

EDEXCEL • GCSE BIOLOGY 1B10

Higher Tier — Paper 1

June 2025 exam series

MARK SCHEME

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Mark Scheme (Results)

Summer 2025

Pearson Edexcel GCSE
In Biology (1BI0)
Paper 1H

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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.

Mark schemes have been developed so that the rubrics of each mark scheme reflects the characteristics of the skills within the AO being targeted and the requirements of the command word. So for example the command word 'Explain' requires an identification of a point and then reasoning/justification of the point.

Explain questions can be asked across all AOs. The distinction comes whether the identification is via a judgment made to reach a conclusion, or, making a point through application of knowledge to reason/justify the point made through application of understanding. It is the combination and linkage of the marking points that is needed to gain full marks.

When marking questions with a 'describe' or 'explain' command word, the detailed marking guidance below should be consulted to ensure consistency of marking.

Assessment Objective		Command Word	
Strand	Element	Describe	Explain
AO1*		An answer that combines the marking points to provide a logical description	An explanation that links identification of a point with reasoning/justification(s) as required
AO2		An answer that combines the marking points to provide a logical description, showing application of knowledge and understanding	An explanation that links identification of a point (by applying knowledge) with reasoning/justification (application of understanding)
AO3	1a and 1b	An answer that combines points of interpretation/evaluation to provide a logical description	
AO3	2a and 2b		An explanation that combines identification via a judgment to reach a conclusion via justification/reasoning
AO3	3a	An answer that combines the marking points to provide a logical description of the plan/method/experiment	
AO3	3b		An explanation that combines identifying an improvement of the experimental procedure with a linked justification/reasoning

*there will be situations where an AO1 question will include elements of recall of knowledge directly from the specification (up to a maximum of 15%). These will be identified by an asterisk in the mark scheme.

Biology 1BIO_1H

Question number	Answer	Mark
1(a)(i)	B 120 cm The only correct answer is B A, C and D are not correct because they are not on the 10th percentile for an 8-year-old boy	(1) AO2 2

Question number	Answer	Additional guidance	Mark
1(a)(ii)	An answer linking: • he is growing as expected (1) • because the boy is still on the 5th percentile (1)	accept healthy growth accept he is on the 5th percentile (at age 6) / the same percentile	(2) AO3 2a+2b

Question number	Answer	Additional guidance	Mark
1(b)(i)	An answer including: • add ethanol and water (1) • a white emulsion is present (1) OR • rub food on paper (1) • leaves grease spot (1)	accept cloudy accept emulsion test	(2) AO1 2

Question number	Answer	Mark
1(b)(ii)	B fatty acids The only correct answer is B A, C and D are not correct because they are not produced when fats are digested	(1) AO1 1

Question number	Answer	Additional Guidance	Mark
1 (c)	the energy (content of food)	accept calories / joules	(1)
		ignore temperature (change)	AO1 1

Total for question 1 = 7 marks

Question number	Answer	Additional guidance	Mark
2 (a)	Any two from: • take antibiotics (1) • vaccination / immunisation (1) • covering mouth when sneezing or coughing / wear a (face) mask (1) • isolation of (infected individuals) / avoid contact with infected people (1) • washing hands / disinfecting surfaces (1)	ignore take medicine / drugs ignore PPE accept avoid mixing in groups / more ventilation / air filters	(2) AO1 1

Question number	Answer	Additional guidance	Mark
2(b)(i)	(because) it cannot be passed from person to person / it is not caused by a pathogen	ignore it cannot be spread unqualified accept it is caused by consuming alcohol (1)	(1) AO1 1

Question number	Answer	Additional guidance	Mark
2(b)(ii)	calculation $(80 \div 90) = 0.8888$ (1) 0.89	award full marks for the correct answer with no working accept 0.88 / 0.8 / 0.9 / 0.90 / 1.13 for one mark	(2) AO2 1

Question number	Answer	Additional guidance	Mark
2(b)(iii)	An explanation linking: - the risk to health is low (1) (because excess mass) is not around the {waist / vital organs}	ignore no risk accept because the {WHR / 0.75} is less than 0.80 (1)	(2) AO3 2a2b

Question number	Answer	Additional guidance	Mark
2(c)	An answer including two from: - two (cells produced) (1) - diploid / two sets of chromosomes (1) genetically identical (1) - body cells (1)	ignore they double / duplicate accept a full set of chromosomes reject haploid accept somatic cells	(2) AO1 1

Total for Question 2 = 9 marks

Question number	Answer	Additional guidance	Mark
3(a)	An explanation including three from: (the mass) will increase (1) because water will move into the potato (cells) (1) water moves across a {partially / semi} permeable membrane (1) by <u>osmosis</u> (1) from a high water concentration to low water concentration (1)	accept weight for mass accept potato absorbs water accept references to down a water concentration gradient / water potential / low to high {solute / named solute} concentrations maximum two marks if mass change or direction of water movement incorrect	(3) AO2 1

Question number	Answer	Additional guidance	Mark
3(b)(i)	$3 \times 3 \times 3 / 3^3$ (1) 27 (cm³)	award full marks for the correct answer with no working accept $54 \div 2$	(2) AO2 1

Question number	Answer	Additional guidance	Mark
3(b)(ii)	An explanation linking two from: - cube A takes less time (1) - because cube A {is smaller / has a smaller volume} / surface area to volume ratio of cube A is greater (1) - as A has a shorter diffusion distance (1)	accept reverse argument for B against all three marking points ignore the surface area of cube A is smaller	(2) A03 1a1b

Total for Question 3 = 7 marks

Question number	Answer	Mark
4(a)(i)	C genes The only correct answer is C A, B and D are not correct because they are units of inheritance.	(1) AO1 1

Question number	Answer	Mark
4 (a)(ii)	wrinkled characteristic is recessive / wrinkled characteristic is not passed on	(1) AO2 1

Question number	Answer			Additional guidance	Mark
4(b)(i)		R	r	accept rR	(3) AO3 1a and 1b
	R	RR	Rr	accept other letters	
	r	Rr	rr		
	correct parental gametes (1)				
	correct offspring genotypes (1)			ecf from incorrect parental genotypes	
	percentage probability = 25% (1)			ecf from incorrect Punnett square	

Question number	Answer	Additional guidance	Mark
4(b)(ii)	Any two from: - grow in a greenhouse (1) (same) soil (conditions) (1) (same) temperature / use a heater (1) (same) light / use a lamp (1) (same) watering / rain (1) - eliminate (micro) organisms / insects (1)	accept enclosed area / (same) carbon dioxide (concentration) accept named soil condition e.g. pH accept optimum temperature accept same humidity accept pathogens / named pathogens accept use pesticides accept control {abiotic / biotic} factors (1)	(2) AO2 2

Question number	Answer			Additional guidance	Mark	
4(c)(i)		feature	asexual reproduction	sexual reproduction	accept Y / ✓ / true for Yes accept N / X / false for No	(3) AO1 1
		produce genetically identical offspring	yes	no		
		requires male and female gametes	no	yes		
		rapid reproductive cycle	yes	no		
	one mark for each correct row of the table					

Question number	Answer	Additional Guidance	Mark
4 (c)(ii)	{two copies / pairs} of each chromosome / full set of chromosomes	accept 46 chromosomes / a chromosome from the male and a chromosome from the female ignore double the number of chromosomes / all of the chromosomes / all the genetic material	(1) AO1 1

Total for Question 4 = 11 marks

Question number	Answer	Mark
5(a)(i)	900 000 / 0.9 million / 900 thousand / 9 hundred thousand / nine hundred thousand / 9×10^5 (years) ignore 0.9	(1) AO2 1

Question number	Answer	Additional guidance	Mark
5(a)(ii)	Any one from: • hunting (1) • skinning (1) • making other tools (1) • preparing food / cooking (1) • fighting / weapons / defence (1) • building / making shelters (1) • making fire (1)	accept any other reasonable use of tools accept to break rocks ignore protection unqualified accept to date fossils (1)	(1) AO1 1

Question number	Answer	Additional guidance	Mark
5(a)(iii)	Any two from: - Lucy was shorter (1) - Lucy had a smaller skull (1) - Lucy was less upright (1) - Lucy had {longer arms / shorter legs} (1)	accept reverse arguments for <i>Homo habilis</i> for all mark points accept smaller brain / (changes to) skull shape or jaw / changes to teeth ignore bipedal / walked upright accept Lucy had a larger big toe / longer fingers (1)	(2) AO1 1

Question number	Answer	Additional guidance	Mark
5(a)(iv)	An explanation linking: - selection pressure / change in environment (1) - no advantageous adaptations (1) - unable to compete / they are outcompeted (1)	accept examples e.g. disease / predator / lack of food / natural disaster accept they cannot adapt (to the change) accept another species was better adapted accept there was competition	(3) AO2

Question number	Answer	Additional guidance	Mark
6(a)(i)	An answer including: • (structure P) is for movement / swimming (1) • (structure Q) is for protection / maintain the structure / prevents cell bursting (1)	accept it controls what {enters / leaves} the cell accept to adhere to other cells	(2) AO1 1

Question number	Answer	Additional guidance	Mark
6(a)(ii)	unit conversion $12 \times 1000 / 12\ 000 / 2.0 \div 1000 / 0.002$ (1) substitution $(12\ 000 \div 2.0 / 12 \div 0.002)$ = 6000	award full marks for correct answer with no working ecf for incorrect unit conversion award one mark for the answer with a power of ten error ignore units	(2) AO2 1

Question number	Answer	Additional guidance	Mark
6(a)(iii)	diarrhoea	accept nausea / vomiting / dehydration / stomach pain	(1) AO1 1

Question number	Answer	Additional guidance	Mark
6(a)(iv)	by (contaminated) water	accept by (contaminated) food / oral-faecal route / water-borne	(1) AO1 1

Question number	Answer	Additional guidance	Mark
6(b)	An answer linking: • pathogens have antigens (1) • (trigger the production of) antibodies (1) • (by) lymphocytes / memory lymphocytes produced (1)	accept antitoxins accept memory cells accept phagocytosis / phagocytes destroy pathogens (1)	(3) AO1 1

Total for Question 6 = 9 marks

Question number	Answer	Additional guidance	Mark
7(a) (i)	An explanation linking: • X-rays (1) • absorbed by the tumour (1) • because tumours are {a mass of cells / dense} (1)	accept tumours absorb the radiation award two marks for tumours absorb X-rays	(2) AO2 1

Question number	Answer	Additional guidance	Mark
7(a) (ii)	cerebrum / cerebral hemispheres / cerebral cortex	accept hippocampus accept occipital lobe accept cerebellum / frontal lobe	(1) AO2 1

Question number	Answer	Additional guidance	Mark
7(b)	An explanation linking: • the glucose goes to the tumour (1) • because they are (rapidly) dividing / (glucose is used) for respiration (1)	accept cancer cells for tumour accept tumours {have a higher metabolism / require energy / have rapid growth}	(2) AO2 1

Question number	Indicative content	Mark
7 *(c)	AO1 6 marks Production • uses antigen present in a blood clot • antigen is injected into a small mammal • mammal has an immune response • lymphocyte producing the complementary antibody is isolated • fused with a myeloma / cancer cell / tumour cell • to form a hybridoma • which divides and produces the monoclonal antibody • Diagnosis • monoclonal antibody is attached to a radioisotope • injected into the blood stream of a person • monoclonal antibody attaches to the antigen in the blood clot • the location of the blood clot is identified	(6) AO1 1

Level	Mark	Descriptor
	0	• No rewardable material.
Level 1	1-2	• Demonstrates elements of biological understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. • Presents an explanation with some structure and coherence.
Level 2	3-4	• Demonstrates biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and /or developed. • Presents an explanation that has a structure which is mostly clear, coherent and logical.
Level 3	5-6	• Demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas is detailed and fully developed. • Presents an explanation that has a well-developed structure which is clear, coherent and logical.

Additional Guidance

Level 1	1–2	• A brief description of the production OR the use in diagnosis • The response includes more than one stage of production or diagnosis
Level 2	3–4	• A brief description of the production AND the use in diagnosis OR a detailed explanation of the production OR a detailed explanation of the use in diagnosis • The response makes a links between stages using key scientific terms correctly
Level 3	5–6	• A detailed explanation of the production AND the use in diagnosis • Response makes links between stages of production and diagnosis using key scientific terms correctly

Total for Question 7 = 11 marks

Question number	Answer	Mark
8 (a)(i)	(put the results in order) determine the middle value / place the results in order and find the 3 rd value	(1) AO2 1

Question number	Answer	Additional Guidance	Mark
8 (a)(ii)	An explanation linking one from: • {height / start point} of the ruler (1) • where catching hand starts / catching hand starts at 0 • distances the thumb and fingers are apart (1) • catching it with the same hand (1) • {food / drink / drug} intake / amount of sleep (1) AND • valid / comparable (1)	accept tiredness	(2) AO2 1

Question number	Answer	Additional guidance	Mark
8(a)(iv)	An answering including three from: - two students each given a different caffeine drink (1) - test before and after drinking / use a control (1) - a variable that needs controlling (1) - repeat with multiple students (for each drink) / calculate the mean (1)	accept use of the same student with a time interval in between accept same volume of caffeine drink / same time interval between drinking and testing	(3) A03 2ab

Question number	Answer	Mark
8 (b)(i)	cell body	(1) A01 1

Question number	Answer	Additional guidance	Mark
8(b)(ii)	An answering including three from: - increasing diameter increases the speed (1) (after 0.5 μm) there is a greater increase in the speed of impulses in myelinated neurones (1) - correct comparison of data from the graph for the effect of diameter on speed (1)	accept the speed is greater in myelinated neurones / impulses travel faster in myelinated neurones accept the increase in speed in myelinated neurones is linear / ORA ignore speeds quoted for one diameter	(3) A03 2ab

Total for question 8 = 12 marks

Question number	Answer	Mark
9(a)(i)	C carrier affected carrier The only correct answer is C <i>A is not correct because the father should be affected</i> <i>B is not correct because the son should be a carrier</i> <i>D is not correct because the mother should be a carrier</i>	(1) AO2 1

Question number	Answer	Additional guidance	Mark
9(a)(ii)	An answer including two from: • (cilia) can't move the mucus (1) • {bacteria / pathogens / dust} are trapped (1) • (increased chance of) infection (1) • reduced diameter of the airway / cough / breathing difficulties (1)	accept cannot move the pathogens / named pathogens accept blocks the airway accept less gas exchange	(2) AO2 1

Question number	Answer	Additional guidance	Mark																		
9(b)	An answering including: <table><tr><td></td><td>a</td><td>a</td></tr><tr><td>A</td><td>Aa</td><td>Aa</td></tr><tr><td>a</td><td>aa</td><td>aa</td></tr></table> correct parental genotypes (1) correct offspring (1) 50% (chance) of the offspring being unaffected / 50% (chance) of the offspring being affected (1) (Hh) is affected because they have one dominant allele / (hh) is unaffected because they have {two recessive alleles / no dominant alleles} (1)		a	a	A	Aa	Aa	a	aa	aa	accept any letter with gametes in either orientation <table><tr><td></td><td>H</td><td>h</td></tr><tr><td>h</td><td>Hh</td><td>hh</td></tr><tr><td>h</td><td>Hh</td><td>hh</td></tr></table> award from the Punnett square award from the Punnett square ecf from incorrect parental gametes accept 2/4, 1/2, 1 in 2, 1:1 for 50% reject 50% are carriers accept heterozygous are affected and homozygous recessive are unaffected		H	h	h	Hh	hh	h	Hh	hh	(4) AO2 2
	a	a																			
A	Aa	Aa																			
a	aa	aa																			
	H	h																			
h	Hh	hh																			
h	Hh	hh																			

Question number	Indicative content	Mark
*9 (c)	AO1 6 marks Extraction • strawberry is crushed • to increase the surface area • detergent is added • to break down membranes / cells • protease added • to break down proteins • heat in a water bath • to speed up reaction • salt added • to clump DNA • filtering • insoluble material is removed • ice cold ethanol is added • to precipitate the DNA / makes the DNA visible Structure • double helix • polymer of nucleotides • made of two strands • backbone consists of a sugar and phosphate • bases connect the two strands • four bases A pairs with T and C pairs with G • joined together by weak hydrogen bonds	(6) AO1 2

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-2	- Demonstrates elements of biological understanding, some of which is inaccurate. Understanding of scientific, enquiry, techniques and procedures lacks detail. - Presents a description which is not logically ordered or with significant gaps.
Level 2	3-4	- Demonstrates biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific, enquiry, techniques and procedures is not fully detailed and/or developed. - Presents a description of the procedure that has a structure which is mostly clear, coherent and logical with minor steps missing.
Level 3	5-6	- Demonstrates accurate and relevant biological understanding throughout. Understanding of scientific, enquiry, techniques and procedures is detailed and fully developed. - Presents a description that has a well-developed structure which is clear, coherent and logical.

Additional Guidance

Level 1	1-2	- A brief description of the structure of DNA OR how it can be extracted from fruit cells - The response links to a reason for the extraction stage OR two extraction stages OR two ideas on the structure of DNA
Level 2	3-4	- A brief description of the structure of DNA AND how it can be extracted from fruit cells OR a detailed description of the structure of DNA OR a detailed description of how it can be extracted from fruit cells - Response gives reasons for at least two extraction stages
Level 3	5-6	- A detailed description of DNA molecule AND a detailed description of how it can be extracted from fruit cells - Response gives reasons for at least three stages of the extraction process AND the complementary base pairs linked by hydrogen bonds for a DNA molecule.

Total for Question 9 = 13 marks

Question number	Answer	Additional guidance	Mark
10(a)	four / 4		(1) A03 1a

Question number	Answer	Additional guidance	Mark
10(b)(i)	An answer including: one advantage from - increased crop yield (1) - increased profit (1) one disadvantage from - ingested by {herbivores/consumers} that feed on the plants (1) - pollute rivers / runs off into water (1) - fertilisers are expensive / can cost money (1) - increases the growth of weeds (1)	accept {increased / faster} growth / provides mineral ions for growth accept idea of bioaccumulation / enters the food chain / harmful to animals accept eutrophication / causes algal growth ignore damages the environment	(2) A02 1

Question number	Answer	Mark
10(b)(ii)	C 20% The only correct answer is C A, B and D as they are not the correct result of the calculation	(1) A02 1

Question number	Answer	Additional guidance	Mark
10(b)(iii)	An answering including two from: • use more concentrations of fertiliser between 1 % and 10 % (1) • use a control / do not apply fertiliser to one field (1) • repeat the test {at each concentration / at each percentage / on each field} (1) • controlling a variable e.g. all fields in the same location / crop density / crop variety / volume of fertiliser (1)	accept other ranges within 0-10% accept use smaller increments of fertiliser accept repeat the test over a larger area / more fields accept soil pH / watering / aspect of fields / idea of polytunnels accept idea of using the fertilisers in the same field ignore control the area / temperature / light intensity / greenhouse	(2) A03 3a

Question number	Answer	Mark
10(c)	C biological control The only correct answer is C A, B and D are not correct because they are not the name of the method	(1) A01 1

Question number	Answer	Additional guidance	Mark
10(d)	An answer linking: • {sample / cells / tissue} taken from the (parent) plant (1) • aseptic techniques used (1) • placed on (sterile/nutrient) growth medium (1) • hormones applied (so plantlets develop) (1)	accept take leaf discs / cuttings / meristems / explants accept aseptic technique being described accept agar / Petri dish accept the cells {differentiate / specialise} accept {roots / shoots / leaves / plantlets / callus} form	(4) AO2 1

Total for Question 10 = 11 marks

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