer	Mark
10	C use at least two temperatures differing by 3°C / eq (1) O same species / same plant / age / size / condition / same crop / eq (1) R repeat / calculate mean / use more than one glasshouse (for each temperature) / eq (1) M1 measure mass / weight (of crop) / mass / weight of fruit / mass / weight of grain / number of fruits / number of grains / number of leaves / size of leaves / eq M2 stated time period (one day plus) / eq (1) S1 same light (intensity) / light duration / same sun(light) / same time of year / eq S2 same carbon dioxide concentration / mineral ions / water / soil / pH / humidity / eq (1)	**6**

total 6 marks

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