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Examiners' Report

Summer 2013

GCE Biology (6BI04) Paper 01R
NATURAL ENVIRONMENT

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General

This paper performed well and some high-scoring scripts were seen, demonstrating good understanding by many students. There were very few blank answer spaces, again showing that students have a good understanding of the content of the specification and that the students had enough time to answer the paper.

Question 1

Students performed well in this question overall, despite the study of lichen being an unfamiliar context for field work.

The majority of students scored well in parts (a), (b) and (c) indicating that the AS content has been revisited in preparation for the synoptic element of this question. The responses seen to part (d) demonstrated a good application of field work studies. Part (iv) was a good discriminator as the more able students wrote more-detailed answers that made three points on looking for a relationship between data.

Question 2

The first five parts of this question caused very few problems to the students; they had clearly learnt the names of the various molecules involved in photosynthesis.
Part (iv) was more discriminating with the more able students writing answers in sufficient detail, that also answered the question. A common mistake was to simply describe the **structure** of starch and not its synthesis.

Question 3

Global warming has been tested a number of times in the past papers, but still seems to cause students problems in wording their answers accurately enough to score well. This year was no exception.

Common errors included referring to methane as a combustion product of wood (mark point 1), confusion between light energy and heat energy (mark points 4 and 5), referring to carbon when it should be carbon dioxide (mark points 1 and 8) and not making it clear what is actually warming up as a result of the infra red radiation being trapped (mark point 7).
These points are illustrated in the response below:

Forest fires result in the production of carbon and methane. These gases trap UV light that has been radiated from the earth and as a result the earth gets warmer.

Students clearly understand the concept of carbon neutral, but again there was confusion between carbon and carbon dioxide. It was not uncommon to see explanations that stated that carbon dioxide was stored in the plants or that carbon was removed from / released into the atmosphere.

Question 4

Students performed well in this question, again not being phased by an unfamiliar context for testing a specification point or the data being presented in a different format. The marks for this question as a whole were spread according to the level of detail that the students wrote, with the more able students giving fuller descriptions. This was particularly so in part (c); most students knew that NPP=GPP-R, but few went on to state a use of the energy released by respiration.

Question 5

This question was clearly more challenging, but not through its complexity. Marks were lost either through poorly worded answers or answers that did not actually answer the question.

For example, in part (a)(ii) many students used the term given in the stem of the question to answer the question. In other words, they wrote about the bases not overlapping instead of explaining what non-overlapping actually means, using a different expression. We also saw several references to the bases **making up** an amino acid; although we knew what the students meant we cannot accept wrong Biology as amino acids are not made up of bases, they are made up of carbon, nitrogen etc.

In part (c), many students launched into a straight description of translation without actually explaining the role of the three stop codons. Some marks could be awarded for these descriptions but full marks can rarely be gained if the actual question is not answered.

There were some instances where a description of translation was also given for part (d). It is worth pointing out to students that if they find themselves writing information twice it is worth rereading both questions again very carefully, as they are answering one of them incorrectly.

Question 6

A question based on the specification points relating to immunology always presents students with problems and this one was no exception. Students do not seem to appreciate the following points:

- T helper cells and T killer cells are different cell types
- T killer cells destroy infected cells and not the pathogen directly
- B cells have to be activated to divide into B effector cells **before** they differentiate into plasma cells and memory cells
- Macrophages are APCs for T helper cells, B cells act as APCs in their own activation and infected host cells are the APCs for activation of T killer cells
- T helper cells, through cytokine production, are involved in the activation of both B and T killer cells.
- Antibodies do not directly destroy the pathogen but facilitate phagocytosis by the macrophages

Part (a) however saw a good range of responses; students clearly understand that viruses and bacteria are very different microorganisms.

Question 7

Part (a) for this question also saw a good range of responses. Many students realised that we were testing them on the role of the stomach as a barrier to infection, but there were a good number of students who thought about the context of the question and gave mark points 5, 6 and 7.

Part (b) was more challenging; it appears that many candidates think that HIV is the only type of virus that exists and that all viruses use reverse transcriptase and integrase to make a DNA copy of their RNA and integrate this into the host cell genome respectively. Our mark scheme allowed these students to still have access to full marks, but very few gave sufficient detail to score well.

Students made good attempts at both (b) parts (ii) and (iii). However students need to take more care when describing the destruction of viruses; viruses cannot be killed as they have never been living.

Question 8

Excellent definitions of a species were seen. Generally students who were not awarded this mark were those who referred to viable offspring instead of **fertile** offspring. Students generally appreciated what they were being asked for in part (b) but again, only the more able students gave sufficient detail in their answers to score full marks. This was also the case in part (c).

Paper Summary

In future series, students will perform better if they:

- Put more detail into their answers, so that they make at least as many points as there are marks allocated to the question
- Identify the specification point being tested and then apply their knowledge of this to the actual context of the question
- Check that they are not giving the same answer to two different questions
- Do not write about the killing of viruses
- Understand the fundamental points of the immune response more clearly

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