



Mark Scheme (Final)

Summer 2026

Pearson Edexcel Advanced Subsidiary In Biology B
8BI0/01

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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)(i)	• U A C G C G G A G (1)		(1)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	• transcription (1)		(1)

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	• $4.98 \times 10^9 / 5 \times 10^9$ (1)	ACCEPT Any number of dps ACCEPT 4.98×10^3 million	(1)

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	• 1.69 x more / 3.20×10^8 (1)	ACCEPT 3.20×10^2 million	(1)

Question Number	Answer	Additional Guidance	Mark
1(c)(i)	insertion (1)	ACCEPT point / addition / frameshift	(1)

Question Number	Answer	Additional Guidance	Mark
1(c)(ii)	because an adenine has been inserted (causing a frameshift) (1)	ACCEPT descriptions of a frameshift	(1)

Question Number	Answer	Additional Guidance	Mark
2(a)(i)	The only correct answer is C <i>A is incorrect because cell R is in prophase and cell S is in metaphase</i> <i>B is incorrect because cell R is in prophase and cell S is in metaphase</i> <i>D is incorrect because cell R is in prophase and cell S is in metaphase</i>		(1)

Question Number	Answer	Additional Guidance	Mark
2(a)(ii)	0.17 (1) / 0.16̇ / 0.167	ACCEPT answers in range 0.16-0.25	(1)

Question Number	Answer	Additional Guidance	Mark
2(b)(i)	An explanation that makes reference to the following: {phase 1 / mass increases} because {semi conservative replication is taking place / DNA is replicating} (1) {phase 2 / mass decreases} because cytokinesis has taken place (1) (and there is less DNA) because {chromosomes/(sister) chromatids} have been pulled {to opposite sides of the cell / apart} (1)	ACCEPT chromosomes have two sister chromatids / S phase is taking place ACCEPT cell has split in two	(3)

Question Number	Answer	Additional Guidance	Mark
2(b)(ii)	An answer that makes reference to the following: Similarities: • {G₂ and mitosis / phase between phase 1 and phase 2} are the same duration (1) Differences: (2 max) • {phase 1 / S phase} is longer in cell V (1) • (whole) cell cycle time in cell V is longer (1) • interphase is longer (1)	ACCEPT take the same length of time ACCEPT converse for all differences ACCEPT takes more time / slower	(3)

Question Number	Answer	Additional Guidance	Mark
3(a)(i)	An explanation that makes reference to the following: • because {fatty acids/lipids} are {hydrophobic/non-polar/uncharged} (1) • therefore the {hydrophilic/polar/charged} water molecules cannot pass through them (1)	ACCEPT have a hydrophobic tail ACCEPT can't associate / bind with water	(2)

Question Number	Answer	Additional Guidance	Mark
3(a)(ii)	An explanation that makes reference to the following: • because a saturated lipid has no carbon carbon double bonds • (so there are) no kinks in the tail (1) • therefore there are fewer gaps for the water to pass through (1)	ACCEPT no C=C ACCEPT lipids lie closer together	(2)

Question Number	Answer	Additional Guidance	Mark
3(b)(i)	A description that makes reference to the following: - mass of cockroach measured before and after the experiment (1) - divided by the time (period in hours) (1)	ACCEPT change in mass ACCEPT <u>change in mass</u> / hours for 2 marks	(2)

Question Number	Answer	Additional Guidance	Mark
3(b)(ii)	temperature at which the rate of evaporation increases (sharply) (1)		(1)

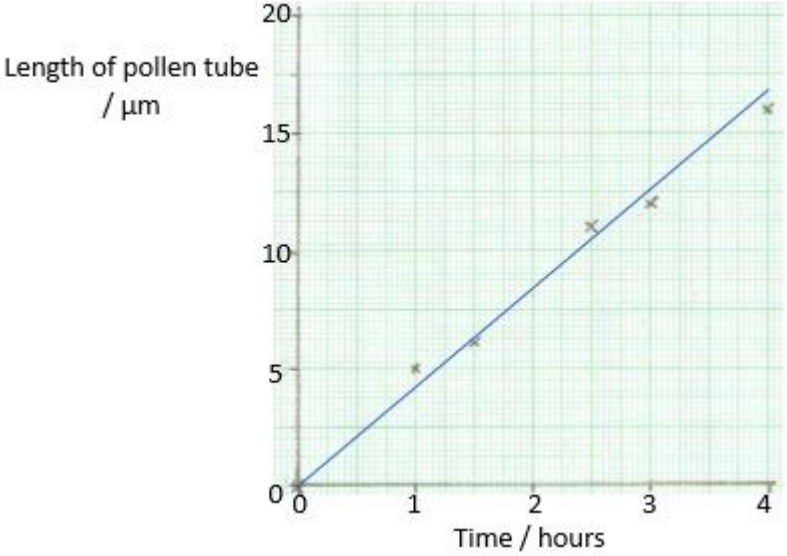
Question Number	Answer	Additional Guidance	Mark
3(c)	An explanation that makes reference to the following: - as the T_M of the lipids in the cuticle increases the T_C of the cuticles increases (1) - therefore at the T_C the structure of the {lipids / cuticle} is destroyed and water can pass through (1)	ACCEPT positive correlation ACCEPT the lipids have more kinetic energy so water can pass through / more fluid to let more water through	(2)

Question Number	Answer	Additional Guidance	Mark
4(a)	The only correct answer is C <i>A is incorrect because the pollen tube has already germinated to reach the embryo sac</i> <i>B is incorrect because pollen tube has already germinated to reach the embryo sac</i> <i>D is incorrect because pollen tube has already germinated to grow through the style</i>		(1)

Question Number	Answer	Additional Guidance	Mark
4(b)(i)	32 - 38 (µm) (1)		(1)

Question Number	Answer	Additional Guidance	Mark
4(b)(ii)	The only correct answer is D <i>A is incorrect because $(8 \times 1000) \div 5 = 1\,600 = 1.6 \times 10^3$</i> <i>B is incorrect because $(8 \times 1000) \div 5 = 1\,600 = 1.6 \times 10^3$</i> <i>C is incorrect because $(8 \times 1000) \div 5 = 1\,600 = 1.6 \times 10^3$</i>	D has the correct order of magnitude	(1)

Question Number	Answer	Additional Guidance	Mark
4(c)(i)	An answer that makes reference to the following: - Y axis correctly labelled with suitable scale, plots and line occupy at least two large squares (1) - X axis correctly labelled with suitable linear scale (1) 6 points correctly plotted on their using their scales (1)	ACCEPT X axis with time of day Length of pollen tube / μm Time / hours	(3)

Question Number	Answer	Additional Guidance	Mark
4(c)(ii)	a straight line through the data starting at the origin / intersect the X axis at 0 μm	ACCEPT ecf from 4 (c)(i) 	(1)
Question Number	Answer	Additional Guidance	Mark
4(c)(iii)	- rate calculated either from the data in the table or the gradient of their line (1) 32 (1)	ACCEPT ecf from 4(c)(ii) e.g. $16 \div 4 = 4$ $m = 4, x = 8, c = 0$ Correct answer gains 2 marks	(2)

Question Number	Answer	Additional Guidance	Mark
5(a)(i)	iron (ion) / nitrates / sulfates (1)	Ignore sulfur / nitrogen	(1)

Question Number	Answer	Additional Guidance	Mark
5(a)(ii)	An explanation that makes reference to three of the following: {haem group / iron ion} so that oxygen can bind (1) - globular so that it will dissolve in the cytoplasm (of the red blood cells) (1) - four subunits so that four molecules of oxygen can be carried (1) - four subunits so that the oxygen is released according to the partial pressure of oxygen (1)	ACCEPT {globular/compact} so more haemoglobin can fit in the red blood cell	(3)

Question Number	Answer	Additional Guidance	Mark
5(b)(i)	A description that makes reference to the following: - one male nucleus fertilises the female {gamete/egg cell} to produce the diploid {zygote / embryo} (1) - one male nucleus fertilises the two polar nuclei to form the {triploid endosperm / endosperm} (1)	ACCEPT one mark for reference to male gamete For one mark - {female gamete/egg cell} and two polar nuclei fertilised	(2)

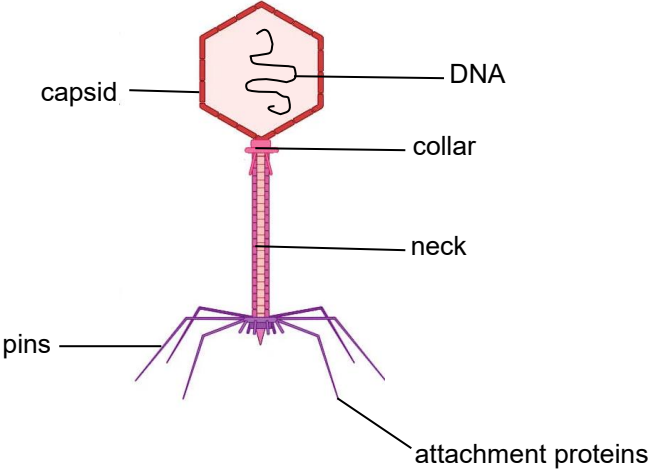
Question Number	Indicative Content	
*5(b)(ii)	Indicative content: Complete culture solution (C): - all mineral ions present for healthy plant - all mineral ions present for maximum growth (in the conditions) No nitrates (N): (nitrogen) needed to make DNA / bases / amino acids / proteins / enzymes - stunted growth because cells cannot divide due to {lack of DNA / no semi-conservative replication} - stunted growth because lack of proteins to make new cell components - stunted growth as no enzymes to catalyse metabolic processes No calcium ions (CP): - calcium ions needed to form calcium pectate (in middle lamella) - without calcium pectate the cell walls will be weaker - therefore the leaves will droop as no strength to support them No magnesium ions (M): - magnesium ions used to make chlorophyll - leaves appear yellow as no chlorophyll - some green areas as magnesium ions present in the grain No phosphates (P): - phosphates used to make ADP / ATP / DNA / phospholipids - some growth as phosphates would be present in grain - but growth stunted when no more energy available for metabolic processes - growth stunted as no phosphates to make DNA nucleotides for cell division - growth stunted as no phosphates to make phospholipids to make cell membranes Water(W): - some growth due to mineral ions in the grain - yellow leaves as no magnesium ions in the water - leaves drooping as no calcium ions in the water - stunted growth as no nitrates / phosphates in the water	Level 1: 1 mark - any one explanation FOR any ion / water / full culture 2 marks - any two explanations FOR any ions / water / full culture Level 2: 3 marks - any three explanations from at least two ions / water / culture 4 marks - any four explanations from at least three ions / culture / water Level 3: 5 marks - any five explanations from at least four ions / culture / water 6 marks - at least one explanation from EACH of tubes

Question Number	Answer	Additional Guidance	Mark
6(a)(i)	The only correct answer is A <i>B is incorrect because the glucoses are all α glucoses</i> <i>C is incorrect because there are $(11 \times 6) - 10 = 56$ oxygens</i> <i>D is incorrect because the glucoses are all α glucoses and there are $(11 \times 6) - 10 = 56$ oxygens</i>		(1)

Question Number	Answer				Additional Guidance	Mark	
6(a)(ii)	Monosaccharide	Glycosidic bond					(2)
		1 - 4 only	1 - 6 only	Both 1 - 4 and 1 - 6	Neither 1 - 4 nor 1 - 6		
	2	[x]	[x]	[x]	[x]		
	3	[x]	[x]	[x]	[x]		

Question Number	Answer	Additional Guidance	Mark
6(a)(iii)	An explanation that makes reference to three of the following: • {polymer / many} glucose molecules to {give high energy content / large energy store} (1) • branched molecule so that {many (glycosidic) bonds broken at any one time / it can be hydrolysed quicker} (1) • compact so that a lot of glucose molecules can fit into a space (1) • {polymer / large / insoluble} so that it {has no osmotic effect / does not affect the water potential} (1)	ACCEPT broken down quicker	(3)

Question Number	Indicative Content	
*6(b)	Method (M) • use a range of temperatures (sensible range eg: 10-50°C) • Place in waterbath <i>before mixing to bring the solutions up to the {required / same} temperature</i> • add enzyme last <i>to ensure that reaction starts at t = 0</i> • start stopwatch when enzyme is added <i>to ensure that reaction starts at t = 0</i> • remove samples every (specified) seconds <i>to follow course of reaction</i> • intervals should be small <i>so that initial rate of reaction can be calculated</i> • immediately cool the solution / heat with Benedict's <i>to stop the cellulase action</i> • buffer should be added <i>as this will control pH as enzyme activity is affected by pH</i> • temperature should be controlled <i>as this affects enzyme activity</i> • waterbath should be used to control temperature <i>as this minimises effects of fluctuations in external temperature</i> • heat in Benedict's for same length of time <i>so that colours can be compared validly</i> • same {concentration / volume} of {cellulose / cellulase / buffer} should be used <i>so that variables are controlled for validity</i> Results (R) • record the colour of solution after heating with Benedict's <i>so that concentration can be worked out (later)</i> • take photographs of colours <i>so that the comparison is less subjective</i> • use a colorimeter <i>so that the colour is judged objectively</i> • take at least 5 readings <i>so that trends can be seen</i> • plot a graph of concentration of glucose/time for each temperature <i>in order to calculate the initial rate of reaction</i> • calculate initial rate of reaction <i>as this allows for the decrease in substrate concentration as reaction progresses</i> • use a minimum of 5 different temperatures <i>as this is the minimum number needed to see a trend in the data</i> • repeat each temperature at least 3 times and calculate a mean <i>as this gives repeatable data / increases validity</i>	If no cellulose and cellulase added max Level 1 Level 1: Some methodology/result analysis, but no explanation 1 mark : 2 details given of method (M) or results (R) without justification 2 marks : 3 details of method (M) or results (R) given that could produce results without justification Level 2 : 3 marks : 2 details of method (M) or results (R) with reasons that would produce some relevant data 4 marks : 3 details of method (M) or results (R) with reasons that would produce some relevant data Level 3 : 5 marks : 4 details of method (M) that would produce valid data with explanations, including details of the results (R) being recorded 6 marks : 5 details of method (M) that would produce valid data with explanations, including details of the results (R) being recorded and an explanation of how to calculate initial rate of reaction

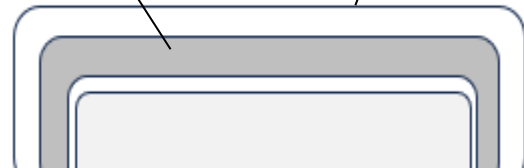
Question Number	Answer	Additional Guidance	Mark
7(a)	An answer that makes reference to three of the following: • <u>DNA</u> drawn and labelled in the head region (1) Any two from: • capsid / head / protein coat (1) • collar (1) • neck / tail (1) • pins / spikes / tail fibres / base plate(1) • attachment proteins (1)	Example of drawing: 	(3)

Question Number	Answer	Additional Guidance	Mark
7(b)	An explanation that makes reference to four of the following: • because different types of viruses would {affect/infect} different types of bacteria (1) • bacteria {are destroyed / undergo lysis} (1) • the effectiveness (of AS system) depends on the {enzymes released by / the roles of} the bacteria (1)	ACCEPT different bacteria have different {functions / roles}	(3)

Question Number	Answer	Additional Guidance	Mark
7(c)	An explanation that makes reference to the following: - viruses replicate their nucleic acid inside their host cells (1) - and some of the nucleic acid would be released when the host cell bursts (1)	ACCEPT viral genetic material is replicated inside the bacteria/ host cell ACCEPT not all the nucleic acid is {packaged inside the capsid/ used to form new viral particles} / some nucleic acid escapes from the bacteria	(2)

Question Number	Answer	Additional Guidance	Mark
7(d)	An answer that makes reference to the following: - types and abundances of viruses are different in each AS system (1) - SK only found in one AS systems (1) {ST / ST, STL and SWH} are present in most AS systems (1) - SK, TP and YL have the highest abundance (in any one system) (1) {system 2 / system 5} has the fewest (different) types of virus / {system 4 / system 6} has the most (different) types of virus (1)	ACCEPT SK is only {abundant/found} in {one AS system / system 4} ACCEPT TP highest in system 3 / YL highest system 2	(4)

Question Number	Answer	Additional Guidance	Mark																				
8(a)	<table><tr><th rowspan="2">Structures</th><th colspan="4">Presence of structure</th></tr><tr><th>In prokaryotic cells only</th><th>In eukaryotic cells only</th><th>In both prokaryotic cells and eukaryotic cells</th><th>In neither prokaryotic cells nor eukaryotic cells</th></tr><tr><td>mitochondria</td><td>[x]</td><td>[x]</td><td>[x]</td><td>[x]</td></tr><tr><td>nucleoid</td><td>[x]</td><td>[x]</td><td>[x]</td><td>[x]</td></tr></table>			Structures	Presence of structure				In prokaryotic cells only	In eukaryotic cells only	In both prokaryotic cells and eukaryotic cells	In neither prokaryotic cells nor eukaryotic cells	mitochondria	[x]	[x]	[x]	[x]	nucleoid	[x]	[x]	[x]	[x]	(2)
					Structures	Presence of structure																	
				In prokaryotic cells only		In eukaryotic cells only	In both prokaryotic cells and eukaryotic cells	In neither prokaryotic cells nor eukaryotic cells															
				mitochondria	[x]	[x]	[x]	[x]															
				nucleoid	[x]	[x]	[x]	[x]															

Question Number	Answer	Additional Guidance	Mark
8(b)	An answer that makes reference to the following: - thin layer of {peptidoglycan / murein} drawn and labelled (1) {outer membrane / lipopolysaccharide layer} drawn and labelled (1)	peptidoglycan layer outer membrane  ACCEPT cell wall for peptidoglycan layer	(2)

Question Number	Answer	Additional Guidance	Mark
8(c)	An explanation that makes reference to the following: - because Gram positive bacteria have a thick peptidoglycan wall which some antibiotics can target (1) - the lipopolysaccharide layer of Gram negative bacteria will only allow non-polar antibiotics through (1)	ACCEPT Gram negative bacteria have a lipopolysaccharide layer that antibiotics can't penetrate	(2)
Question Number	Answer	Additional Guidance	Mark
8(d)(i)	- percentage of other streptothricins calculated (1) - correct ratio in whole numbers (1)	$100 - 65.5 - 29.6 = 4.9$ ACCEPT 5 13 : 6 : 1 / 66 : 30 : 5 Correct answer with no working gains both marks	(2)

Question Number	Answer	Additional Guidance	Mark
8(d)(ii)	An answer that makes reference to the following: - S-D has the greatest effect / S-F has the least effect (1) - these bacteria may be (more) permeable to S-D (than S-F) (1) - nourseothricin (has a MIC₅₀) in the middle as it is a combination of S-D, S-F and other streptothricins (1) - the other streptothricins have a greater effect than S-F and a lower effect than S-D (1) - S-D is 8 x more effective than S-F / nourseothricin is 4 x more effective than S-F / S-D is twice as effective as nourseothricin	ACCEPT S-D requires lowest {concentration / dose} (to be effective) ACCEPT {S-F/S-D} is diluted by other chemicals in nourseothricin	(4)