Pearson Edexcel

Mark Scheme (Results)

Summer 2025

Pearson Edexcel GCE

Advanced Subsidary

In Biology B (8BI0 01)

Paper 1: Core Cellular Biology and Microbiology

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Summer 2025
Question Paper Log Number P78689A
Publications Code 8BI0_01_2506_MS
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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 the following: • arrangement of H and OH on C1 shown (1) • rest of molecule correct (1)		**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)	• glycosidic (bond / link) (1)	Ignore 1-4 / 1-6	**(1)**

Question Number	Answer	Additional Guidance	Mark
1(c)	• 504 (1)		**(1)**

Question Number	Answer	Additional Guidance	Mark
2(a)(i)	• J and K : cytosine and guanine (1) • L and M : adenine and thymine (1)	1 mark = correct pairings but wrong way round OR 1 mark for letters (C-G and A-T) the correct way round	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(a)(ii)	• D = hydrogen (bond) E = phosphodiester (bond) F = covalent (bond)	All three correct = 2 marks 1 or 2 correct = 1 mark **ACCEPT** covalent **ACCEPT** N-glycosidic bond	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(a)(iii)	• 33.81 (%) (1)		**(1)**

Question Number	Answer	Additional Guidance	Mark
2(b)	• (two) DNA molecules are made that consist of one, original / old (parent) strand and one new strand (1)		**(1)**

Question Number	Answer	Additional Guidance	Mark
3(a)(i)	**The only correct answer is C** ***A** is incorrect because the second and third layer cannot line up with polar heads adjacent to non-polar tails* **B** *is incorrect because the non-polar tails cannot interact with the aqueous environment on either side of membrane* **D** *is incorrect because the non-polar tails cannot interact with the aqueous environment + the second and third layer cannot line up with polar heads adjacent to non-polar tails*		**(1)**

Question Number	Answer	Additional Guidance	Mark
3(a)(ii)	**The only correct answer is B** ***A** is incorrect because the answer is 0.02* **C** *is incorrect because the answer is 0.02* **D** *is incorrect because the answer is 0.02*		**(1)**

Question Number	Answer	Additional Guidance	Mark
3(a)(iii)	An explanation that makes reference to the following: • the resolution is higher (enough to see the space between the two membranes) (1) • because the wavelength of electrons is short(er) (1)	ACCEPT electron microscope uses electrons not light	**(2)**

Question Number	Answer	Additional Guidance	Mark
3(a)(iv)	• chloroplast / nucleus (1)	ACCEPT amyloplast	**(1)**

Question Number	Answer	Additional Guidance	Mark
3(b)(i)	An explanation that makes reference to one of the following: • because one cell divides into two cells (1) **OR** • and therefore each new cell would, only have half the number of / not enough, mitochondria (1) plus • and therefore would not be able to, provide sufficient energy / produce enough ATP(1)	ACCEPT two (daughter) cells produced ACCEPT mitochondria shared between the two cells ACCEPT ORA	**(2)**

Question Number	Answer	Additional Guidance	Mark
3(b)(ii)	A description that makes reference to three of the following: • DNA replication takes place (1) • the inner membrane extends through the matrix (1) • a second membrane would form around each half of the mitochondria (1) • synthesis of any other named component that would be found in mitochondria (1)	ACCEPT (inner) membrane pinches together in the middle (of mitochondria) ACCEPT outer membrane forms /encloses each half e.g. matrix, ribosomes	**(3)**

Question Number	Answer	Additional Guidance	Mark
4(a)	An answer that makes reference to the following: • all cells drawn with no extra details (1) • in correct proportions and twice as big (at least 4.4 cm) (1) • visible nuclei shown in correct positions (1)	No shading/feathered lines	**(3)**

Question Number	Indicative content	
*4(b)	**Indicative content:** **1. Method for soaking stomata in potassium ions:** • leaf / leaf sections / epidermal strips taken • kept in dark (until all stomata are closed) • soaked in potassium ions/solution containing K^+ • of at least {five different concentrations / four different concentrations + water control) • left for a period of time • several leaf samples used /repeats, at each concentration **2. Control variables:** • leaves from same plant/same species of plant • all, kept in dark / exposed to same light intensity • other control variable, such as temperature / CO_2 concentration / windspeed / humidity / other (named) ions • same period of time **3. Visualising stomata:** • use a (light) microscope / description indicating microscope use • use, leaves / section/ strip, thin enough for light to penetrate through • use a, stain / named stain, to show stomata • nail varnish peel method • suitable plant leaf type eg: Tradescantia **4. Measurements made:** • use of an eye piece graticule • measure width of stomata • several stomata measured • eye piece graticule calibrated • using a stage micrometer **5. Data handling:** • calculate means • standard deviation / statistical analysis • graph plotted of width of stomata against potassium ion concentration	**Level 1** 1 mark : one relevant comment made 2 marks : Any 2 comments made from any aspect **Level 2 :** 3 marks : 3 comments made from at least two aspects 4 marks : 4 comments made from at least three aspects **Level 3 :** 5 marks : 4 comments made from at least four aspects 6 marks : at least 5 comments made from all aspects ACCEPT use of correlation coefficient test

Question Number	Answer	Additional Guidance	Mark
5(a)	An explanation that makes reference to three of the following: • because water molecules are (di) polar (1) • due to even distribution of charge (1) • and therefore form hydrogen bonds between water molecules (1) • which are (high) cohesive forces (1) • only form between molecules to side and below, not with air • resulting in an {inward / downward} force (at the surface) (1)	ACCEPT H bonds between O^- and H^+ for mp1 & 3 ACCEPT cause cohesion ACCEPT (water) molecules pulled closer together	**(3)**

Question Number	Answer	Additional Guidance	Mark
5(b)(i)	An explanation that makes reference to two of the following: • the weight of the insect is spread out over a large area /insect has hairs on its legs, to {distribute weight / exert less downward, pressure / force} (1) • so the force of the mosquito is, less than the cohesive forces (of the water) / insufficient to break the H bonds (1)		**(2)**

Question Number	Answer	Additional Guidance	Mark
5(b)(ii)	An explanation that makes reference to the following: • eggs sink because kerosene reduces surface tension (1) • by reducing the {number of hydrogen bonds that can form / cohesive forces} (1)		**(2)**

Question Number	Answer	Additional Guidance	Mark
5(c)(i)	An answer that makes reference to two of the following: • two points read from the graph and divided by the temperature difference (1) • answer given in standard form to one dp (1)	1 mark for: 0.0001625 OR 0.0001666 Correct answer: 1.6×10^{-4} or 1.7×10^{-4} = 2 marks	**(2)**

Question Number	Answer	Additional Guidance	Mark
5(c)(ii)	An explanation that makes reference to two of the following: • water molecules {have more kinetic energy / vibrate more /move faster} (1) • reducing / breaking, the {hydrogen bonds / intermolecular attraction / cohesive forces} (1)		**(2)**

Question Number	Answer	Additional Guidance	Mark
6(a)(i)	**The only correct answer is D** ***A** is incorrect because R guides pollen tube growth* **B** *is incorrect because R guides pollen tube growth* **C** *is incorrect because both P and Q are involved in fertilisation*		**(1)**

Question Number	Answer	Additional Guidance	Mark
6(a)(ii)	**The only correct answer is A** ***B** is incorrect because all three nuclei are haploid* **C** *is incorrect because all three nuclei are haploid* **C** *is incorrect because all three nuclei are haploid*		**(1)**

Question Number	Answer	Additional Guidance	Mark
6(b)(i)	An answer that makes reference to three of the following: • conclusion is not, justified / correct (1) • (from the data provided) they both have the same range of temperatures (1) • there is no data available for below 10 °C and above 30 °C (1) • percentage germination for species A is dropping more steeply so range could be narrower (1) • percentage germination for species A is always higher so could show some germination at lower and higher temperatures (1) • Not very accurate /large gaps between temperatures/needs to have smaller increases between temperatures (1) • no idea of sample size / no standard deviations calculated (1) • low percentage germination for each species (at each temperature) (1)	ACCEPT same/similar temperatures ACCEPT needs more temperatures below 10°C and above 30 °C	**(3)**

Question Number	Answer	Additional Guidance	Mark
6(b)(ii)	An answer that makes reference to four of the following: • carry out the investigation using the same two species of plant (1) • investigate more temperatures between 20 °C and 30 °C (1) • at, smaller increments / increments of {1 / 2} °C (1) • credit named control variable (1) • place slides in petri dish, with a humid atmosphere / AW (1) • count the number of pollen grains and the number of pollen grains that have germinated to calculate the percentage (1) • repeats / calculate {mean / standard deviations} (1)	Eg: same, sucrose concentration / mineral salt concentration / volume of sucrose / mineral salt solution / time period ACCEPT appropriate statistical test	**(4)**

Question Number	Answer	Additional Guidance	Mark
6(c)	• correct calculation (1) • correct answer given to one dp (1)	1 mark: 2.8 ÷ 1.4 = 2 2 marks: 2.8 ÷ 1.4 = 2.0	**(2)**

Question Number	Answer	Additional Guidance	Mark
7(a)	**The only correct answer is B** *A is incorrect because Ebola is an RNA virus* **C** *is incorrect because Ebola is an RNA virus and is not a retrovirus* **D** *is incorrect because Ebola is not a retrovirus*		**(1)**

Question Number	Answer	Additional Guidance	Mark
7(b)	An explanation that makes reference to the following: • because they are non-living / have a protein coat (1) • therefore antibiotics have {no / few} (target) sites (1) **OR** • because they, reproduce / hide / go through latency, inside cells (1) • and therefore drugs cannot access them (1)	ACCEPT • high mutation rate / antigenic variability • therefore, antibodies no longer complementary (to antigens) / antiviral drugs no longer work	**(2)**

Question Number	Answer	Additional Guidance	Mark
7(c)(i)	An answer that makes reference to the following: • outbreaks do not occur every year / Ebola is rare (1) • number of cases of Ebola is (relatively) low except in 2014 (1)	ACCEPT (Ebola) doesn't occur often ACCEPT most cases occurred in 2014	**(2)**

Question Number	Answer	Additional Guidance	Mark
7(c)(ii)	An answer that makes reference to the following: • not all infections documented / some asymptomatic infections (1) • some people died without a diagnosis / are not seen by a healthcare professional (1)	ACCEPT not diagnosed	**(2)**

Question Number	Answer	Additional Guidance	Mark
7(c)(iii)	• 2 : 1 (1)	10 141 : 4 922 = 2.06034132 : 1	**(1)**

Question Number	Indicative content	
***7(d)**	**Indicative content:** **P. Methods for reducing spread between people:** • Isolation / quarantine • protective clothing • covering wounds • testing / increase testing facilities • train healthcare workers to recognise early symptoms (of Ebola) • not sharing needles • limit movement into uninfected areas and out of infected areas **A. Methods for reducing spread between animals and people:** • not eating meat of carrier animals • cooking meat thoroughly • covering uncooked meat • washing fruits and vegetables **C. Climate change and land use:** • monitoring conditions and advising / regulate land use • education about appropriate land use / promote sustainable agricultural practices • monitor wildlife for signs of disease **E. Economy and health:** • more money in health service • develop rapid response teams • education about better health and hygiene/ public awareness campaign • development of vaccines • use of vaccines • stockpile medical supplies / PPE **D. Disadvantages:** • lack of money / costly • trade-offs with other programmes • public resistance	**Level 1** 1 mark: answer has 1 comment from any aspects 2 marks : answer has 2 comments from **any** aspect **Level 2 :** 3 marks : answer has 3 comments from **at least 2** aspects 4 marks : answer has 4 comments from **at least 3** aspects **Level 3 :** 5 marks : answer has 5 comments from **4 aspects** 6 marks : answer has comments from **all 5** aspects

	• mistrust of authorities • misinformation • poor access to remote areas • limited healthcare workforce • dependent on foreign aid • impact on food supply	

Question Number	Answer	Additional Guidance	Mark
8(a)	An answer that makes reference to the following: • COOH and NH_2 shown (1) • H shown (1) • all attached to central carbon (1)	ACCEPT $-NH_3^+$ and $-COO^-$	**(3)**

Question Number	Answer	Additional Guidance	Mark
8(b)(i)	**The only correct answer is B** ***A*** *is incorrect because the activation energy is the energy between that of the substrates and the highest energy* **C** *is incorrect because the activation energy is the energy between that of the substrates and the highest energy* ***D*** *is incorrect because the activation energy is the energy between that of the substrates and the highest energy*		**(1)**

Question Number	Answer	Additional Guidance	Mark
8(b)(ii)	**The only correct answer is C** ***A*** *is incorrect because the reactant is threonine and the product is intermediate J* **B** *is incorrect because the reactant is threonine and the product is intermediate J* **D** *is incorrect because the reactant is threonine and the product is intermediate J*		**(1)**

Question Number	Answer	Additional Guidance	Mark
8(b)(iii)	**The only correct answer is C** ***A*** *is incorrect because the energy of the reactants does not change but more activation energy would be needed* **B** *is incorrect because the energy of the reactants does not change but more activation energy would be needed* **D** *is incorrect because the energy of the reactants does not change but more activation energy would be needed*		**(1)**

Question Number	Answer	Additional Guidance	Mark
8(c)	An explanation that makes reference to the following: • because threonine is not converted directly to isoleucine / it is not a one step process / (conversion) is part of a metabolic pathway (1) • each intermediate has a different (3D) shape (1) • and therefore, active site of (one) enzyme is not complementary to all substrates (1)	ACCEPT all (substrates) cannot fit into the active site of the same enzyme	**(3)**

Question Number	Answer	Additional Guidance	Mark
8(d)(i)	An explanation that makes reference to three of the following: • above a certain concentration, {isoleucine /final product} binds to {threonine deaminase / enzyme } (1) • at an allosteric site / site other than active site (1) • causing a conformational change (of protein / enzyme) • the (3D) shape of the active site, changes / is different 1) • so it cannot bind to threonine (1)	ACCEPT description of it binding elsewhere on enzyme A active site deforms A threonine/substrate, can no longer fit A no, enzyme-substrate / ES, complexes form	**(3)**

Question Number	Answer	Additional Guidance	Mark
8(d)(ii)	An answer that makes reference to the following: • a line starting at zero and sloping up (1) • a line that overall stays flat (1) • but there are oscillations /AW (1)	ACCEPT slight decrease	**(3)**

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