Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

January 2020

Pearson Edexcel International Advanced Subsidiary / Advanced Level
In Biology (WBI14)
Paper 01 Energy, Environment, Microbiology and Immunity

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January 2020
Publications Code WBI14_01_2001_ER

Paper introduction
This Januray series saw the introduction of the new specification and student responses were of a good standard. It was clear that students had been prepared for some of the new-style questions using examiner's reports and mark schemes for the new-style international AS papers and the home spec AS and A2 papers.

There were very few blank responses and many included all of our mark points. The maths questions were attempted with many students including their working, which gave the opportunity to score some of our method marks, even if they did not arrive at the final correct answer.

Question 1
(a)
The majority of students answered this question well. Some students tried to elaborate on their answer in Box B and a few lost marks as a result of writing that energy was lost for respiration.

(b)(i)
Many students knew that an ecosystem involved both biotic and abiotic factors but failed to state that it involved their interaction.

(b)(ii)
This multiple choice caused few students a problem.

(b)(iii)
Most students scored both marks on this calculation.

Question 2
(a)(i)
Students who read the question carefully scored both marks. Those who did not assumed microorganisms could already break down plastics.

(a)(ii)
Students are generally good at writing answers to natural selection questions, although we do still see some generic responses which do not answer the question in its context. One misconception is that the selection pressure causes the mutation, which cannot be credited.

(b)
A mixture of responses were seen for this multiple choice question, with many students selecting the correct answer.

Question 3

(a)

In this question, the majority of students demonstrated their clear understanding of greenhouse gasses.

(b)

This multiple choice was not quite as high-scoring as others as some students did not look at the trend shown in the graph carefully enough.

(c)

Students clearly understand the greenhouse effect and were able to make the correct selection for this multiple choice question.

(d)(i)

This was another multiple choice question which caused few students a problem.

(d)(ii)

This question was deliberately worded '...rings produced in 1970 would be different ...' as we wanted students to tell us whether the rings would be narrower or wider. Some of the less able students used this wording throughout their response but did not explain the effect on the ring width nor made a comparative explanation.

Question 4

(a)(i)

The majority of students found this calculation staightforward but many did not read the question carefully enough and so did not express their answer in standard form as instructed.

(a)(ii)

This was the first question on the paper that caused a real problem for students. It was clear that many students understand the general idea of what is meant by each of the terms. However, students stuggled to word their answers clearly enough to show that that biodiversity relates to the number of different species and population refers to the number of organisms within a species. The less able students did not attempt to differentiate between the two terms.

(b)(i)

A range of responses were seen to this question, and many students scored both marks. Those who lost marks either failed to relate the adaptations to the wasp's resemblence to a bee or did not state which type of adaptation they were referring to. There was some confusion between physical and physiological.

(b)(ii)

A range of responses were seen here, although less able students tended to only offer one advantage.

(b)(iii)
Students clearly understand PCR and gel electrophoresis but many do not use the mark allocation as a guide for how much detail to include in their answer. Lengthy explanations that are purely knowledge based are not the style of this new qualification's assessment. Less able students, as in previous series, wrote a generalised answer without relating to the context of the question.

Question 5
(a)(i)
As we have noticed in previous series, the majority of students do not fully appreciate the role of the viral genome and believe it acts as a template for the synthesis of new genome. There are also a significant number of students who think all viruses behave like HIV resulting in many responses regarding reverse transcription and incorporation of the DNA copy into the host cell as a provirus.

(a)(ii)
A good number of students knew that the glycoprotiens were for attachment to host cells. Again, because many students think all viruses behave like HIV, we saw a number of references to glycoproteins binding to CD4 molecules on T helper cells.

(b)
A reasonable number of students could state that RNA polymerase was needed for RNA synthesis but some also claimed that it was needed for translation, negating their previosu point. Fewer students scored the second mark for appreciating that this enzyme would not be present in the host cell.

(c)
Many responses repeated the information provided in the stem of the question, without answering what virus assembly was. Those who could explain that it was involved in making new particles did not include that the genome had to put together with the proteins.

(d)
A range of responses were seen to this question and there were some very good answers. It became clear that students had been prepared for this exam using past papers, including last summer's WBI04 paper, where there was a 6 mark question on interferon.

Question 6
(a)
Some excellent suggestions for why barnicles might occupy different niches were seen. Students knew the meaning of the term 'niche' which is something that has not really been evident in the past.

(b)(i)
All of the marking points were seen for this question but rarely in the same response. Students need to remember that the number of marks allocated to a

question of this type indicates the number of points that they need to make. The most common misconception is that the actual length of the error bar does not relate to its reliability, but its value in relation to the mean. Very few students picked out that the most reliable data was that for the rock with barnacles as this was the smallest error bar in relation to the mean.

(b)(ii)
Students need to read the question thoroughly in order to appreciate what the study was aiming to do. Many responses had the three rock types being put into separate containers which would not determine the substratum preferences of the barnicles. In addition, a number of students did realize that the mean and standard deviations would need to be calculated.

Question 7
(a)(i)
This multiple choice, probably the most difficult of the nine questions of this style on the paper, yielded the expected range of responses but there were a decent number of students who chose the correct answer.

(a)(ii)
It was clear from the responses that reports on past papers are being taken on board as there were more references to light 'absorption'.

(b)(i)
A range of responses were seen with some students showing a clear idea how plants synthesise proteins. The less able students could state that amino acids are joined by peptide bonds but were less likely to appreciate that nitrate ions would be needed (as a source of nitrogen).

(b)(ii)
This was the first of our two levels-based questions and was the higher-scoring of the two. Students embraced the question and very few blank responses were seen. Students will become familiar with these questions as past papers become available for training purposes. There were three components to the question that needed discussing for the level three responses and students need training to identify how to structure their answers to score well. Concise but relevantly detailed responses are required to score well. In addition, students need to be taught the meaning of the command words; here, a justified judgement was required.
In the example below there is more than enough for 6 marks to be awarded; the minmum needed has been indicated.

Seaweeds are healthy because they contain many important nutrients like carbohydrates and proteins and lipids. Its an excellent food source because its more energy efficient eating it directly than eating the herbivores because more energy will be lost and less available. So it provides more energy and nutrients than eating animals. Its environmental-friendly because it takes up carbon dioxide from the water/ environment so less carbon dioxide which is a greenhouse gas so greenhouse effect is not enhanced. its an economic food source because its easily grown and doesnt need alot of caring or looking after and it doesnt need many nutrients to grow and can take its minerals from seawater and it makes it own food by photosynthesis so its cheaper. contains many antioxidants carotenoids, phenols, flavonoids which help the immune system and the body making it very healthy and has enough nutrients for humans.

(Total for Question 7 = 12 marks)

2 reasons why seaweeds are healthy

A reason why seaweeds are environmentally-friendly

and a justification

A reason and a justification why seaweeds are economic

Question 8

(a)

All four options were chosen in this multiple choice but the majority of students selected correctly.

(b)(i)

The option selected most frequently was **C** lambda phage. Students were expected to use the information provided previously on HIV to select the correct answer.

(b)(ii)

One mark was generally scored for this question, with the more able students extending their response to give us our second mark point.

(b)(iii)

This question was generally well-answered by the students who had been taught, and remembered, that it was essential to write 'genetically' identical when talking about the results of mitosis.

(b)(iv)

Many students scored two marks for this question as they recognised that an immune response could be triggered if the CAR-T cells were from another patient, and as a result would be destroyed. The second mark point was awarded the least frequently the mark scheme insisted on the term 'antigen'; a key word associated with immunology. We were pleasantly surprised by the number of students who knew about immunosuppressants.

(b)(v)

This was one of the few 'suggest' questions on the paper. Few students scored both marks, as they tended to offer only one suggestion. Again, students should be encouraged to use the mark allocation to help them recognise how much to write.

Question 9

(a)

This was a one mark question which was deliberately included as a hint to students as to what they should be thinking about later in the question.

(b)

This calculation was also included to encourage student to consider how the optical density depends on size of the microorganism.
The calculation itself did not cause too many students a problem.

(c)(i)

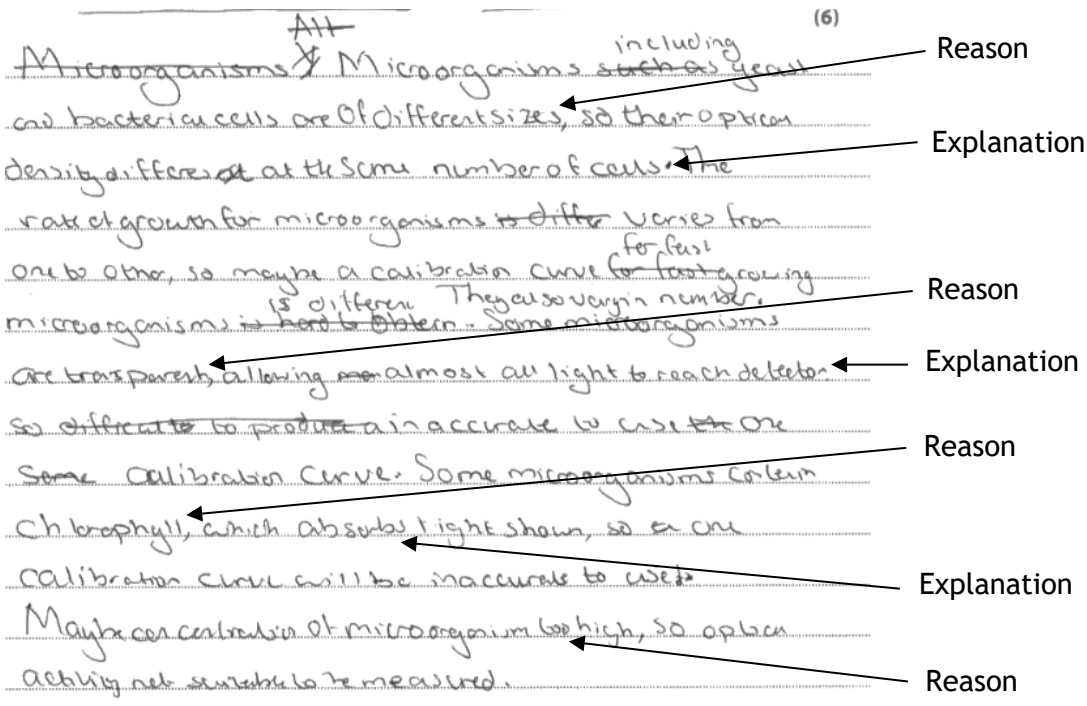
This question was designed to encourage students to think about numbers of organisms and optical density. Many students omitted that the optical density levelled off at a certain number of cells. This mark was lost by a large number of students.

(c)(ii)
This question caused students a lot of problems. Possibly because students did not look carefully at the drawing given at the beginning of the question. Any stimulus material that is included in a question is useful and students should be trained to use it.

(d)
Students were expected to find this question difficult as it involved the rearranging of an equation that included log expressions, however, with many scored all three marks.

(e)
This question was the second of the levels-based questions and caused students more problems than the first one, despite the information given in the previous parts of the question. There were, however, relatively few blank responses. Working out what was required for each level in this question was not quite so obvious as in the first one, but the command word 'explain' told students that if they do not give reasons in their answer, they are unlikely to achieve more than a level 1 mark.

The response below illustrates the sort of answer we were expecting for 6 marks.



Paper Summary

The following points may help prepare students for future series:

- questions should be read carefully, any stimulus material should be used and specific instructions should be followed
- command words should be noted and their meanings understood
- all questions should be attempted, stating the obvious first and then expanding on the ideas to answer the question
- all working in calculations should be shown, even if the calculation is not completed or a mistake has been made somewhere
- the question mark allocation should be taken into consideration as a guide to how many points to make in an answer
- the context of the question should be addressed in the answer where required so generic answers are avoided
- in the levels-based questions, consideration of what might be required to achieve each level should be considered

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