Examiners' Report
Principal Examiner Feedback

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Pearson Edexcel International A Level
In Biology (WBI14)
Paper 01: Energy, Environment, Microbiology, and Immunity

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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 question was accessible and very few blank responses were seen. 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.

Question 1

The first question on the paper was very straightforward but was mis-read by a number of candidates who saw the 'State two precautions' and then wrote about safety issues, not about avoiding contamination. This did not stop them from scoring mp 3 for covering the plate.
The MCQ was reasonably well done with well-over half the candidates working out the correct answer.
A range of responses were seen for part (c). Candidates who identified the command word 'explain' and noted the mark allocation scored well. A proportion of candidates wrote very generic descriptions of how the zone of inhibition could be used, without referring to the data shown in the diagram.

Question 2

The MCQs in the first part of this question scored well with the second one probably being answered the least well; many candidates do not appreciate that the light-dependent reactions take place on membranes.
For part (b), candidates who read the question carefully gave conclusions. The candidates who just saw the 'describe' literally just did that and talked about the profiles shown in the two diagrams. Our third conclusion was for picking out the wavelength of light that was most absorbed. A number of candidates lost a mark here for either not reading the values from the graph accurately or for not identifying that bacteria had two wavelengths of maximum absorbance.
Part (c) was answered very well, with many candidates scoring all three marks. This spec point is clearly well-understood by candidates.

Question 3

The MCQ was only answered correctly by about half the candidates, with the most frequently opted for wrong distractor being C; plant viruses do not have an envelope. The calculation in (b)(i) was answered well and in (b)(ii) candidates could tell us that enzymes were involved in the breakdown of plastics but did not write much more. In

(b)(iii) the majority of candidates knew that carbon dioxide was released by respiration but could not give any indication of the molecules that constituted biomass.

Question 4

A range of responses were seen for the estimation in part (a). Marks tended to be lost by those candidates who gave too many significant figures or decimal places in their estimates.

Part (b) was a bit disappointing as we have asked about the role of GALP in the formation of various molecules before. Although this context was new, we were surprised that candidates did not pick up the first three mark points; candidates are usually well-prepared for their exams using past papers, but this was an exception.

It was clear from the answers to part (c) that candidates have a good understanding of the theory behind dendrochronology. However, our first mark point was infrequently awarded as candidates did not write their responses in the context of the question.

Question 5

We have not asked candidates about models before but there were some good attempts at trying to explain what a model is. The less-able candidates tended to put the information shown in the diagram into words.

The percentage calculation was reasonably well done but some candidates incorrectly rounded their answer up whilst others gave their final answer as a recurring value.

We saw some really good attempts at the levels-based question but a high proportion of responses focussed on the positive impacts of the planting regimens. A 'discuss' question in this type of context requires both sides of a scenario to be considered. To access the level 3 marks, candidates were required to explore both the positive and negative impacts of the planting regimens on global warming, biodiversity and local populations.

Question 6

The MCQ at the beginning of this question caused few problems with the commonest wrong answer being given as A.

Part (b)(i) took some candidates a bit by surprise indicating that very few appreciate how a log scale works.

The second MCQ scored highly, with candidates being able to recognise biotic and abiotic factors.

Candidates who recognised that (b)(iii) was actually an enzyme question scored well on this question. Common causes of lost marks included not explaining that enzymes lack kinetic energy at lower temperatures, describing the active site as denaturing and stating that enzymes 'start' to denature at higher temperatures.

The Q_{10} calculation caused the usual problems with only the more able candidates scoring the marks. The commonest error was to read the value from the graph at 20°C

and then add 10 to this value to use in their division. However a relatively high proportion of candidates lost marks because they could not read two values from the graph accurately. Other lost the third mark for expressing their answer to an unrealistic number of decimal places.

The last part to this question did not score very highly. Most candidates picked up the first mark for describing the data, which is quite often a good starting point in an 'explain' question. Others wrote as much as they knew about enzyme activity and picked up another mark.

Question 7

We expected the MCQs at the start of this question to be fairly straightforward but a surprisingly high number of candidates gave the answer as 'C' in the first MCQ. The second of the two was the highest scoring.

The majority of candidates know what endemism is but there was confusion with habitats by some. The less able candidates did not give an answer that used the context of the question in their answer.

Parts (ii) and (iii) saw some excellent responses with candidates really embracing the context of the question.

Part (iv) was less well answered but we have not asked it before so this was not unexpected. Lack of expression did lose some candidates a mark as they did not make it clear that one primer was needed for each strand, not each end of each strand. Less able candidates got very muddled between DNA strands and DNA molecules.

Part (v) was slightly different but candidates made some good attempts. The full three marks was rarely scored, probably because candidates did not identify that three comments would be needed to score the three marks.

Question 8

In (a) part (i) candidates wasted a lot of time writing about HIV and latency before writing about translation. We have seen this on several occasions before: a large proportion of candidates think that all RNA viruses are retroviruses.

Candidates coped with the slightly unusual context of part (ii) and realised that the viral components would not be formed that were necessary for viral assembly. Marks were lost by candidates who repeated the stem of the question and talked about viruses not being produced, or formed, instead of portraying the idea of the component parts being put together or the virus actually being assembled.

Some very good responses were seen to part (b). However there were quite a few candidates who wrote about the white blood cells only and not the platelets, which limited them to three marks. The usual mistakes were seen in questions of this type: B cells producing antibodies, plasma cells differentiating into antibodies, antibodies destroying the pathogen, the virus being killed. Candidates know that antibodies cause agglutination and opsonisation but clearly do not know the difference between the two processes or how these processes enhance phagocytosis.

Part (c) saw some sensible suggestions for advantages of these methods. The less able candidates tended to only write about one advantage, again not using the mark allocation to guide them to what is required.

Question 9

The ratio calculation in part (a) caused the usual issues; candidates just do not seem to be able to express a ration correctly. The majority know to divide one number by another but then fail to give their answer a 1 : something.

The responses to part (b) were a little surprising. We have asked about the consequences of TB infection in numerous previous series but very few responses scored all three marks, which was quite disappointing.

Part (c)(i) saw a variety of responses with only the more able candidates being able to explain why. Frequent responses simply referred to a control being needed.

The second part to (c) received some very good attempts. The context of the question was novel but candidates embraced the question and very few blank responses were seen. Some candidates identified that they were being asked about the properties of antibodies and took this approach but others worked through each step methodically and identified what was happening. Most candidates realised that the dye was included to make the complex visible. A few responses talked about the presence of macrophages and pathogens and opsonisation but we ignored this where possible.

The third part of (c) also saw some good attempts, again with comments about macrophages which we tried to ignore. Candidates clearly realise that optical methods mean shining light at the culture and measuring the turbidity by the light that passes through. However a high proportion of responses included a description of bacteria being grown on agar plates and the light being shone through these, which was a little surprising.

Some good suggestions for how the protein could be used were made in response to the last question on the paper. We originally planned for vaccines being the answer but there were other valid suggestions that even incorporated the idea of epigenetic modification.

Summary
A few suggestions for improving candidate performance are given below:

- Candidates should avoid repeating information in the stem of the question in their answers as this will not gain marks.
- Candidates need to take notice of the mark allocation for each item to help them decide if they have written enough points to be awarded that many marks.
- Candidates should consider the questions asked in the early question parts as they are quite often trying to give a clue as to what is expected in the latter question parts.

- Answers should include A level detail and terminology.
- Candidates should check the command word for each question before attempting their response. In particular, if the command word is 'explain, then they need to make sure that some science has been used some science to say why something has happened. Their answer should include terms like: because, therefore, as a result, so. The other poorly addressed command word being 'determine' where a calculation must be included. Appendix 7 in the specification lists all the command words and their meanings.
- Any information given in a question is there for a reason, albeit in a table, a graph, a diagram or in the text of the question, so must be used in the response.
- Maths skills as outlined in the appendix should be practiced and in particular candidates need to be able to convert one unit into another, write a ratio in the form 1 : x, express a value in correct standard form (only one digit to the right of the decimal point), round up values to a given number of decimal places or significant figures and work out percentages.