Examiners' Report/ Principal Examiner Feedback

October 2017

Pearson Edexcel International Advanced Level in Biology (WBIO2) Paper 1 Development, Plants and the Environment

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General Introduction

Once again there were some very good answers provided to the questions in this paper, indicating a sound understanding of the content of the specification. It was encouraging to see many students writing better descriptions of core practical work and giving a clear indication that they had carried out the practical themselves.

The data analysis question again asked students to analyse data provided in a table. Good answers were given by students who carefully read the question. However, there were many that compared the data about both types of fibre when they were only asked about one type of fibre. In another part of the question they were asked to make a comparison but many failed to understand that it was essential that the comparison was to the control group. These points indicate the need for students to take time and care when reading the question stem.

Students need to ensure they can distinguish between similar terms when using biological terminology. A surprisingly large number wrote amylopectin or amylose instead of amyloplast in one question and seemed to think chromosome and chromatid were interchangeable terms in another question. Yet again many students did not seem to understand when to use the term gene and when to use the term allele. It was clear that many thought that they were the same thing.

It is essential that students appreciate the requirement to not only recall information but to also be able to apply their knowledge and understanding of biology.

Question 1(a)

Examiners awarded the full range of marks from zero to four. There were many that could not recall that starch was a polysaccharide and just as many that only stated that the monomer in starch was glucose rather than the more precise answer that was expected which was alpha glucose. In the final part of the question the name that was expected was amyloplast but the word amylopectin was commonly seen as was the name amylose.

Question 1(b)

This was fairly well attempted with the majority correctly stating that microfibrils were present and that hydrogen bonds held the cellulose molecules together. Fewer referred to the matrix in which cellulose is embedded. A common error was to describe the structure of cellulose instead of its arrangement in the cell walls. This was not penalised but wasted valuable time for the student.

Question 2(a)(i) and (ii)

Far more students were able to correctly identify the position of xylem vessels than that of sclerenchyma fibres. The line used to label these structures in the photograph was expected to touch the tissue.

Question 2(b)

This was very well answered by the majority of students although a number did describe functions rather than structures and this obviously did not gain credit.

Question 2(c)

This question proved to be very straightforward.

Question 3(a)(i) – (iv)

These multiple choice questions all tested knowledge of plant and animal cell structures and proved to be straightforward for the majority of students.

Question 3(b)(i)

A commonly seen answer that gained no marks was a reference to DNA profiling and a less frequent answer that was also not accepted was a reference to just phylogeny rather than the required molecular phylogeny.

Question 3(b)(ii)

It was pleasing to see that the majority of students understood the diagrams showing evolutionary relationships.

Question 4(a)(i)

The question asked for conclusions to be made about the data but a lot of answers just gave observations about one cell (eg cell 1 has the largest mitochondria) rather than stating general conclusions about the mitochondria. Unfortunately, many attempted to relate the number of mitochondria to their volume which led to incorrect statements.

Question 4(a)(ii)

Disappointingly, a significant number did not attempt this question. The only commonly awarded mark was for the idea of a small sample size.

Question 4(b)(i)

It was pleasing to see so many students using the data efficiently and completing the calculation to gain the correct numerical answer. Some unfortunately did not gain the final mark because they stated an answer that included decimal places which was not appropriate based on the data they were provided with.

Question 4(b)(ii)

The most commonly awarded mark was for realising that only one section of the cell was used and this may not be representative of the whole cell. Some thought that ribosomes on the rough ER would not be seen rather than giving a clear statement about the problem of some ribosomes being hidden **behind** other structures.

Question 4(b)(iii)

Many gave good descriptions of the role of the rough ER although in a number of cases poor expression about the packaging of protein into vesicles prevented the award of the final marking point. There were many clear answers that described the folding of the polypeptide into a secondary or tertiary structure.

Question 4(c)

There was only one mark available and this required the correct domain to be identified along with a correct reason for the choice of domain. Unfortunately, a disappointingly large number of students did not get beyond the first step of correctly identifying the domain; those that did, generally went on to give a correct reason. It was expected that when an organelle was named it would be either ER or mitochondrion as these are the only two relevant organelles given in the information in the question. Some stated ribosomes but this is not a suitable response.

Questions 5(ai)-5(aii)

These were single mark questions for explaining the terms phenotype and genotype. A widespread understanding of both terms was evident but fewer students were successful in part (ii) where it was quite common for answers to refer to genes rather than alleles.

Question 5(a)(iii)

Fewer students could explain the meaning of the term environment compared to the previous two questions. Surprisingly, few made any reference to the terms biotic and abiotic factors.

Question 5(b)(i)

Although most gained the first marking point for describing the increase and decrease in the number of facets, fewer went on to describe the relative decrease in the number of facets in wild type and ultra bar fruit flies. Disappointingly, few attempted to use the data quantitatively and failed to quote comparative values.

Question 5(b)(ii)

It was very rare to see answers where the concept was clearly understood and a clear, coherent explanation was given. The most common answer was the simple statement that the number of facets changed as the temperature increased and this did not gain any credit.

Question 5(b)(iii)

Although some very good answers were seen many were spoiled by poor expression. This included describing homologous chromosomes lining up rather than pairing up, sister chromatids rather than non-sister chromatids overlapping and using the word gene instead of allele.

Question 6(a)

A lot of students did not read the question carefully enough and were clearly comparing the effect of treatments on banana plant fibres to the effect on bagasse fibres whereas the question only asked about banana plant fibres. It is important that students state units when they give numerical answers.

Question 6(b)

Students were asked to compare the effects of treatments on the two types of fibres. Unfortunately, a large number of answers were seen in which there was just a comparison of the strength of fibres from banana plants and bagasse and no attempt was made to relate the increase or decrease relative to the control. This type of answer was therefore failing to answer the question.

Question 6(c)

Answers provided clear evidence that the vast majority of students had carried out the core practical themselves which was pleasing to see. There were many good answers that gained the full five marks. Unlike in several previous exams assessing core practical work, students in general did pay attention to describing how they would measure the dependent variable although some referred to measuring the tensile strength rather than measuring the actual mass. Some left out the need to use untreated fibres as a control.

Question 6(d)

A number of answers stated that "the fibres can be used again and again" which is not the same as renewable so no credit was given. Quite a few answered in terms of why the fibres may be good for building, eg describing high tensile strength but did not make any statement about why they may be a **sustainable** source.

Questions 7(a)(i)

Species richness is a term that is well understood by most students. Unfortunately a significant number failed to use finches as an example and did not gain the second mark.
It is very important that students read questions carefully.

Question 7(a)(ii)

Quite a few students thought native and endemic were synonymous, although those who used this term often gained both marks anyway because of what they stated elsewhere in their answer. Again a significant number failed to use finches as an example and did not gain the second mark.

Question 7(a)(iii)

The majority could give a clear definition of niche but fewer went on to refer to the context of this question.

Question 7(b)

It was pleasing to see that many students were able to correctly recognise the selection pressure although there were a number of other answers that suggested the hard seeds **caused** the mutations which lead to powerful beaks. It was encouraging to see many students taking into account the context of the question but there was still evidence that others were writing generic responses with no mention of finches. The stem of the question states that an explanation of how natural selection has led to adaptation and evolution of these finches is needed. However, very few mentioned natural selection or evolution and could not gain the final two marks in the mark scheme.

Question Q8(a)

Most correctly stated thirty chromosomes but a few thought there would only be fifteen.

Question 8(b)

A large number of students wrote their answer in such a way that it was not clear if they were describing sexual or asexual reproduction. The most commonly awarded marks were for stating that sexual reproduction results in genetically different offspring and asexual reproduction leads to genetically identical offspring.

Question 8(c)(i)

It was common for students to correctly place the cross in the first two rows of the table to gain the first two marks. However, relatively few chose zero for the number of chromatids in telophase and so failed to gain the third mark.

Question 8(c)(ii)

There were plenty of good answers that gained the full four marks.
A significant number just wrote everything they could remember about interphase despite the question stem only asking for details of early interphase. This meant there were lots of answers that described replication of DNA and also the G2 phase. Although we did not penalise students that did this, it is important students target their answers to avoid wasting valuable time in the examination that could be put to much better use.

Paper Summary

Based on their performance on this paper, student should:

- Read all of the details in the questions carefully, especially the context of the question.
- Understand that when asked to give examples as part of the answer, marks will be lost if none are included.
- Learn key definitions of terms in the specification.
- Gain practice at interpreting information presented in tables.
- Ensure they can distinguish between the terms gene and allele and between chromosome and chromatid.

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