



Mark Scheme (Results)

Summer 2026

Pearson Edexcel International GCSE in Biology

4BI1/2B

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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	Mark
1(a)(i)	The only correct answer is D (restriction) <i>A is not correct as ligase does not cut DNA</i> <i>B is not correct as lipase does not cut DNA</i> <i>C is not correct as maltase does not cut DNA</i>	1

Question Number	Answer	Additional guidance	Mark
1(a)(ii)	• 300 (2) One mark for any of: <u>20(%) G</u> OR <u>20(%) C</u> OR <u>60(%) A and T</u> OR <u>40(%) G and C</u> OR 450 (in working)	Do not accept numbers unqualified except 450	2

Question Number	Answer	Additional guidance	Mark
1(b)	A description that makes reference to three of the following points: 1. (translation occurs at/ mRNA binds to) ribosome / eq (1) 2. tRNA brings amino acids / eq (1) 3. (tRNA) anticodon binds with (mRNA) codon / eq (1) 4. amino acids are joined together / chain of amino acids forms / peptide bonds formed / eq (1)	Reject mRNA anticodon binds with tRNA codon Ignore polypeptide Ignore protein	3

Question Number	Answer	Additional guidance	Mark
1(c)	An answer that makes reference to the following point: • other areas (of genome/ DNA) may have similar (sequences) / other areas may have same (sequences) / eq (1) • guide RNA is complementary to other areas / DNA / eq (1)	Ignore bind to wrong area unqualified	1

Question Number	Answer	Additional guidance	Mark
1(d)(i)	• both (alleles) affect the phenotype / both (alleles) are expressed / eq (1)	Reject both genes are expressed Accept both versions of a gene expressed	1

Question Number	Answer	Additional guidance	Mark
1(d)(ii)	An explanation that makes reference to three of the following points: 1. as red blood cells have lower surface area / eq (1) 2. less <u>oxygen</u> (can reach tissues) / eq (1) 3. less respiration / eq (1) 4. fewer white blood cells can reach tissues / fewer antibodies can reach tissues / eq (1)	Accept low S.A Accept low S.A.: Vol ratio Accept less oxygen transport Accept more anaerobic respiration Accept fewer lymphocytes can reach tissues / fewer phagocytes can reach tissues	3

Question Number	Answer	Additional guidance	Mark
1(d)(iii)	An explanation that makes reference to three of the following points: 1. (genetic) variation (existed in population) / eq (1) 2. heterozygotes survive / people with (mild) sickle cell allele survive (malaria) / eq (1) 3. reproduce / have offspring / eq (1) 4. pass on allele / eq (1)	Accept converse for mp2, mp3, mp4 Accept carriers survive Note pass on allele to offspring = mp3 and mp4 Accept pass on gene Accept pass	3

	5. high chance of two heterozygotes having child with two sickle cell alleles / eq (1)	on mutation	
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Question Number	Answer	Additional guidance	Mark
1(e)	An explanation that makes reference to the following points: - stem cells are <u>undifferentiated</u> / stem cells can <u>differentiate</u> / stem cells can <u>specialise</u> / stem cells are <u>unspecialised</u> / eq (1) - can multiply / can divide / can undergo mitosis / eq (1)	Accept converse for body cells Accept stem, cells are <u>not differentiated</u> / are <u>not specialised</u> Accept replicate Reject meiosis	2

Question Number	Answer	Additional guidance	Mark
1(f)	An answer that makes reference to one of the following points: - ethical issues / may be against religion / eq (1) - could have side effects / unknown effects / may cause mutations / eq (1) - would change whole organisms / would change future generations /eq (1) - issues of not being able to give consent / against human rights / eq (1)	Accept not moral Accept it is a form of eugenics Ignore inhumane Accept changes inherited / passed on Accept future	1

		generations cannot consent	
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(Total for Question 1 = 17 marks)

Question Number	Answer	Additional guidance	Mark
2(a)	An explanation that makes reference to two of the following points: 1. fewer minerals absorbed (by tree roots) / eq (1) 2. soil erosion / roots do not hold soil / soil erodes into water bodies / soil enters water / eq (1) 3. less transpiration / less evaporation from leaves / less water taken up by trees / eq (1) 4. less drainage through soil / reduced (soil) permeability / less absorption <u>by soil / ground</u> / eq (1) 5. more decomposition (of dead trees) / more decay / eq (1)	Accept fewer / no trees to absorb minerals Accept nutrients for minerals Accept roots hold soil together Accept less absorption of water <u>by trees / roots</u> Accept less infiltration / less interception (of rain) Ignore runoff	2

Question Number	Answer	Additional guidance	Mark
2(b)(i)	• <u>all</u> (the) organisms (of all species) in an area / <u>all</u> (the) organisms in an area / <u>all</u> species in an area / eq (1)	Accept habitat / ecosystem / region for area Accept every organism for all organisms Accept all the populations in	1

		an area Accept all the biotic (elements) of an area Reject all the biotic and abiotic (elements) of an area	
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Question Number	Answer	Additional guidance	Mark
2(b)(ii)	A description that makes reference to four of the following points: 1. use deforested area and forested area / eq (1) 2. quadrat (1) 3. use random (locations) / eq (1) 4. multiple quadrats / coordinates / repeat / eq (1) 5. count number of (different) <u>species</u> / how many different <u>species</u> / count number of each <u>species</u> / eq (1) 6. same time of year / same day / same weather / same time / seasons / eq (1)	Reject quadrant once Note quadrats = 2 marks	4

(Total for Question 2 = 7 marks)

Question Number	Answer	Additional guidance	Mark
3(a)(i)	An answer that makes reference to one of the following points: • prevent evaporation / prevent water loss / eq (1) • so water loss is from plant (only) / eq (1)	Reject prevent evaporation from plant	1

Question Number	Answer	Additional guidance	Mark
3(a)(ii)	An answer that makes reference to two of the following points: • wind (speed) / air movements / eq (1) • humidity / moisture / eq (1) • temperature / eq (1)	Ignore heat Ignore light / distance of lamp Ignore carbon dioxide	2

Question Number	Answer	Additional guidance	Mark
3(b)(i)	0.033 (3) Allow Two marks for 0.03333..... OR 0.03 One mark only for: ÷240 OR 120-112 in working OR 8 (q) in working	Ignore negative symbol Accept 112 - 120	3

Question Number	Answer	Additional guidance	Mark
3(b)(ii)	An explanation that makes reference to three of the following points: 1. <u>mass</u> decreases more with high(er) light intensity / less fall in <u>mass</u> with low(er) light intensity / eq (1) 2. transpiration is high(er) in high light intensity / transpiration is low(er) in low light intensity / eq (1) 3. stomata are open in high light / stomata are closed in low light / eq (1) 4. <u>guard cells</u> (open stomata) / <u>guard cells</u> (close stomata) / eq (1)	Accept <u>mass</u> decreases faster in high light / <u>mass</u> decreases slower in low light Accept evaporation / water loss for transpiration	3

Question Number	Answer	Additional guidance	Mark
3(b)(iii)	An explanation that makes reference to two of the following points: 1. more water taken up than lost / not all water is lost / (some) water stays in plant / (some) water not transpired / eq (1) 2. (water) maintains turgidity / prevents	Accept change in mass is less than change in volume Accept decrease in mass is less than decrease in volume Accept 27 (lost) and 30 (taken up) Accept 3 (cm³) remains in plants Accept plant	2

	wilting / supports plant / (water) in xylem / absorbed into <u>cells</u> / as turgor / eq (1) 3. (as some water) used in photosynthesis / metabolic processes / used in chemical reactions / eq (1)	shoot may have been dehydrated	
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(Total for Question 3 = 11 marks)

Question Number	Answer	Mark
4(a)(i)	The only correct answer is B (they have nuclei in their cells) <i>A is not the answer as some eukaryotes are single celled</i> <i>C is not the answer as some eukaryotes do not have chloroplasts</i> <i>D is not the answer as eukaryotes do not have a protein coat</i>	1

Question Number	Answer	Mark
4(a)(ii)	The only correct answer is A (carbon dioxide) <i>B is not the answer as nitrate is not excreted by plants</i> <i>C is not the answer as oxygen is not excreted by animals</i> <i>D is not the answer as urea is not excreted by plants</i>	1

Question Number	Answer	Mark
4(b)(i)	The only correct answer is D (proximal convoluted tubule) <i>A is not the answer as glucose is not absorbed in the Bowman's capsule</i> <i>B is not the answer as glucose is not absorbed in the collecting duct</i> <i>C is not the answer as glucose is not absorbed in the loop of Henle</i>	1

Question Number	Answer	Mark
4(b)(ii)	The only correct answer is D (oxygen and urea) <i>A is not the answer as carbon dioxide is higher in the renal vein</i> <i>B is not the answer as carbon dioxide is higher in the renal vein</i> <i>C is not the answer as urea also has a higher concentration in the renal artery</i>	1

Question Number	Answer	Additional guidance	Mark
4(b)(iii)	An explanation that makes reference to three of the following points: 1. collecting duct <u>less</u> permeable / eq (1) 2. less water <u>re</u>absorbed / less water absorbed into blood / eq (1) 3. by osmosis (1) 4. so high volume of urine / eq (1)	Accept ADH makes collecting duct more permeable Accept ADH causes more water to be <u>re</u>absorbed / more water to be absorbed into the blood Accept with ADH there would be a low(er) urine volume Accept urine more dilute	3

Question Number	Answer	Additional guidance	Mark
4(c)	An answer that makes reference to five of the following points: 1. (sodium chloride / urea / glucose move by) <u>diffusion</u> / eq (1) 2. (excess) sodium chloride is removed as there is a (concentration) gradient / more in blood than fluid / eq (1) 3. glucose is not removed as more glucose in fluid than blood / some glucose passes into patient as more glucose in fluid than blood / eq (1) 4. glucose is needed for respiration / eq (1) 5. (most) urea removed as there is none in fluid / (most) urea removed as there is a gradient / more in blood than fluid / eq (1) 6. urea is a toxin / urea is excreted / urea is not needed in body / eq (1) 7. glucose reduces water <u>potential</u> / eq (1) 8. (excess) water will leave by <u>osmosis</u> (1) 9. protein is too large to pass through membrane / eq (1) 10. membrane has large surface area / eq (1) 11. fluid refreshed to maintain gradient / eq (1)	Accept salt for sodium chloride Accept not all sodium chloride removed as some present in fluid / same as in healthy blood Accept glucose is needed for energy Accept all urea	5

(Total for Question 4 = 12 marks)

Question Number	Answer	Additional guidance	Mark
5(a)	• P: sensory (neurone) • Q: relay / inter / bipolar / multipolar / association / coordinator (neurone) • R: motor (neurone) (2) Two marks if all three correct Allow one mark for any one correct neurone		2

Question Number	Answer	Additional guidance	Mark
5(b)(i)	• 16 / 15.7 / 15.75 / 15.8 (1) • 15 (1)		2

Question Number	Answer	Additional guidance	Mark
5(b)(ii)	• 0.12 (1)		1

Question Number	Answer	Additional guidance	Mark
5(b)(iii)	An answer that makes reference to three of the following points: 1. sight takes less <u>time</u> / ruler falls <u>less distance</u> with sight / ruler is caught <u>more quickly</u> with sight / sight is a faster <u>reaction</u> / sight is a faster <u>response</u> / eq (1) 2. distance (of pathway / impulse travels) for sight is short(er) / eq (1)	Accept converse Ignore sight is faster unqualified Ignore faster time Ignore faster reflex (arc) Accept converse for touch	3

	3. (overall) <u>impulse</u> is <u>faster</u> for <u>touch</u> / <u>impulse</u> speed was not calculated / need to calculate <u>impulse</u> speed / no information given on actual <u>impulse</u> speed / eq (1) 4. credit attempt at calculation of impulse <u>speed</u> (1) 5. idea that synapse numbers may differ / (number of) synapses may affect speed / eq (1) 6. neurotransmitters (diffuse) across synapses / eq (1)	Accept converse Accept <u>impulses</u> (may) travel at same <u>speeds</u> / sight <u>impulse</u> may not be faster / eq Reject <u>impulse</u> speed is quicker for sight e.g. 875 cm/s for sight Accept number of neurones may differ	
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Question Number	Answer	Additional guidance	Mark
5(b)(iv)	An answer that makes reference to two of the following points: 1. (reliable because) data has been repeated / done eight times / eq (1) 2. (reliable because) there are no outliers / no anomalies / all values are similar / eq (1) 3. (not reliable as) only one person was used / need to use more people / eq (1)	Accept few outliers / few anomalies	2

(Total for Question 5 = 10 marks)

Question Number	Answer	Additional guidance	Mark
6(a)(i)	• <u>primary consumer</u> / <u>1° consumer</u> / second (trophic level) / 2 / eq (1)	Reject second(ary) consumer Reject 2° Reject secondary Ignore herbivore	1

Question Number	Answer	Additional guidance	Mark
6(a)(ii)	A description that makes reference to three of the following points: 1. decomposer (bacteria) produce ammonium (from waste) / ammonification occurs / eq (1) 2. ammonium is converted into nitrite (1) 3. nitrite is converted to nitrate (1) 4. nitrifying bacteria / nitrification (1)	Accept ammonia throughout Accept decay / decomposition produces ammonium Accept ammonium into nitrate for one mark if no mp2 or 3 Reject denitrifying / nitrogen fixing	3

Question Number	Answer	Additional guidance	Mark
6(a)(iii)	An explanation that makes reference to the following points: • (to make) amino acids (1) • (amino acids to make) proteins / enzymes (1)	Accept chlorophyll Accept chlorophyll for photosynthesis	2

Question Number	Answer	Additional guidance	Mark
6(a)(iv)	An explanation that makes reference to two of the following points: • provides oxygen / eq (1) • for respiration / eq (1) • (releasing) energy for active transport (of minerals) (1)	Ignore carbon dioxide Ignore photosynthesis Accept oxygen and carbon dioxide for respiration and photosynthesis for two marks BUT oxygen and carbon dioxide for photosynthesis and respiration is only one mark	2

Question Number	Answer	Additional guidance	Mark
6(b)	An answer that makes reference to five of the following points: 1. less waste / less faeces / waste is converted into fertiliser / eq (1) 2. less eutrophication / fewer nutrients / fewer minerals / fewer nitrates (in water) / eq (1) 3. fewer algal blooms / eq (1) 4. less decomposition / decay / eq (1) 5. more oxygen (in water) / eq (1) 6. less respiration by bacteria / fish can respire / fish do not suffocate / eq (1)	Accept converse for conventional for all mps Accept old food is removed / waste is recycled Ignore pesticides cause eutrophication Ignore	5

	7. fish do not escape / eq (1) 8. plant based food is more sustainable / wild fish stocks remain higher / fewer (wild) fish harvested / plant food removes carbon (from atmosphere) / less overfishing / eq (1) 9. less bioaccumulation of pesticides / fewer wild species killed by pesticides / less chance of pests becoming resistant / eq (1) 10. less disease (spread) / eq (1) 11. wild fish not damaged by nets / nets do not damage habitats / eq (1) 12. food <u>webs</u> / food <u>chains</u> not damaged / eq (1)	organisms die less Accept fewer wild fish killed for food Accept wild fish populations increase Accept fewer organisms harmed by pesticides Ignore bacterial resistance Ignore pesticide release unqualified Accept idea of fewer organisms damaged by nets / eq	
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(Total for Question 5 = 11 marks)