Examiners' Report
Principal Examiner Feedback

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Pearson Edexcel International Advanced Level

In Biology (WBI02) Development, Plants and the Enviroment

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Introduction:

Most candidates had a good grasp of the factual content of the course. Topics such as the structure of starch, the acrosome reaction, the arrangement of cellulose in cell walls and the differences between Withering's method of drug testing and modern drug testing were all well understood by many candidates. As in previous exam series, questions that required the application of knowledge to a particular context were not dealt with so well. Once again those who had learnt a particular stock answer to a topic were often able to gain only the 'generic marks' available and were not able to gain full marks because they did not apply their knowledge to the specific context.

As stated in previous reports the use of correct biological vocabulary is vital in this paper but it was still evident that similar looking terms such as cristae and cisternae were being confused. Other terms that were confused included amylose with amylase, amylose with amylopectin and acrosin with acrosome.

There was clear evidence that candidates often failed to read the question thoroughly enough and included much irrelevant information in their answers. Examples of this were writing about cellulose molecules rather than microfibrils and writing about the role of the pollen tube rather than the pollen tube nucleus. In another question candidates were asked to explain how cells get bigger but instead tended to provide details of how new cells are formed in the meristem and wrote about mitosis. Two questions asked candidates to use information about the great tit to explain the meaning of terms with each question being worth two marks. In each case one of the two marks was allocated for using the great tit as an example to explain the definition. A disappointingly high number of candidates did not read the questions thoroughly and failed to refer to the great tit at all.

It is disappointing to note that yet again many candidates 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. Polygenic inheritance was often explained as being due to multiple alleles rather than more than one gene.

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

Question 1(a) and (b)

These multiple choice questions about nuclear division were generally high scoring although fewer gained the mark in (a)(i) for knowing that DNA synthesis occurred before both meiosis and mitosis.

Question 1(c)

The majority of candidates gained a mark for knowing that a reason that neither meiosis nor mitosis take place in prokaryotic cells was due to the absence of a nucleus. Fewer gained a second mark as they either did not refer to a lack of chromosomes or they did not link the lack of meiosis to the fact that prokaryotic organisms reproduce by binary fission. Weaker candidates merely described prokaryotic cells.

Question 1(d)

Most gained both marks but a disappointing number thought the cell membrane was only found in eukaryotic cells.

Question 1(e)

A lot of candidates could draw the Golgi apparatus but failed to label the cisternae.

Question 2(a)

It was apparent that candidates did not read this question carefully enough. The majority wrote about the pollen tube itself, not the pollen tube nucleus or they wrote about double fertilisation.

Question 2(c)(i)

This question was well answered but a few candidates referred to amylase rather than amylose and others confused the terms amyloplast and amylose.

Question 2(c)(ii)

Few mentioned the insoluble nature of starch and that this meant it could not move into the embryo plant. A significant number, however, did state that the glucose available after starch had been broken down could be used in respiration.

Question 3(a)(i)-(ii)

Although many gave correct definitions of the terms a large number failed to follow the instruction in the question stem which required candidates to use the great tit as an example. In (a)(i) some candidates drifted away from the question asked and wrote about similarities with a common ancestor.

Question 3(b)(i)

Those candidates that did not gain both available marks had generally confused alleles with genes.

Question 3(b)(ii)

Stronger candidates used their understanding of natural selection and applied it carefully to the example given in the question. Weaker candidates gave generic answers and made little or no reference to the example.
Serious misunderstandings of the causes of mutation were evident with some stating that the mutations in beak length were caused by the bird feeders or they were a result of selection

pressure. Others were let down by poor expression giving answers that seemed to indicate that the selection pressure was the bird feeders themselves.

Question 4(a)

Many well-argued explanations were seen of a process that was new to candidates. It was pleasing to see candidates applying their biological knowledge. One common error was a reference to 'preventing polyspermy'.

Question 4(b)(i)- (b)(ii)

Although the majority had no difficulty in defining the meaning of tissue in part (i), they frequently then failed to read the question in part (ii) carefully enough and simply restricted their answers to describing mitosis. Those that did realise the importance of stem cells scored well.

Question 4(c)(i)

The question asked for a control rather than a controlled variable. It was evident that a significant number of candidates failed to realise that these two terms are not the same. Careful reading of the question should have led to a realisation that sea water would need to be used and that no peptide should be present. Many candidates indicated one or the other but very few referred to both.

Question 4(c)(iii)

Although the majority of candidates knew about the acrosome reaction some confused acrosin with the acrosome and some thought that it was contact between the sperm head and the oocyte that triggered the reaction.

Question 5(a)(i)

It is important for candidates to read questions very carefully. Here many wasted time and space writing about the structure of cellulose whereas the question asked about the arrangement of cellulose molecules in cell walls. There was some confusion about where the hydrogen bonds were and although most referred to microfibrils fewer wrote about them being in layers. Others referred to the cellulose molecules (rather than the microfibrils) being in layers.

Question 5(a)(ii)

Poor expression let candidates down and too many simply stated that lignin was waterproof or that lignin was strong and failed to relate these properties to the xylem vessels.

Question 5(b)(i)

Although a large number of candidates found the calculation very straightforward a significant number only gained the first mark for calculating 230 – 180.This was because they then divided by 180 rather than dividing by 230.

Question 5(b)(ii)

Answers lacked detail and very often just quoted figures for the lignin content that were given in the table. We expected candidates to link the lignin content to the xylem vessels. Others stated that the leaves in the GM plants were shorter despite the stem of the question indicating that they were the same. Although many gained a mark for indicating that the leaves were wilting or drooping few related this to a lack of water.

Question 5(c)

This proved to be a high scoring question with many candidates gaining the full three marks that were available. Weaker answers were generally due to a lack of detail about specific ions and why they were needed. Some thought xylem vessels were concerned with transport of glucose.

Question 6(a)(i)

Apart from a few that got the relationship the wrong way round, most understood the meaning of a negative correlation.

Question 6(a)(iii)

This question tested knowledge of a core practical and the practical techniques were well known. Marks were usually obtained for knowing acid was added to the root tip, for naming a suitable stain and giving further detail such as warming to intensify the stain. Fewer stated the need to use the same species of plant or the same plant. The most frequent cause of lost marks was not relating the mitotic index to the distance from the root cap.

Question 6(b)(ii)

This is another question that illustrated the need to read the question carefully. Candidates were asked to explain how cells get bigger but instead provided details of how new cells are formed in the meristem and wrote about mitosis.

Question 7(a)

Although most gained the full three marks that were available, some expressed their answers so poorly that it was impossible to tell whether the answer was referring to Withering's method or to the modern way of drug testing.

Question 7(b)(i)

A disappointingly large number of candidates just gave a description of three-phase testing and so failed to score marks. Other candidates offered the idea of different doses but surprisingly few stated these would be given to patients and some even erroneously suggested they would be given to healthy volunteers. Few indicated that the lowest effective concentration would be selected and instead seemed to think that it would be the highest dose that did not have side effects that would be chosen.

Question 7(b)(ii)

This was straightforward for many candidates although some stated the drugs the wrong way round. They may have benefitted from checking through their answers after completing the paper. Too many spoiled their answers by referring to OH bonds or OH atoms.

Question 7(b)(iii)

A significant number gained the first two marking points on the mark scheme. Other candidates had the idea that patients were different but then failed to indicate how they may be different.

Question 8(a)

The best answers were given by candidates that used subheadings or at least separate paragraphs for each type of adaptation. Even then some struggled to correctly classify the adaptations as anatomical, behavioural or physiological. Three of the available marks were for linking an adaptation to its survival advantage but here many candidates failed to sort out and use information correctly. It was evident that some candidates need more practice at marshalling information such as this in prose as part of exam preparation.

Question 8(b)

Although a significant number of candidates understood that the birds would occupy different niches others thought the exact opposite and stated that the two species would occupy the same niche. Quite a number of candidates disappointingly wrote about speciation.

Question 8(c)

Some misunderstood the question and wrote about the problem of a low birth rate and even linked this to a need for conservation. Several thought it was the flamingo reducing its population so there would be less competition. Few linked birth rate to death rate which was the focus of the question. When marks were awarded it was most commonly for stating that there would be few predators or that not many other animals can live in the lakes.

Paper summary:

In order to improve their performance candidates should: -

- understand that when asked to give examples as part of the answer, marks will be lost if none are included.

- make sure they can distinguish between the terms gene and allele.

- when describing practical procedures, remember to refer to the dependent variable

- take into account the command words used in the question, explain is not the same as describe

- pay particular attention to spelling and the use of technical names and terms