



Pearson
Edexcel

Examiners' Report

Principal Examiner Feedback

October 2018

Pearson Edexcel International Advanced Level
In Biology (WBI02) Development, Plants and the
Environment

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Most candidates had a good grasp of the factual content of the course. Topics such as the structures present in plant and animal cells, the differences between prokaryotic cells and eukaryotic cells and the structure and functions of xylem vessels 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. 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.

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.

There was clear evidence that candidates often failed to read the question thoroughly enough and seemed to focus on a word or phrase in the stem of the question without considering the overall context. Examples of this include 3(a)(ii) which contains the phrase "production of sperm cells". This induced some candidates to write about meiosis whereas careful reading of the question should make it clear the question was about mitosis. Another example was 2(c) which contains the phrase "organisms have changed over the years" and a large number of candidates seemed to respond to this and launch into descriptions of Natural Selection and speciation. Those that read the question carefully and looked at the timeline provided, realised the question was about taxonomic grouping rather than speciation.

Some candidates did not gain a mark when answering some questions because they used the term that they were explaining in their explanations. Examples of this were using the term continuous to explain continuous variation or using the word totipotent to explain the difference between pluripotent and totipotent cells.

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

1(a)(ii)

This question asked candidates to explain what is meant by the term chromatid but the vast majority did not heed the command word and instead just described a chromatid. Some referred to a strand of DNA but this is not a suitable term to use in this instance and no credit was given unless it was clear that a candidate was referring to a molecule of DNA.

1(b)(ii)

The majority of candidates could name a suitable stain with the two most frequently seen correct answers being orcein and toluidine blue.

Question 2

2(a)

Although many correctly stated that centrioles were only present in animal cells, it was disappointing to see that a significant number thought mitochondria were only found in animal cells. Fewer candidates had difficulties stating a structure found in both animal and plant cells with the most frequently seen correct answer being the cell membrane. The majority could correctly give the name of a structure only found in plant cells with chloroplasts and the cell wall being the most frequent responses.

2(b)

This question was well answered but a number of candidates incorrectly thought that a flagellum could not be found in a eukaryotic cell. Others gave the answer cell wall but did not qualify this to distinguish it from the cellulose wall found in some eukaryotic cells.

2(c)

It seems that many candidates saw the phrase “changed over the years” in the stem of the question and then gave an account about natural selection and speciation. Those that did read the question more carefully often failed to give clear explanations. A description of the use of molecular phylogeny was the only response that was regularly offered that gained credit.

Question 3

3(a)(ii)

It was expected that there would be a reference to the production of primary spermatocytes rather than just to the vague description of production of more cells. Although a significant number indicated that a large number of sperm cells are produced, several then stated that sperm were genetically identical. Others saw that the question was about sperm production and so immediately launched into a description of meiosis.

3(b)(iii)

The calculation proved to be straightforward to the majority of candidates. Some that didn't gain full marks could quickly have realised their answer was not realistic by looking at the diagram of the sperm provided in the question. Candidates that did not give the correct answer tended to lay their calculation out so poorly that it was very difficult to give any marks for the method of working.

Question 4

4(a)

The vast majority of candidates correctly completed the table although it was sometimes difficult to distinguish between their lower case letters and capital letters.

4(b)(i)-(iii)

These three questions asked candidates to use information in the table 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 information provided. A high number of candidates did not read the questions thoroughly and failed to refer to the table at all. This means the maximum they could attain was three of the six available marks. Polygenic inheritance was well understood but a significant number spoiled their answer by referring to alleles instead of genes. The meaning of the term phenotype was often correctly stated but as previously described there were few that used the information in the table to gain the second mark. The meaning of the term continuous variation proved to be more problematic for candidates to explain. Too many used the word continuous to explain the meaning of continuous. Others tried to use a reference to a normal distribution but did not relate it to characteristics or phenotypes.

4(c)(i)

Although many candidates correctly stated the meaning of the term negative correlation, some spoiled their answer by suggesting it was a causal relationship between two variables.

4(c)(ii)

There were many references to ultraviolet light being an environmental factor but far fewer stated that skin colour is genetically determined. Both parts were needed to gain credit. A significant number of answers failed to state that ultraviolet light is a mutagen but instead just stated that it causes cancer. Some good answers that were seen where candidates clearly understood the formation of oncogenes and the resulting lack of control of the cell cycle.

Question 5

5(a)

Although most parts of this question were well answered, examiners very often saw responses that stated that the cell wall of xylem vessel contained cellulose or lignin with far fewer indicating that both would be present in the wall.

5(b)

Those candidates that read the question carefully and understood that the command word was 'explain' generally gave good accounts about the suitability of starch as a storage molecule. Quite a few candidates stated that starch was unreactive even though they referred to starch being hydrolysed in the same answer. Many had a good understanding of the structure and properties of starch and related this knowledge to its storage function.

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

6(a)

A lot of candidates gave good, concise answers with the majority attempting to define biodiversity in terms of species richness. Unfortunately some attempts to do this referred to the number of organisms rather than the number of species. Far fewer candidates attempted to explain biodiversity in terms of genetic diversity. Those who chose this approach again produced clear, accurate answers although it was noted that some responses were spoiled because of a reference to genes not alleles.

6(b)(i)

This question tested knowledge of a core practical. Many gained the full five marks available, typically by knowing an extract would need to be produced and this would be transferred to a paper disc which would then be placed on to a lawn plate of bacteria that had been prepared using aseptic technique. The need to carry out replicates to calculate mean values was also commonly seen. A mark was available for stating a suitable temperature and time for incubation but this was not awarded so frequently as many stated only one of these rather than both of them. The mark for describing the dependent variable was also not awarded as often because it was expected that a clear statement about what would be measured would be given. We expected candidates to indicate that the diameter or area of the zone of inhibition would be measured but a significant number just stated that the zone of inhibition would be measured.

6(b)(ii)

The vast majority knew the correct sequence. Several only referred to a group of people when describing phase II and phase III testing and failed to indicate that this was a group of patients with a bacterial infection.

6(c)

Although there were many good answers about conservation of plants which gained both available marks, there were some that wrote about captive breeding and zoos. The majority of those who did gain both marks wrote about seed banks.

Question 7

7(a)

Although many gained credit for knowing which types of cells totipotent and pluripotent cells can give rise to, it was less common to see answers that indicated that the two types of stem cells are undifferentiated. A few candidates described the terms the wrong way round and thought pluripotent cells could give rise to all cell types. This was another example of a question where you cannot use a term given in the stem as part of the explanation. This can be illustrated by the example of candidates stating that pluripotent cells can give rise to all cell types except totipotent cells.

7(b)

Surprisingly few used the term differential gene expression in their answer. Credit was frequently given for descriptions of transcription at active genes, followed by translation of mRNA and a suitable statement about the resulting protein modifying the cell. This seems to indicate candidates had learned responses from previous papers, as marks that required answers to be linked to the specific context of the question were rarely awarded.

7(c)

Candidates often gained the majority of the marks here and this again seemed to be an example of candidates having learned responses from a previous paper. A similar question appeared in the January 2018 paper and many answers were exactly as appeared on that mark scheme.

Question 8

8(a)(ii)

Although a significant number of candidates understood that the birds would occupy different niches as they had different length beaks and would therefore have different food sources others wrote about speciation.

8(b)(i)

Not many realised that the water would supply food to the worm. Rather more realised that the water was the source of oxygen and that the gills would provide a large surface area for the uptake of oxygen from the water. Too many just copied the stem which told the candidates that the external gills enabled gas exchange to occur.

8(b)(ii)

We expected candidates to look for overall trends shown by the data and did not give credit for descriptions about individual data points. Some answers were seen in which candidates stated there were 15 tunnels in summer and 13 in winter which indicated that they incorrectly thought one bar represented one tunnel. This was probably the reason why the statement that there were more tunnels in summer was seen so frequently. A more thorough examination of the data should have led candidates to the opposite statement.

8(b)(iii)

Here too, some candidates mistakenly thought this was a question about Natural Selection. Those that did realise this was a question about competition were often able to gain two of the three marks available.

Advice to students:

In order to improve their performance candidates should: -

- Read the command words in the questions carefully and make sure they know the difference between describe and explain.
- Understand that when asked to give examples as part of the answer, marks will be lost if none are included.
- Make sure they do not use the word they are defining in their definition.
- Ensure they can distinguish between the terms gene and allele.
- Read all of the details in the questions carefully, rather than respond to just one word or phrase

