



# Examiners' Report Principal Examiner Feedback

October 2024

Pearson Edexcel International Advanced Level In  
Biology (WBI14) Paper 01

Energy, Environment, Microbiology, and  
Immunity

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October 2024

Publications Code WBI14\_01\_2410\_ER

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## **Introduction**

We saw a wide range of responses from candidates, with some excellent responses from the more able candidates. The MCQs generated a range of responses as did the calculations. The two levels-based questions did generate some level 3 responses, but candidates still need schooling on how to structure their responses to access all six marks. A number of centres are clearly 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.

## **Question 1**

Some good suggestions were seen in part (a) with most candidates selecting the idea of not all wavelengths being absorbed or light passing through the leaf. A number wrote about light being reflected but we felt that candidates ought to be able to tell us that it was the green light that was reflected, which some omitted. There were a few who wrote about shading from other plants, but we felt that this did not answer the question.

None of the three calculations that followed really caused many candidates a problem.

## **Question 2**

Both gel electrophoresis and PCR are familiar topics to candidates.

The majority of candidates picked up the first mark in (a) part (i) although fewer scored the second mark as well.

Part (ii) was lower scoring as we have not asked about Taq polymerase before. Some candidates misinterpreted the question and wrote about the enzyme's ability to work at higher temperatures.

The MCQ caused few problems to candidates.

A range of responses were seen to (b) part (ii). Some candidates clearly misread the question and wrote about the need for the plants in the genetic engineering process instead of the identification process. Marks were also lost by candidates who did not specify which of the broccoli plants were used. There were however some very clear answers scoring the three marks allocated to the question.

## **Question 3**

The responses to part (a) were mixed, probably depending on the extent of revision done on the AS topics. A number of candidates wrote that the complex was transported straight from the RER to the cell membrane, omitting to mention the role of the Golgi.

The calculation caused few issues in the first part of (b) but then not many of the candidates used their value in their response to part (ii). If we had wanted a generic response, the question would have read: State what is meant by the term resolution.

Part (c) saw very long-winded responses with many candidates writing down everything they knew about T killer cells. This did not count against them but may have used up valuable time. The first two mark points were frequently awarded but very few candidates appreciated why the number of cells needed to be increased so the third mark point was rarely awarded.

Many candidates also wrote everything they knew about T killer cells in response to part (d). The first mark point was frequently awarded but few candidates could tell us the significance of this so the other two mark points were not awarded frequently. A common misconception, which we have seen in previous series, is that the antibodies can then bind to the virus particles and kill them. Wrong on two accounts. Firstly, antibodies cannot kill anything themselves, they just enhance phagocytosis and as a result the macrophages' ability to destroy a pathogen. Secondly, viruses are not alive and something that is not alive cannot be killed.

#### **Question 4**

The MCQs in parts (a) and (b) of this question were reasonably well done overall; not unexpectedly the fourth of the four was the least high scoring.

The structure of the responses to part (c)(i) was very encouraging. Centres are clearly teaching their candidates to look at the mark allocation for the question and at the information given. The majority of candidates wrote separate paragraphs on lactic acid, pH and ATP. The weaker candidates wrote descriptions not explanations, but this was expected. Some of the explanations for the drop in ATP showed confusion between aerobic and anaerobic respiration, which we tried to ignore where possible. Most candidates knew why the levels of lactic acid increased but a number wrote that it was carbon dioxide that was responsible for the fall in pH and not this rise in lactic acid.

The structure was less encouraging for part (ii) however. All the points on our mark scheme were seen but very few candidates gave more than two ideas at the most, despite the mark allocation of three.

#### **Question 5**

The responses to part (a) were probably the most disappointing of the whole paper, and probably the most surprising given 'succession' is a spec term and a topic we have frequently examined in the past. There were lots of references to changes in soil, plants and habitats instead of species. A high proportion wrote about a climax community being achieved but did not indicate that this would take a (long) period of time.

The MCQ in part (b) was reasonably well done but there are still a number of candidates that think that an organisms' niche is its habitat and opted for distractor D.

The first of our levels-based questions was attempted by the majority of candidates but few gave sufficient explanation to achieve the level three marks. The less able candidates simply described the data so could not be awarded higher than a level one mark. Despite numerous comments in previous examiner's reports, a high proportion of candidates were still making vague references to 'competition' without stating what the competition was for.

### **Question 6**

The two MCQs were not as high performing as many of the others on this paper; this is not surprising as they were both assessing maths skills in a way that has not been done on this paper before.

Part (b) performed well, not causing many candidates too many issues, provided they gave two reasons.

A wide range of responses were seen to the first part of (c). Many candidates are using past mark schemes to prepare for this paper so could pick up some of the first four points, although we did see the usual misconceptions about dead viruses being in the vaccine, B cells producing antibodies and plasma cells differentiating into antibodies were seen. Whether the fifth mark point was awarded depended on how well the candidate had read the question before writing their response; a lot of responses referred to the antibodies being present in the milk. This mark was also lost by candidates who talked about the baby when they should have been writing about the fetus. The last point was rarely seen.

How well candidates did on the second part of (c) depended on whether they thought about their response before writing it and the wording that they used. Many did not make it clear that the vaccine had to be given to the woman whilst she was pregnant and not the mother. A lot of responses stated that the babies should be exposed to the virus to see if they had fatal responses to it.

### **Question 7**

Part (a) was generally well-answered with many candidates realising that they had to explain two effects, that of the lack of chloroplasts and the blocked xylem vessels. Despite pointing this out several times in previous examiner's reports, there are still several candidates not stating that the light is 'absorbed' resulting in mark point not being awarded. There were a few vague references to the water being needed for photosynthesis or the light-dependent stages, meaning that the third mark point could not be awarded.

We have not asked candidates about the differences between prokaryotic DNA and human DNA and were pleased to see some very good descriptions of these differences in (b) part (i). Weaker candidates tended to overlook the requirement for the structural differences to be described and wrote about location instead. One misconception was that only the human DNA is double stranded and helical.

Responses were not so good to the second part of (b) with candidates not picking up on the target site of the albicidin was an enzyme present only in prokaryotic cells. Many repeated information in the stem of the question about bacteria not being able to function properly. A few candidates stated that the human cells would not be affected as they did not have chloroplasts or xylem.

Candidates tended to pick up the first mark point in part (iii) but did not write about the significance of having a treatment for diseases caused by resistant bacteria.

### **Question 8**

We do not have calculations worth three marks very often, so part (a) was more of an exception. However, many candidates did well and scored at least two marks, if not three of the marks. The commonest error was to use a diameter of 62  $\mu\text{m}$  but candidates could still access two marks if they did this. The other error was in converting  $\mu\text{m}$  into mm.

The calculation in (b) part (i) caused few problems.

There were some interesting responses to the second part of (b) with many candidates picking up on the idea that they should collect shed plates and add them to another source of *E. huxleyi*. We had tried to give an indication of how small these organisms are by including the calculation in part (a) but marks were lost by candidates who did not mention the use of a microscope or some sort of staining. Some candidates wrote about using DNA profiling or carbon dating as a means of identification; we felt that this would not work but gave credit for what they would have observed (the third mark point). A number of candidates suggested that the number of plates should be counted to see if extra ones had adhered. Again, we did not feel this would work as we had told them that the plates are continuously being produced.

In the second of our two levels-based responses, we saw lots of good ideas about how global warming could be affected, in either a positive way or a negative way. Surprisingly, very few candidates had picked up on the fact that their account should be extended to include the effects of climate change. It was evident that candidates have not considered how the carbon dioxide levels in the water can affect the carbon dioxide levels in the atmosphere, or vice versa. This was expected, in part, for the level three marks.

### **Question 9**

There were some good responses to part (a); photosynthesis is a familiar topic for candidates as it is covered in a number of spec points for this paper. The majority of candidates knew that the light was needed for both photolysis and excitation of the pigment electrons. They also know that the electrons from the water are used to replace those lost by the pigments.

A range of responses were seen to the MCQ in (b)(i).

Explaining the data given in part (ii) was less well done. There were many descriptions of the two sets of data shown in the graphs but only the more able candidates were able to use the information in the first graph to explain the data given in the second graph. The fifth mark point was rarely seen.

Describing conclusions always causes candidates problems, usually because they pick out specific points rather than discussing trends. The question in part (iii) was no exception but was compounded by the fact that candidates had not read the column headings in the table correctly and wrote about how much light was absorbed.

The final question on the paper resulted in a range of responses, with those written by the weaker candidates lacking specific A level detail. The more able candidates scored well.

## Summary

The following tips are worth considering by centres and candidates preparing for future exams:

- When writing a response ensure that your answer includes the level of detail expected at A level. This would have helped in question 9 (b)(iv) for example: yes, RUBISCO is an enzyme involved in the light-independent stages of photosynthesis, but a candidate is expected to know that more specifically it is involved in carbon fixation.
- Always show your working out to calculations, especially if they are worth more than one mark. This would have helped in question 8 for example where we looked for method marks if the final answer was incorrect.
- Read the question very carefully to make sure you are answering all aspects of it. This applies particularly to the levels-based questions which generally consist of more than one aspect that needs addressing. This approach was particularly important in 8(b)(iii) where a level three answer needed to include how the *E. huxleyi* affected the carbon dioxide levels in the water, how the levels of carbon dioxide in the water affected the levels in the atmosphere, an explanation of how global warming was affected by these changes and the effect of changes in global warming on the implications of climate change.

- When writing conclusions, try to include generalisations about what the data shows before picking out the most significant specific points. This would have helped for example in question 9(b)(iii) where the first two points were generalisations, the third point related to the pigments and the last two points related to the pigments.
- Read table column headings and graph axes headings carefully to ensure that your response is relevant to the data shown. This would have helped in 9(b)(iv) where the data does not relate to light absorption.
- Papers 4 and 5 both have synoptic elements where you are supposed to draw on AS knowledge, so this needs to be thoroughly revised as well. This would have helped in question 3(a) for example which was testing on the role of Golgi (unit 2) and cell transport mechanisms (unit 1).
- A candidate needs to know the definition of every biological term in the spec as any of these can be tested. Question 5(a) is an example of this.
- Use past paper mark schemes in revision schedules as these will help with the level of detail needed for a particular topic and highlight the language that needs to be used in expressing an answer. This would have been useful in question 9 part (a) for example.

