Pearson Edexcel

Mark Scheme (Results)

Summer 2025

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

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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.

Question Number	Answer	Mark
1(a)(i)	**C (protoctists)** A is not the answer as *Euglena* is not in bacteria B is not the answer as *Euglena* is not in fungi D is not the answer as *Euglena* is not in viruses	**1**

Question Number	Answer	Mark
1(a)(ii)	**D (U)** A is not the answer as P is the membrane B is not the answer as R is the flagellum D is not the answer as T is the nucleus	**1**

Question Number	Answer	Mark
1(a)(iii)	**D (T)** A is not the answer as P is the membrane B is not the answer as Q is the cytoplasm C is not the answer as R is the flagellum	**1**

Question Number	Answer	Mark
1(a)(iv)	**A (P)** B is not the answer as Q is the cytoplasm C is not the answer as R is the flagellum D is not the answer as U is the mitochondrion	**1**

Question Number	Answer	Mark
1(b)	**C (S)** A is not the answer as P is the cell membrane B is not the answer as Q is the cytoplasm D is not the answer as T is the nucleus	**1**

Question Number	Answer	Mark
1(c)	• structure / part of a cell with particular function / purpose / role (s) /eq (1)	**1**

Question Number	Answer	Additional guidance	Mark
1 (d)	An explanation that that makes reference to three of the following: • mitochondrion / U (1) • (mitochondrion) respiration / releases energy / provides ATP / eq (1) • flagellum / R / tail / eq (1)	No credit if U called cytoplasm/chloroplast P/Q/ R/ S/ T for respiration = no credit for mp 2 Ignore produces energy	**3**

Question Number	Answer	Mark
2(a)(i)	• temperature/ 70°C / time / 5 mins / 5cm^3 / volume of water / 5cm^3 / volume of Benedict's / 5cm^3 /volume of solution (1)	**1**

Question Number	Answer	Mark
2(a)(ii)	• use water bath / beaker of water and Bunsen / eq (1)	**1**

Question Number	Answer	additional guidance	Mark
2(b)	An explanation that makes reference to four of the following 1. B (1) 2. (B) as has turned (brick) red (1) 3. (B) has <u>most</u> glucose / eq (1) 4. for respiration / eq (1) 5. provides / releases energy / for energy / ATP /eq (1) 6. for muscle <u>contraction</u> / eq (1) 7. can run faster / longer / eq(1)	If answers A C D can still score mp 4 5 6 NOT 2 3 7	**4**

Question Number	Answer	additional guidance	Mark
2(c)	An explanation that makes reference to two of the following • fewer calories / kilojoules / less energy / eq (1) • so less mass gain / may wish to lose weight / prevent obesity / heart disease / eq (1) • less tooth decay / diabetes / eq(1)	allow • some people may be diabetic (1) • increase blood glucose/ blood sugar / cannot release (enough) insulin / eq (1)	**2**

Question Number	Answer	Mark
3(a)	• light / sunlight / solar (1) • chemical (1)	**2**

Question Number	Answer	additional guidance	Mark
3(b)(i)	An explanation that makes reference to two of the following • keep in dark for 12/ 24 /48 hours /eq (1) • so all starch used up / eq (1) • in respiration (1)	Not just a while /some time No credit for no photosynthesis	**2**

Question Number	Answer	additional guidance	Mark
3(b)(ii)	• LHS outside flask black / blue / starch present / eq (1) • RHS inside flask yellow / orange / brown / no starch / eq (1)	If unlabelled allow LHS if shaded for one mark If starch and colour don't match no credit	**2**

Question Number	Answer	Additional guidance	Mark
3(c)	A description that includes • mineral 1 / eq (1) • function 1 / eq (1) • mineral 2 /eq (1) • function 2 / eq (1)	Can gain two for two correct mineral **ions** mineral with correct function not just for growth nitrate amino acids / proteins / enzymes / DNA magnesium chlorophyll / chloroplasts / photosynthesis iron chlorophyll / chloroplasts / photosynthesis /respiration phosphate DNA / ATP /cell membranes calcium cell walls/cell membranes potassium water balance / enzymes /photosynthesis /respiration Ignore phosphorous nitrogen but allow function So phosphorus for DNA scores one mark nitrogen for amino acids scores one mark	**4**

Question Number	Answer	Additional guidance	Mark
3(d)	An explanation makes reference to three of the following 1. active transport / eq (1) 2. no / less oxygen (in waterlogged / flooded soil) / eq (1) 3. no / less respiration / eq (1) 4. no / less energy / ATP / eq (1)	 No credit for no air	**3**

Question Number	Answer	additional guidance	Mark
4(a)(i)	• sucrose / sugars (1) • amino acids (1)	ignore glucose allow water / plant hormones / named plant hormone	**2**

Question Number	Answer	additional guidance	Mark
4(a)(ii)	An explanation that makes reference to three of the following 1. no /less respiration / no / less energy / eq (1) 2. no/ less protein / eq (1) 3. no / less growth / new cells / eq (1) 4. less fruit production / fewer oranges / smaller fruit / eq (1)	 No credit for less sugar amino acid or glucose Ignore less crops / less yield	**3**

Question Number	Answer	additional guidance	Mark
4(b)(i)	An answer that makes reference to five of the following 1. reduce (quickly / steeply) after ladybug introduced / eq (1) 2. as the ladybugs feed on scale / pests /eq (1) 3. scale insects numbers go up and down / fluctuate / oscillate /eq (1) 4. some pests required for ladybugs to feed on / scale insects never completely wiped out / eq (1) 5. insecticide release causes (rapid) increase in scale insects / pests / eq (1) 6. as (more) ladybugs killed (than scales / pests) eq (1) 7. fewer scale insects are eaten / less predation / eq (1) 8. insecticide becomes less effective / disperses / ladybugs recover / ladybugs develop resistance / eq (1) 9. scale insects / pest numbers drop / eq (1) 10. ladybugs / biological control more effective than insecticide / kill more pests/ eq (1)		**5**

Question Number	Answer	Additional guidance	Mark
4(b) (ii)	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 pollution alone allow contaminate crops ignore immune	**4**

Question Number	Answer	Additional guidance	Mark
5(a)(i)	• all DNA of an organism / complete set of genes / all of genetic material of an organism / eq (1)	allow ……..in a <u>diploid</u> cell	**1**

Question Number	Answer	Mark
5(a)(ii)	An explanation which makes reference to • a gene is a section of DNA that codes for a specific protein / polypeptide / eq (1) • allele is an alternative form / version of a gene / eq (1)	**2**

Question Number	Answer	Additional guidance	Mark
5(b)(i)	An answer that includes: (Parents) Bb Bb (1) (Gametes) B or b (B or b) (1) (Offspring) BB 2 Bb bb (1) (Phenotype ratio) 3 Black: 1 brown 75% Black: 25% brown or phenotypes in correct numbers evident (1)	allow any symbols allow different letters By x By BY x BY not 4 alleles eg not By bY ignore X and Y allow parent genotypes, gametes and offspring genotypes and ratio from Punnett square allow ECF allow correct offspring genotypes from incorrect parents 1 max	**4**

Question Number	Answer	Additional guidance	Mark
5(b)(ii)	calculation method not marking points 0.75 × 0.5 = 0.375 or 37.5 (%) or 3/8 (2)	Full marks for correct answer If answer incorrect allow one mark for 0.5 or 50(%) or ½ or 0.75 or ¾ or 75(%)	**2**

Question Number	Answer	Additional guidance	Mark
5(c)	An explanation that includes three of the following • cross with blue eyed female/ homozygous recessive female / eq (1) • if any offspring blue eyed then male is Bb / heterozygous / eq (1) • (if offspring brown eyed) repeat cross to obtain more foals/ eq (1) • if all offspring are brown / if never have blue eyed offspring / then male is BB/ homozygous / eq (1)	allow one mark for: Look at parents of male horse If one parent is blue eyed (bb) then Male horse is Bb / heterozygous (1)	**3**

Question Number	Answer	Additional guidance	Mark
6(a)(i)	calculation method not marking points 82 ÷ 120 = 0.683 0.683 × 100 = 68 or 68.3 or less 68.33 (2)	Full marks for correct answer If answer incorrect allow one mark for ÷ 120 Allow any number of significant figures that round to 68	**2**

Question Number	Answer	Additional guidance	Mark
6(a)(ii)	An explanation that makes reference to • (temperature) changes during the day / changes at night / eq (1) • is more realistic / natural / outside / simulates / mirrors / eq (1)	Ignore changes in seasons	**2**

Question Number	Answer	Mark
6(a)(iii)	• leaf area / growth of maize / leaf size / eq (1)	**1**

Question Number	Answer	additional guidance	Mark
6(b)(i)	An answer that includes • scales linear and at least 3.5 big squares on y axis and 3 on x axis (1) • lines straight and through all points (1) • axis right way round (days on x and leaf area y) with Units days and cm^2 / eq (1) • points correctly plotted within a small square (1) • key / labelled A and B	allow 2 different graphs for A and B ignore extrapolation Bar chart max 4 no L	**5**

Question Number	Answer	Additional guidance	**Mark**
6(b)(ii)	calculation method not marking points (6800 – 10) ÷ 100 67.9 or 68 (2)	Full marks for correct answer If answer incorrect allow one mark for 6790 or ÷ 100 Allow 70 (2)	**2**

Question Number	Answer	Additional guidance	Mark
6(b)(iii)	An explanation that makes reference to two of 1. no temperature difference up to 80 /82 days / increased temperature decrease growth /growth decreases in B / grows more in A after 80 / 82 days/ eq (1) 2. difference in growth in (first 80 / 82 days) due to other factors / light / eq (1) 3. enzyme denatures at higher temperature (B) / optimum is below 30 / eq (1) 4. enzyme and substrate no longer bind /change in active site /eq (1)	If no mp 1 to mp 4 marks awarded allow one alternative mark for link between temperature and kinetic energy or temperature and collisions /eq	**2**

Question Number	Answer	Additional guidance	Mark
6(b)(iv)	A description that makes reference to two of • draw around outline of / put on squared paper / grid / use transparent squared grid eq (1) • count squares / sum squares / eq (1) • multiply by 2 / for each side /eq (1)	measure width and length and multiply together	**2**

Question Number	Answer	Mark
7(a)(i)	**C (S)** A is not the answer as P is a platelet B is not the answer as Q is a white blood cell D is not the answer as T is a monocyte	**1**

Question Number	Answer	Mark
7(a)(ii)	**A (P)** B is not the answer as Q is a white blood cell C is not the answer as R is a lymphocyte D is not the answer as T is a monocyte	**1**

Question Number	Answer	Mark
7(a)(iii)	**C (R)** A is not the answer as P is a platelet B is not the answer as Q is a white blood cell D is not the answer as S is red blood cell	**1**

Question Number	Answer	Mark
7(a)(iv)	**B (iron)** A is not the answer as calcium is not found C is not the answer as magnesium is not found D is not the answer as sodium is not found	**1**

Question Number	Answer	additional guidance	Mark
7(b)	A description that makes reference to four of the following 1. phagocytes / white blood cells engulf pathogens / bacteria /eq (1) 2. phagocytes / white blood cells digest / break down / pathogens / bacteria /eq (1) 3. lymphocytes / white blood cells produce antibodies / eq (1) 4. antibodies are specific to pathogen / antigens / complementary to pathogen / antigens / eq (1) 5. antibodies attach to pathogens / bacteria / antigens / eq (1) 6. (antibodies) cause agglutination / sticking together / bursting / eq (1)	No credit for phagocytes release antibodies / lymphocytes engulf allow ref to memory cells as alternative to mp 6	**4**

Question Number	Answer	additional guidance	Mark

7(c)(i)	calculation method not marking points 5.0×10^{12} in one litre / dm^3 $(5.0 \times 10^{12}) \div (1 \times 10^6\ mm^3)$ So 5×10^6 in $1mm^3$ and 2 x in $2mm^3$ $= 1.0 \times 10^7$ or 1×10^7 (3)	Full marks for correct answer If answer incorrect allow one mark for $\div 1.0 \times 10^6$ ÷1000000 or 5.0×10^6 Allow 2 marks for 10×10^6 or 0.1×10^8 or 0.01×10^9 10 million Or 10 000 000	**3**

Question Number	Answer	additional guidance	Mark
7(c)(ii)	An answer that makes reference to five of the following 1. no difference in platelets (1) 2. no difference in clotting / scab formation / eq (1) 3. more phagocytes that engulf / digest pathogens / bacteria /eq (1) 4. more lymphocytes that produce antibodies / eq (1) 5. can fight infection / prevent disease / more effective immune system / can become immune /eq (1) 6. has an infection / bacteria / virus /sepsis / eq (1) 7. too much cell division / mutation / cancer / eq (1) 8. no difference in rbc / eq (1) 9. no difference in oxygen transport / no difference in respiration / not anaemic / eq (1)	allow converse for mp 3-mp7 for without condition	**5**

Question Number	Answer	additional guidance	Mark
8(a) (i)	• community / organisms **and** their (non-living) environment / habitat / eq (1)	allow biotic and abiotic factors	**1**

Question Number	Answer	additional guidance	Mark
8(a)(ii)	• all of the of organisms of all species in an area / all organisms in an area / all species in an area / eq (1)	allow different species allow in habitat	**1**

Question Number	Answer	additional guidance	Mark
8(a)(iii)	• all of **one** species / **a** species in an area / eq (1)	allow in habitat / ecosystem	**1**

Question Number	Answer	Mark
8 (b)	• direction (1) • producer / plant (1) • trophic (1) • heat / thermal (1) • respiration (1) • faeces / manure (1) • urine / urea / sweat (1) • bacteria (1)	**8**

Question Number	Answer	Additional guidance	Mark
9(a)	A description that includes : 1. restriction enzyme (1) 2. cuts DNA from donor / cuts / cuts / opens plasmid / cuts gene / cuts genetic material / produces sticky ends / complementary bases / eq (1) 3. ligase (1) 4. join / insert / stick DNA together / eq (1)	**If function does not match enzyme - can award one mark (for either enzyme or function)**	**4**

Question Number	Answer	Additional guidance	Mark
9(b)	An answer that makes reference to two of the following: • GM uses foreign DNA / from other species / transgenic / eq (1) • GM quicker / fewer generations /eq (1) • GM involves asexual / clones / eq (1) • GM uses enzymes / plasmids / vectors / eq (1)	allow converse selection uses same species slower uses sexual reproduction / crossing / pollination/ fertilisation /eq	**2**

Question Number	Answer	Additional guidance	Mark
10	C light and no light or different periods of light / light intensity / eq (1) O same species of seeds / same age / mass / eq (1) R repeat / (calculate mean) for each light / dark group / eq (1) M1 count number of seeds germinated / that have roots / shoots / split / eq (1) M2 after stated time period / eq (1) S1 same temperature / eq (1) S2 same water / same oxygen / same soil / eq (1)	Not just different light exposure unexplained Not repeat at different light periods / eq allow amount that have germinated ignore measure roots/shoots one day plus	**6**

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