Pearson Edexcel

Mark Scheme (Results)

Summer 2025

Pearson Edexcel International GCSE In Biology (4BI1) Paper 2B

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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	Additional guidance	Mark
1(a)	An answer that makes reference to one of the following points: • maintenance of constant (internal) conditions in body / eq (1) • control / regulating / maintaining internal conditions / eq (1) • control / regulating / maintaining internal environment / eq (1) • keeping conditions in body the same / within a (narrow) range / eq (1)	**Ignore** just examples e.g. temperature / water	**1**

Question Number	Answer	Additional guidance	Mark
1(b)	• 250 (1)		**1**

Question Number	Answer	Mark
(c)(i)	The only correct answer is **A (cell wall and cytoplasm only)** B is not the answer as bacteria do not have nuclei C is not the answer as bacteria do not have nuclei D is not the answer bacteria do not have nuclei	**1**

Question Number	Answer	Additional guidance	Mark
1(c)(ii)	An explanation that makes reference to the following points: 1. fertilisers / animal waste / minerals / nitrates / phosphates (run off / leach) / eq (1) 2. algal growth / eutrophication / eq (1) 3. less light (penetrates) / competition for light / less photosynthesis / eq (1) 4. decomposition / decay (of dead algae / plants / organisms / organic waste / manure / faeces / sewage) eq (1) 5. less oxygen / only anaerobic species grow / eq (1) 6. bacteria <u>respire</u> / other species cannot <u>respire</u> / reduced <u>respiration</u> / eq (1) 7. pesticides kill organisms / eq (1)	**Accept** other named correct minerals e.g potassium **Ignore** nitrogen / phosphorus **Accept** algal bloom **Accept** plants / producers grow **Accept** sewage fungus blocks light **Accept** becomes anoxic **Accept** decomposers <u>respire</u>	**4**

Question Number	Answer	Additional guidance	Mark
1(d)(i)	An answer that makes reference to one of the following points: • eggs / ova / follicles, do not mature / do not grow / eq (1) • (FSH is required to) mature eggs / ova / follicles (1) • (low FSH leads to) less oestrogen / (FSH) stimulates oestrogen release (1)	**Accept** female gametes **Ignore** prevents ovulation / FSH stimulates ovulation	**1**

Question Number	Answer	Additional guidance	Mark
1(d)(ii)	An answer that makes reference to one of the following points: • no ovulation occurs / egg not released / ova not released / eq (1) • LH / it stimulates ovulation / LH / it stimulates egg release / eq (1) • (lower LH leads to) less progesterone / LH / it stimulates progesterone (1)	**Accept** female gametes	**1**

Question Number	Answer	Additional guidance	Mark
1(e)(i)	An explanation that makes reference to two of the following points: • less water absorbed / less water enters blood / less water enters capillaries / eq (1) • (water moves by) <u>osmosis</u> (1) • water potential in blood is high(er) / water potential in gut / faeces / lumen is low(er) / eq (1)	**Accept** water does not enter blood **Accept** water moves from blood into faeces / gut / lumen / eq **Reject** water absorption **in kidneys** **Reject** salt moves by osmosis **Accept** blood is dilute / water concentration in blood is high(er) / water concentration in faeces / gut / lumen is low(er) **Accept** salt <u>concentration</u> of faeces is high(er) / salt <u>concentration</u> of blood is low (er) **Accept** correct reference to water potential gradient / concentration gradient	**2**

Question Number	Answer	Additional guidance	Mark
1(e)(ii)	An explanation that makes reference to three of the following points: 1. mutation (1) 2. (only resistant bacteria) survive / are not killed / non-resistant bacteria are die / eq (1) 3. bacteria reproduce / multiply / eq (1) 4. pass on allele / gene / mutation / eq (1)	 **Ignore** immune **Accept** survival of fittest **Accept** breed / offspring	**3**

Question Number	Answer	Additional guidance	Mark
1(f)(i)	An explanation that makes reference to two of the following points: • (denitrifying bacteria convert) nitrate into nitrogen (1) • so less eutrophication / less algal growth / more oxygen in river / lower BOD / eq (1) • wood chips have large surface area (for bacteria) / wood chips are biodegradable (so do not pollute) / eq (1)	 **Accept** nitrite to nitrogen **Ignore** less pollution	**2**

Question Number	Answer	Additional guidance	Mark
1(f)(ii)	An explanation that makes reference to two of the following points: 1. trees / roots absorb water / trees intercept water / eq (1) 2. (more) <u>transpiration</u> (1) 3. less runoff / slows down water flow / more soil permeability / more infiltration / eq (1) 4. less soil erosion / roots hold onto soil / roots stabilise soil / eq (1) 5. rivers do not get blocked (with soil) / eq (1)	**Accept** substrate for soil **Accept** trees for roots **Accept** do not silt up	**2**

(Total for Question 1 = 18 marks)

Question Number	Answer	Mark
(a)(i)	The only correct answer is **B (carbon dioxide and water)** A is not the answer as lungs do not excrete urea C is not the answer as lungs do not excrete urea D is not the answer lungs do not excrete urea	**1**

Question Number	Answer	Additional guidance	Mark
2(a)(ii)	An explanation that makes reference to three of the following points: 1. <u>volume</u> increases / inhalation occurs / air drawn in / eq (1) 2. diaphragm / intercostal muscles contract (1) 3. diaphragm moves down / flattens / eq (1) 4. ribcage expands / eq (1) 5. pressure decreases (inside thorax / lungs) / eq (1)	**Accept** internal intercostal muscles relax **Accept** ribs move up / move out / eq **Accept** thorax / chest expands / eq **Accept** pressure higher outside / eq	**3**

Question Number	Answer	Additional guidance	Mark
2(b)	An explanation that makes reference to three of the following points: 1. glucose in urine / eq (1) 2. glucose released by <u>ultrafiltration</u> (into filtrate) / eq (1) 3. glucose not <u>re</u>absorbed / too much glucose (in filtrate) to <u>re</u>absorb / eq (1) 4. in the proximal convoluted tubule / PCT / first convoluted tubule / eq (1) 5. by active transport / eq (1)	**Accept** glucose not absorbed into blood **Accept** some glucose not reabsorbed **Reject** if active transport pumping glucose into filtrate	**3**

(Total for Question 2 = 7 marks)

Question Number	Answer	Mark
3(a)	The only correct answer is **A P** B is not the answer as **Q** is the cornea C is not the answer as **R** is the iris D is not the answer as **S** is the conjunctiva	**1**

Question Number	Answer	Additional guidance	Mark
3(b)(i)	8.2 (2) **Only one mark for:** 24.7 **OR** division by 3 **OR** 8.23….	**Accept** if written in table if nothing written on answer line **Correct answer gains all marks**	**2**

Question Number	Answer	Additional guidance	Mark
3(b)(ii)	A description that makes reference to two of the following points: • (diameter) decreases / pupil smaller / eq (1) • small decrease between 4(au) and 5(au) / starts to level off after 3(au) / starts to level off from 4(au) / large decrease between 2 and 3 (au) / calculated fall / eq (1)	**Accept** any calculated difference in diameter e.g. 6.2 between 1 and 5	**2**

Question Number	Answer	Additional guidance	Mark
3(b)(iii)	An explanation that makes reference to three of the following points: • less light enters (eye) / passes through pupil / eq (1) • to prevent damage to retina / eq (1) • (as pupil narrows) circular muscles (of iris) contract (1) • (as pupil narrows) radial muscles (of iris) relax (1)	**Accept** converse for all mark points for low light intensity **Accept** prevent overstimulation of retina **Accept** prevent damage to rods / cones / fovea **Accept** prevent risk of cataracts **Ignore** damage eye	**3**

Question Number	Answer	Mark
3(b)(iv)	An explanation that makes reference to one of the following points: • distance from camera (1) • same student / person / same eye / left or right eye (1) • food / drinks / caffeine consumed / eq (1) • recovery time / time spent with mask on (1) • noise in room (1) • other light sources / distance from light (1) • (type of) mask (1) • colour of light / wavelength of light (1)	**1**

Question Number	Answer	Additional guidance	Mark
3(b)(v)	An explanation that makes reference to two of the following points: 1. using a camera (to record) / takes a photograph / uses an image / eq (1) 2. waiting 20 s (each time) / waiting same time / eq (1) 3. pupil is not changing size / is stationary / eye has adjusted / eq (1)	**Accept** (image) measured on flat surface / ruler can be placed directly on image (rather than in front of eye) **Accept** can magnify (an image) / eq **Accept** iris has had time to change shape	**2**

(Total for Question 3 = 11 marks)

Question Number	Answer	Additional guidance	Mark
4(a)	An explanation that makes reference to the following points: • diploid (1) • egg (cell) / ovum (1) • (electric) shock / shock (1) • mitosis (1) • uterus / womb (1)	**Accept** 2n **Reject** mei… e.g. meitosis/ **Accept** mytosis **Ignore** endometrium	**5**

Question Number	Answer	Additional guidance	Mark
4(b)	An answer that makes reference to five of the following points: 1. most embryos made with cattle / fewest embryos made with goats / eq (1) 2. low success rate / few live births / few survive / pets usually live longer than two years / low life expectancy / eq (1) 3. cattle have highest survival rate (from live births) / goats have lowest survival rates (from live births) / eq (1) 4. goats have highest live birth rate / cattle have lowest live birth rate (1) 5. credit <u>manipulated</u> data (1) 6. cloning is expensive / not cost effective / more cost than buying a new pet / eq (1) 7. cloned pets are <u>genetically</u> identical / little <u>genetic</u> variation / could pass on harmful alleles / eq (1) 8. some variation is environmental / not all variation is genetic / some features of pets will not be same / eq (1) 9. no data for pets / pets may be different to farm animals / needs to be repeated for pets / eq (1) 10. raises ethical issues / may not be ethical / eq (1) 11. pet cloning could provide emotional benefits for people / eq (1)	**Accept** many attempts with cattle / few attempts with goats **Accept** most eggs / clones / embryos are wasted / very wasteful process **Accept** goats have highest (overall) survival rate (from embryos) / sheep have lowest (overall) survival rate (from embryos) **Accept** calculated percentages / fractions / ratios **Accept** not everyone can afford it **Accept** harmful genes would be the same in clones **Accept** behaviour / learning of pets may be different **Accept** may not be seen as moral	**5**

(Total for Question 4 = 10 marks

Question Number	Answer	Mark
5(a)	The only correct answer is C **Y** A **W** is not the answer as it does not contain xylem B **X** is not the answer as it does not contain xylem D **Z** is not the answer as it does not contain xylem	**1**

Question Number	**Answer**	**Additional guidance**	**Mark**
5(b)(i)	• 8.16(4) (2) **One mark for:** ÷ by 5 **OR** X 52 **OR** X 0.25 **OR** 0.8(164) **OR** 40.82 (allow between 40.82 and 40.85)	**Allow** answers between 8.16 and 8.2 **Allow** answers between 0.816 and 0.82 for 1 mark **Correct answer gains both marks**	**2**

Question Number	Answer	Additional guidance	Mark
5(b)(ii)	A description that makes reference to four of the following points: 1. set up potometer underwater / cut stem underwater / dry leaves / eq (1) 2. use a fan at different distances / with and without fans / different fan speeds / eq (1) 3. leave for set time / stated time (1) 4. measure distance bubble moves / distance water moves (on scale) / eq (1) 5. keep other factors constant (1) 6. repeat / reset bubble with reservoir / eq (1)	**Accept** wafting with card / hairdryer **Accept** time taken to move set distance for mp3 and mp4 **Accept** named factors e.g. temperature / humidity / light intensity / CO_2	**4**

Question Number	Answer	Additional guidance	Mark
5(c)	An answer that makes reference to four of the following points: 1. at start / for first two days, ABA is low / is 0.5 **OR** at start / for first two days water loss is high / is 100 (1) 2. after two days / from three days ABA increases **OR** after two days / from three days percentage water loss decreases / eq (1) 3. after five days / after watering / ABA decreases **OR** after five days / after watering water loss increases / eq (1) 4. as ABA increases water loss decreases / inverse relationship / negative correlation / eq (1) 5. ABA closes stomata / stomata open when ABA low / eq (1) 6. stomata close from two days / stomata close from three days / eq 7. stomata closing reduces transpiration / water loss / evaporation / stomata closing prevents wilting / stomata closing prevents loss of turgidity / ABA reduces transpiration / eq (1) 8. light intensity may change / humidity may change / wind may change / eq (1)	**Accept** when ABA is high, water loss is low **Accept** stomata open for first two days / stomata open after 5/6/7 days / after watering **Accept** converse for open stomata / low ABA **Accept** other correct named factors	**4**

(Total for Question 5 = 11 marks)

Question Number	Answer	Additional guidance	Mark
6(a)(i)	• 1400 (%) (2) **One mark** for 75-5 **OR** 70 **OR** ÷ 5		2

Question Number	Answer	Additional guidance	Mark
6(a)(ii)	An explanation that makes reference to three of the following points: 1. optimum pH is 7 (1) 2. (pH causes) enzyme to denature (1) 3. shape of enzyme changes / shape of active site changes / eq (1) 4. substrate does not fit active site / enzyme no longer complementary / cannot form E/S complexes / eq (1)	**Accept** optimal pH is 7 **Reject** optimum <u>temperature</u> **Accept** at optimum pH (many) E/S complexes form / eq	3

Question Number	Answer	Additional guidance	Mark
6(a)(iii)	An explanation that makes reference to two of the following points: 1. use a colour matching chart / light sensor / colorimeter / eq (1) 2. (because) colour change is subjective / to standardise the end colour / so colour is always same / eq (1) 3. use intervals of shorter than 5 minutes / shorter intervals / check more often check colour constantly / eq (1)	**Accept** use a reference colour / eq **Accept** depends on person viewing / eq	**2**

Question Number	Answer	Additional guidance	Mark
6(b)(i)	An answer that makes reference to three of the following points: 1. DNA is double stranded / RNA is single stranded (1) 2. DNA has T / RNA has U (1) 3. DNA is a helix / RNA is not a helix (1) 4. DNA has deoxyribose / RNA has ribose (1)	**Accept** DNA is a double helix = mp1 and mp3	**2**

	Answer	Additional guidance	Mark
6(b)(ii)	An explanation that makes reference to four of the following points: 1. (complementary) RNA binds to the phenol oxidase RNA / eq (1) 2. translation **cannot** occur (1) 3. so enzyme / phenol oxidase **not made** (1) **AND** **max three from:** 4. transcription makes (m)RNA (1) 5. RNA leaves nucleus and enters cytoplasm / RNA moves to ribosome / eq (1) 6. tRNA brings / carries / transports amino acids / eq (1) 7. (during translation) tRNA binds mRNA / anticodons bind codons (1) 8. amino acids join / amino acid chain / makes polypeptide / peptide bonds form / eq (1)	**Accept** DNA unzips and (m)RNA is made **Accept** polymerase makes (m)RNA **Accept** anticodons and codons cannot bind (if complementary RNA present) (1) **Accept** different amino <u>sequence</u> made / amino acids are not joined together **Ignore** wrong amino acid made	**4**

(Total for Question 6 = 13 marks)