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Examiners' Report

October 2025

Pearson Edexcel International Advanced Level in Biology

WBI14/01A

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October 2025
Question Paper Log Number P87410A
Publication Code WBI14_01A_2510_ER
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Introduction

We saw a wide range of responses from candidates, with some really excellent responses from the more able candidates. The MCQs generated a range of responses as did the calculations. The calculations did seem to score better than in previous series. The levels-based questions were accessible and very few blank responses were seen for these and for the paper in general. A vast number of centres are using our mark schemes and examiners reports to prepare their candidates; this is evident in the answers where mark points have appeared on previous mark schemes and where candidates are sub-heading their responses to the levels-based questions as scaffolding for their answers.

Question 1

The MCQ in part (a) did not really cause many candidates a problem but a range of responses were seen to the MCQ in part (iii), partly because a number of candidates cannot express values to a specified number of significant figures.

On the whole the two questions in part (b) did not cause too many problems either except by candidates who simply wrote blood or skin in part (i) or wrote two skin components in part (ii). The skin is a barrier and can only be breached by pathogens if it is damaged in some way. The blood is in a closed system and similarly, can only be accessed if there are open wounds or if the pathogen is introduced into it by some means. Some candidates wrote that phagocytes were a barrier in part (ii), but the pathogen must already be in the tissues for the phagocytes to have access to it.

Candidates who read the question carefully obtained the correct answer for part (iv).

Part (c) was well-answered. Candidates know the role of macrophages. The second mark point was not always awarded however because candidates had not specified the type of enzymes involved in destroying the bacteria.

Question 2

The MCQ at the start of this question scored well, as did the one in (b) part (ii).

A wide range of diagrams to show the membrane-bound structures inside a chloroplast were seen with candidates who had read the question carefully scoring all three marks. Quite a high proportion of candidates drew in other chloroplast structures which we ignored but labelled them as well which we could not ignore. A surprising number of candidates drew and labelled nuclei and mitochondria in the chloroplast which we could not ignore either.

Completing the graph in part (c) yielded a range of responses. The graphs that did not score were generally due to a lack of attention to detail so that the peaks were not drawn within the correct range of wavelengths or the rate line did or did not touch the x axis where it should.

Question 3

Candidates seemed to be more prepared for calculations that should be expressed in standard form; there appeared to be fewer candidates who gave their answer in incorrect standard form than previous series.

We saw a range of anthropogenic activities given in part (b) with their corresponding effects on the coral, except by those candidates who repeated the stem of the question and stated that the coral would be damaged as a result.

Some responses to (c) part (i) were too vague, simply stating that sexual reproduction would produce genetic diversity and asexual reproduction would produce clones of coral. These responses did not go far enough to explain the actual advantages of these.

In the second part to (c) we saw a wide range of suggestions on how the process could be problematic but as in part (b), the stem of the question was repeated.

Giving two conclusions from the data shown in part (d) did not cause candidates any problem; centres are clearly teaching their candidates the difference between describing data and drawing conclusions from data.

Part (e) was well-answered. Presumably the June paper had been used by centres either as a mock or for exam preparation as there was a similar question asked albeit in a different contest.

Question 4

The relationship between GP, NPP and R, and the units used to express energy content in a trophic level has been asked on a number of occasions before so the first two MCQs scored well. The third MCQ asked for a percentage calculation, and this scored reasonably well as well, with centres clearly preparing their candidates for a percentage calculation to appear on a paper.

For the first levels-based question on the paper, candidates were presented with quite a lot of information but in a straightforward format. Centres have clearly taught their candidates to work through each visual in order and to make comments on each of them. This is a good approach to answering these types of questions as the higher levels often require all visuals to be addressed. The command word ‘assess’ is still causing candidates problems. We saw a lot of good descriptions of the data but only the more able candidates actually used it to decide if top-predator recovery could work for the salt marshes. This command word does require a conclusion to be drawn and, in

this question, this could not be made unless the contraindications were also considered.

Question 5

The first three parts to this question were answered well. The MCQ scored well in (a) and candidates certainly knew an advantage of reducing fossil fuels for part (c). It was clear that some candidates are still muddling up high and low water potential but this is not surprising as it is a difficult concept. There were very few references to water concentration which was very pleasing. The mark point least awarded was the last one which is actually what allows the cyanobacteria to survive, answering the question.

Candidates found both parts to (d) challenging. Candidates are used to data showing correlations so those who did not look at the data carefully enough wrote that the increase in sucrose correlated with the increase in the concentration of salt, which it does not. There were three other mark point available, so full marks could still be scored. However, candidates are still making reference to error bars and significance, without specifying the actual difference that is significant or not significant. As the data is about the effect of salt concentration on sucrose concentration, the significance had to be linked to this specifically.

Answering the question in part (ii) required candidates to pick out exactly what we wanted them to write about. Candidates who did not read the question properly described the changes in total biomass and fortunately, the changes in sucrose and biomass without sucrose, which gave them access to our first and second mark points. The question asked them about the changes in the proportion of sucrose and biomass without sucrose, which required them to look at the relative sizes of the bars on the graph and draw conclusions using these.

Question 6

Candidates clearly know the definition of an antibiotic now, appreciating that they must state it is a molecule, a substance or another similar term.

Candidates could do the actual calculations in (b) parts (i) and (ii) but could not always express the answer appropriately. Too many decimal places were given in part (i) and a whole number was not always given in part (ii).

Candidates clearly know a range of codes of practice relating to prescriptions and the use of antibiotics. Fewer could link them to the correct reason as to why they would help to reduce antibiotic resistance.

The second of our two levels-based questions saw some good responses. Candidates were good at describing practical work involving microorganisms and knew which practical work to choose to answer the question. However, there were fewer responses

that included reasons for their choices. The commonest reasons given related to aseptic technique and measuring the zone of inhibition. Just giving two reasons for a multi-stepped investigation is a bit minimalist and candidates should be encouraged to give a few more. We required four reasons in this question for full marks to be accessed but this number will depend on the question being asked and its context.

In response to (d) part (ii), candidates seemed to either write about AI itself or aspects of the evolutionary race, on which this question was based. Both aspects were needed for full marks to be awarded. Responses tended to be very good.

Question 7

For the calculation in part (a), most candidates converted the miles into km and then worked out the area, scoring both marks provided that the answer was not expressed in too many decimal places. A few candidates calculated the area first and then ran into trouble with converting the area into km. Ideally the answer should have been expressed as a whole number as it is large, but we allowed an answer to one decimal place as the data was given to one decimal place.

Candidates are familiar with answering question on the effects of temperature on living organisms and scored the first two marks. However, fewer candidates linked their answer to the life cycle time that the question asked for. Using the mark allocation to guide their answer may have proved useful here.

Despite the fact that candidates are not supposed to know anything about nematodes, there were some good ideas in responses to (b) part (ii). Some candidates did not appreciate that the command word was explain in this question and did not take their response far enough to be awarded the marks.

The first part to (c) was very high scoring and candidates are clearly well-versed in their knowledge of PCR and gel electrophoresis. Centres are obviously using our examiner reports to advise their candidates. In early series, candidates rarely scored mark point five due to poor wording but now they know exactly what to write.

There were some excellent attempts at answering the last part of this question, despite it being one of the most challenging questions on the paper. The commonest mistake was to write an answer as though the advantages had been gained after the radiation and not before it. Presumably these candidates had not considered the first paragraph in the stem of the question carefully enough?

Question 8

This was another question starting with an MCQ which was answered well.

Part (a)(ii) should have been answered better than it was as surprisingly a high proportion of candidates wrote about the lipid in the envelope and not specifically the

phospholipid. Some candidates had not picked up on the word ‘fuse’ in the question and wrote about glycoproteins attaching to receptors on host cell membranes.

In part (b), the vast majority could tell us that the introns were removed but did not go onto say specifically why they were removed.

All four parts of (c) depended on the candidate reading the introduction to the question and appreciating that the question was about active immunity. The vast majority of candidates did and put forward some good ideas.

Responses to part (i) frequently included information about the lack of differentiation of B cells into plasma cells and the lack of production of antibodies. We were able to ignore this as it was not wrong, just irrelevant and did not answer the question.

Candidates have a good understanding of the role of antibodies, and we saw fewer responses in part (ii) where candidates wrote that antibodies kill the bacteria. Some candidates thought that there would be no antibodies binding and therefore phagocytosis would not occur, forgetting that macrophages can phagocytose bacteria without the presence of antibodies, that it would just be less effective.

Candidates understood what the question was about in part (iii) and we frequently awarded the second and third mark points. Few candidates started their answer with why the mutation should change the antigen structure.

In response to part (iv), candidates seemed to take one of two approaches, scoring either mark points one and two or scoring mark points three and four.

Summary

Below are some thoughts on how centres can help their candidates' performance in this exam.

- Instructions should be followed carefully to ensure that extra information is not included that could compromise the answer. This would have helped some candidates in question 2 where labelled non-membrane structures in the chloroplast were not asked for.
- Care should be taken in drawings of structures, molecules, graphs etc. This would have helped some candidates score better in question 2 for example where the graph had to be completed accurately enough to reflect the biology.
- Repeating the stem of the question will not score marks. This would have helped some candidates in question 3 to gain more marks.
- There is a list of command words in appendix 7 of the specification and these should be shared with candidates. Knowing what is expected in a response to a particular command word will guide candidates as to what to write. This would have helped candidates in the first levels-based question as they would have been more likely to appreciate that a contraindication should have been included in their response.
- When discussing error bars, the significance that they do or do not show needs to be linked to a specific difference that the data is showing. Doing this would have helped candidates in question 5.
- Candidates should not expect all data to show a correlation or a significant difference in the effect of one variable on another. This would have helped candidates in question 5 where there was not a correlation between sucrose and salt concentration.
- If the question does not specify the number of decimal places or significant figures to express the answer to a calculation in, this must be decided by the candidate. This would have helped candidates score in the two calculations at the start of question 6 and in 7(a).
- Use the mark allocation to help you decide how much detail to write. This may have helped candidates in the first part of (b) in question 7.