



Mark Scheme (Results)

Summer 2026

Pearson Edexcel International Advanced Level in Biology

WBI14/01A

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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 C <i>A is incorrect because Q is respiration</i> <i>B is incorrect because Q is respiration and R is decomposition</i> <i>D is incorrect because R is decomposition</i>	(1)

Question number	Answer	Mark
1(a)(ii)	The only correct answer is C <i>A is incorrect because carbon dioxide is not actively transported into the water</i> <i>B is incorrect because condensation is the formation of water</i> <i>D is incorrect because only water passes by osmosis</i>	(1)

Question number	Answer	Mark
1(b)	The only correct answer is B <i>A is incorrect because animals do not have cellulose</i> <i>C is incorrect because animals do not store starch</i> <i>D is incorrect because animal cells do not store starch and plants do not store glycogen</i>	(1)

Question number	Answer	Additional guidance	Mark
1(c)	• 37412.5 (1) • 37 000 (1)	$1^{\circ} = (800 + 550 + 2300) \div 32 = 114.0625$ oceans = $(360 - 32) \times 114.0625 = 37\,412.5$ ACCEPT 37413/37400/3.7×10^4 /3.74×10^4 $3.74 \cdot 10^4$/ 3.74 , 10^4	(2)

Question number	Answer	Mark
2(a)(i)	The only correct answer is C <i>A is incorrect because the cytoplasm is not found on either side of the thylakoid membrane</i> <i>B is incorrect because hydrogen ions pass out of the thylakoid through the ATP synthase</i> <i>D is incorrect because the cytoplasm is not found on either side of the thylakoid membrane</i>	(1)

Question number	Answer	Additional guidance	Mark
2(a)(ii)	electron, oxygen (molecule), hydrogen ion (2)	IGNORE any numbers 1 mark = 2 correct 2 marks = 3 correct ACCEPT proton, H⁺, O₂, e⁻, e DO NOT ACCEPT oxygen ion, atomic oxygen hydrogen	(2)

Question number	Answer	Additional guidance	Mark
2(a)(iii)	(non-cyclic photo)phosphorylation (1)		(1)

Question number	Answer	Additional guidance	Mark
2(b)(i)	A description that includes four of the following points: - compare the Rf value to Rf values of pigments in water (1) And any three of the following: - by using chromatography (1) {extract / dissolve} the pigment in <u>water</u> (1) - load the {pigment / chlorophyll} (solution) onto {(filter) paper / (chromatography) paper} (1) - dip into a solvent and let the solvent soak up the paper (but not to the top) (1)	ACCEPT extract for pigment ACCEPT same solvent/ appropriate solvent DO NOT ACCEPT named non-polar solvents ACCEPT place in solvent and remove from solvent before it reaches the top	(4)

Question number	Answer	Additional guidance	Mark
2(b)(ii)	so that the plant can absorb light at more wavelengths of light (1)	ACCEPT to absorb more light/ other colours	(1)

Question number	Answer	Mark
3(a)(i)	The only correct answer is A <i>B is incorrect because endemic means species that are only found in a limited area</i> <i>C is incorrect because forensic means using scientific methods to solve something</i> <i>D is incorrect because myogenic means control by the heart muscle</i>	(1)

Question number	Answer	Mark
3(a)(ii)	The only correct answer is D <i>A is incorrect because it defines a habitat</i> <i>B is incorrect because it partly defines an ecosystem</i> <i>C is incorrect because it defines weather patterns</i>	(1)

Question number	Answer	Additional guidance	Mark
3(b)	A description that includes the following points: • {to provide food/is the prey} for the {tiger/leopard} (1) • to eat the plant seedlings/ to control the number of plant seedlings (1)	IGNORE tigers and leopards are the predators of the pig IGNORE is the predator of the seedlings	(2)

Question number	Answer	Additional guidance	Mark
3(c)(i)	- correctly drawn tangent (1) - answer in the range of 4-6 to 2 dp + suitable units (1)	Straight line, touching the correct line e.g. (decrease in number of seeds) per m² per month/(no. seeds) m⁻² month⁻¹ DO NOT ACCEPT M for month	(2)

Question number	Answer	Additional guidance	Mark
3(c)(ii)	An explanation that includes three of the following points: - idea of density of seedlings in restored area decreases non-linearly (1) - higher numbers of seedlings in the restored forests as fewer trees competing for light (1) (sharp) drop in seedlings as soil unsuitable to sustain growth (1) {bearded pigs/ animals} feed on the seedlings (1) - drop slows as {plants getting larger/ competition for light/ pigs leaving the area} (1)	ACCEPT density was higher than U and N at first and then lower than both after 6 months ACCEPT more space to grow ACCEPT due to competition for minerals/water/named minerals between seedlings	(3)

Question number	Answer	Additional guidance	Mark
3(c)(iii)	An answer that includes the following points: - a comment about the change in the median value for species richness (1) - a comment about the range of values for species richness (1) - an overall comparative comment (1)	e.g. median value {in U falls between 2 and 6 months / is the same after 6 months as it was after 2 months in N / in R falls between 2 and 6 months} e.g. range of values {is the same in U for both 2 and 6 months / the range is lower in N after 6 months than after 2 months / the range is lower in R after 6 months than after 2 months} e.g. overall, the species richness falls from 2 months to 6 months/at 2 and 6 months U has most species richness	(3)

Question number	Answer	Mark
4(a)(i)	The only correct answer is C <i>A is incorrect because sucrose is a disaccharide and not found in lactose</i> <i>B is incorrect because fructose is a sugar found in fruits not milk</i> <i>D is incorrect because sucrose is a disaccharide and not found in lactose</i>	(1)

Question number	Answer	Additional guidance	Mark
4(a)(ii)	hydrolysis (1)	ACCEPT catabolic DO NOT ACCEPT hydration, condensation, anabolic	(1)

Question number	Answer	Additional guidance	Mark
4(b)	An explanation that includes three of the following points: - baby gains antibodies from {milk / colostrum} (from mother) (1) - antibodies {opsonise / agglutinate} pathogens (1) - therefore pathogen will be {phagocytosed / destroyed} faster (than with no antibodies) (1) - no immune response stimulated (1)	ACCEPT named pathogen e.g. bacteria IGNORE reference to bioactive peptides ACCEPT descriptions of {opsonisation / agglutination} DO NOT ACCEPT antibodies kill bacteria	(3)

Question number	Answer	Mark
4(c)	Indicative content: Table • lipid content similar - provides enough energy • lipid higher than camel - not good if baby overweight/may increase risk of CVD • higher protein than human/less than camel- link to growth/ production of bioactive peptides • lactose lower than human - less sugar better for overweight babies • cows are found around the world so milk is readily available if mothers cannot breastfeed • lipid content less than cow/human - better for overweight babies /may not provide sufficient energy for babies • protein higher than human link to growth/ production of bioactive peptides for immunity (award once) • protein content variable so may be hard to assess what the baby is getting • lactose lower than human/ cow may be better for someone who is lactose intolerant • camels can be kept in extreme environments good where lack of water/no cows • cows produce a lot of methane so contribute to global warming • processing cow/camel milk could produce greenhouse gases/CO₂ • cow milk/camel milk may cause allergies • cow/camel milk provide water which could prevent dehydration Immunity • human milk provides antibodies via passive immunity - no idea if cow/camel provide any antibodies • if there are antibodies in cow/camel milk we don't know if they are effective biopeptides • no information on antioxidants/antibodies/other components in milk • bioactive peptides can inhibit pathogens therefore less likely to be ill • more antioxidants so neutralise free radicals less damage to endothelial lining	(6)

	Level 1 1 mark = description of one advantage / disadvantage/comment 2 marks = description of three advantages/disadvantages/comments Level 2 3 marks = explanation of one advantage / disadvantage 4 marks = explanation of three advantages / disadvantages Level 3 5 marks = explanation of three advantages and disadvantages from two sections 6 marks = explanation of four advantages and disadvantages from three sections	
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Question number	Answer	Mark
5(a)	Indicative content: Attachment and Penetration • to host cell receptors • using E/M protein • fusion of envelope with host cell membrane • virus taken up by endocytosis • RNA migrates to nucleus / ribosomes RNA replication • copy of viral RNA made • copy of the copied RNA made • using RNA polymerases (from virus) • which may be the non-structural proteins • using host-cell nucleotides Protein synthesis • one peptide chain synthesised by translation • excluding the untranslated regions • using host cell amino acids / tRNA / ribosomes / ATP / enzymes • enzymes break (peptide) bonds between individual proteins • prM cleaved to form M protein (and pr) • small part cleaved between NS4a and NS4b Assembly • C proteins form capsid around the RNA / viral enzymes / non-structural proteins • E and M protein assembled on outside of capsid • hundreds of particles made Lysis • viruses burst out of host cell • taking part of membrane with them to form envelope • cycle continues Level 1 : simple description limited to HIV / own knowledge 1 mark = one description 2 marks = two descriptions Level 2 : information used from the diagrams 3 marks = three descriptions that includes a red comment 4 marks = four descriptions that includes two red comments Level 3 : 5 marks = four descriptions that includes three red comments 6 marks = five descriptions that includes four red comments	(6)

Question number	Answer	Additional guidance	Mark
5(b)(i)	An explanation that includes the following points: - normal / heterozygous males {could hear the wings beating /made more attempts to mate} as they had (at least one) allele enabling them to hear (1) - mutated mosquitoes did not attempt to mate because they could not hear the female mosquitoes (1) - the results show that the mutated allele is recessive (1)	Penalise gene once ACCEPT homozygous males had mutations in both the alleles so could not hear (the females) ACCEPT converse	(2)

Question number	Answer	Additional guidance	Mark
5(b)(ii)	An answer that includes the following points: - to check that the mutation had not affected the sperm count (1) - to eliminate a lack of sperm from causing unsuccessful mating / to confirm that the loss of hearing was responsible for a lack of mating (1)	ACCEPT to ensure that the difference was only due to the mutation/hearing or lack of hearing	(2)

Question number	Answer	Additional guidance	Mark
6(a)	An explanation that includes the following points: • there was a range of trunk lengths in the animals (1) • (palaeomastodons/elephants) with the longer trunks could reach the food/water (1) • Food/tree high up acted as a selection pressure (1) • therefore survived and passed their alleles for long trunks on to their offspring (1)	ACCEPT some animals had a mutation for longer trunks ACCEPT water low down acted as a selection pressure ACCEPT allele frequency for long trunk increased over time/ natural selection	(3)

Question number	Answer	Additional guidance	Mark
6(b)	An explanation that includes three of the following points: • (Gondwana / ancestor) elephants got {divided into two / separated from each other} by the sea (1) • different {conditions / named condition / selection pressures} in each continent (1) • resulting in a change in allele frequency of the Asian/African elephants (1) • because there was <u>no</u> gene flow (between the two populations of elephants) (1) • idea of geographical isolation / allopatric isolation (1)	ACCEPT allopatric speciation / reproductively isolated or example of why they were reproductively isolated	(3)

Question number	Answer	Mark
6(c)(i)	The only correct answer is D <i>A is incorrect because $3.4 \div 2.7 = 1.259259259 = 1.26$</i> <i>B is incorrect because $3.4 \div 2.7 = 1.259259259 = 1.26$</i> <i>C is incorrect because $3.4 \div 2.7 = 1.259259259 = 1.26$</i>	(1)

Question number	Answer	Additional guidance	Mark
6(c)(ii)	An answer that includes three of the following points: - idea that different areas of Africa had different temperature/rainfall (1) - therefore different (species of) plants/foods were found (1) - example of how size affected their ability to survive (1) - different populations of elephants become reproductively isolated (1)	e.g difference in size of elephants meant they could access different food ACCEPT no longer able to interbreed to produce fertile offspring DO NOT ACCEPT allopatric speciation	(3)

Question number	Answer	Additional guidance	Mark
6(c)(iii)	A description that includes the following points: • breed the two species of elephant together to produce offspring (1) • if they do not produce fertile offspring, they are different species (1) OR • try to breed the elephants together (1) • if they cannot breed, they must be a different species (1)	ACCEPT determine the fertility of these offspring ACCEPT converse	(2)

Question number	Answer	Additional guidance	Mark
7(a)(i)	• 69 532 / 69 533 (people) (1)	$(105\,352 \div 100) \times 66 = 69532.32$ ACCEPT 6.9532×10^4 ACCEPT $6.9532 \cdot 10^4$ $6.9532, 10^4$ ACCEPT 70000, 69500	(1)

Question number	Answer	Additional guidance	Mark
7(a)(ii)	An explanation that includes four of the following points: - band with mutated gene travels further as it is lighter/shorter (1) - both (healthy and CF) have one band as {alleles for gene are the same/they are homozygous} (1) - heterozygous person has two bands as they have one normal and one mutated gene (1) {healthy / CF} person has thicker bands as both fragments the same (1)	ACCEPT converse for the healthy person ACCEPT healthy person has one band as no mutations and person with CF has one band as both genes are mutated PIECE TOGETHER ACCEPT converse for the heterozygous	(4)

Question number	Answer	Additional guidance	Mark
7(b)(i)	An explanation that includes the following points: • one consideration stated (1) • one consideration explained (1) • second consideration explained (1)	e.g. Is the virus pathogenic/disease causing so wouldn't harm the host/die size of virus - if it is too small there will not be enough room for the DNA/should be hollow to carry genes type of host cell/VAPS on the virus - virus needs to attach/receptors to the airway cells can the virus be manipulated - need to get the DNA inside the virus not antigenic - so would not initiate immune response slow lytic cycle/are latent viruses/ don't lyse the host cells	(3)

Question number	Answer	Additional guidance	Mark
7(b)(ii)	An explanation that includes three of the following points: • a normal copy of the gene will result in functioning CFTR protein being made (1) • credit a description of normal CFTR functioning (1) • therefore the mucus will not be (too) {thick / sticky} (1) • therefore air will be able to flow into lungs (1)	e.g chloride ions move out of the cell/water potential outside the cell is increased/water can move out of the cell ACCEPT more (available) surface area in alveoli/ airways would not be blocked	(3)

Question number	Answer	Additional guidance	Mark
7(b)(iii)	An explanation that includes two of the following points: • the virus will not {reach / attach / infect} cells of {digestive system / pancreas} (1) • therefore these cells will contain the mutated genes (1) • sticky mucus (still) blocks {pancreatic duct/prevents enzyme secretion (from pancreas)} (1)	ACCEPT only targets cells in airway ACCEPT the normal gene wont be inserted	(2)

Question number	Answer	Additional guidance	Mark
7(b)(iv)	An explanation that includes the following points: - gametes will be formed from the germ cells (1) - so mutated gene will be present in gametes(1) OR - virus cannot infect germ cells/ cannot infect cells that produce the gametes (1) - therefore the normal gene cannot be inserted into them (1)	ACCEPT descriptions of germ cells e.g. (diploid) cells in the testes	(2)

Question number	Answer	Additional guidance	Mark
8(a)	7.7×10^8 (people)(1)	$(1.3 \times 10^9) - (5.3 \times 10^8) = 0.77 \times 10^9 = 7.7 \times 10^8$ DO NOT ACCEPT 7.70×10^8 ACCEPT $7.7 . 10^8$ $7.7 , 10^8$	(1)

Question number	Answer	Additional guidance	Mark
8(b)(i)	An explanation that includes two of the following points: - because the phagocytes may not be able to engulf the pathogens (1) - and therefore will not be able to destroy them (1) - and (macrophages) may not be able to present antigen to T helper cells (1)	ACCEPT bacteria for pathogen ACCEPT phagocytose ACCEPT will not be able to digest them ACCEPT an immune response would not be initiated	(2)

Question number	Answer	Additional guidance	Mark
8(b)(ii)	An answer that includes the following points: - because there will be more glucose available (to pathogens) for respiration (1) - therefore more ATP for replication (of pathogens) (1)	Reference to more only needed once to access both marks ACCEPT high glucose damages capillaries therefore bacteria can move into the tissues OR high glucose damages nerve endings therefore bacteria are more likely to enter through damaged skin	(2)

Question number	Answer	Additional guidance	Mark
8(b)(iii)	An explanation that includes three of the following points: • because the antibiotics will act as a selection pressure (1) • {phagocytes cannot destroy pathogens / macrophages cannot activate T helper cells} (1) • resistant bacteria will not be destroyed by immune system (1) • resistant bacteria will multiply faster with more glucose (1)	ACCEPT phagocytes cannot engulf pathogen	(3)

Question number	Answer	Additional guidance	Mark
8(c)(i)	A description that includes three of the following points: • suspension of bacteria made (1) • make serial dilutions/description of dilution plating (1) • description of producing a lawn of bacteria on agar containing rifampicin (1) • (assumption that) one colony equals one (resistant) bacterium (1)	e.g. 1 ml bacteria added to 9ml water <u>and this is repeated</u> e.g spreading bacteria across the agar DO NOT ACCEPT with a loop / streaking onto the Petri dish	(3)

Question number	Answer	Additional guidance	Mark
8(c)(ii)	• 2 and 5.4 used in a (relevant) calculation (1) • 251 089 (1)	anti-log 5.4 - anti-log 2 = 251,088.6431501 ACCEPT 251 000, 250 000, Bald answer of 2512 or 2500 or 2510 = 1 mark	(2)

Question number	Answer	Additional guidance	Mark
8(c)(iii)	An answer that includes three of the following points: (supports the claim) • mice with diabetes developed resistant bacteria whereas mice without diabetes did not (1) and any two of the following (does not support the claim) • this is a mouse model so no evidence in humans (1) • only one type of {bacteria / antibiotic) tested (1) • there may have been past exposure to rifampicin (1) • no error bars between diabetes and non diabetes so cannot determine if the differences are significant	PIECE TOGETHER	(3)