



Pearson
Edexcel

Examiners' Report

Principal Examiner Feedback

October 2021

Pearson Edexcel International Advanced
Level In Biology (WBI11) Paper 01

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October 2021

Publications Code WBI11_01_2110_ER

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Introduction

There was a wide range of responses from candidates, with some excellent responses from the more able candidates. The multiple-choice questions generated a range of responses as did the calculations. The one levels-based question did generate level 3 responses, but candidates still need schooling on how to structure their responses to access all six marks. A vast number of centres are using past mark schemes and examiners reports to prepare their candidates; this is evident in the answers where mark points have appeared on previous mark schemes and the improvement in the responses to the 'compare and contrast' question.

Question 1

Part (b) was answered well by most candidates who were able to state two types of mutation. However, several candidates only quoted one example or gave unacceptable names such as subtraction, nonsense, addition or specific examples.

In part (c), the positive correlation between age and cancer was described in many responses, but there were a few responses referring to age causing cancer or the risk increasing with age. Many noted the change in the number of cases with respect to females and males below the age of 57 / 58 and above 57 / 58, with misquoting the values. Reference to the onset of cancer being later in males or earlier in females was seen less often and many candidates missed out on marking point 4 by just quoting figures.

Question 2

In part (a)(i) most responses generally scoring marking point 1 and marking point 2 for thromboplastin and active site. Fewer were able to identify platelets or blood cells for marking point 3, with many responses referring to a clot being formed, which is in the stem of the question.

There were some well-drawn tangents in (b), however there was quite a high number of carelessly drawn tangents which did not touch the curve at 2 days. Calculations were often correct for the tangents drawn but units were frequently omitted or incomplete.

Question 3

The first part of this was answered well, with many candidates scoring 3 marks. However, some common errors were to confuse the pulmonary artery and vein, to label the vena cava as inferior and to label the aortic arch as the coronary artery. Some candidates lost marks in part (c) through poor expression, through describing the flow of blood through the wrong regions or trying to explain the data in terms of changes in blood pressure.

Question 4

There were several acceptable answers in part (b)(i) for both the volume calculation and the correct ratio, depending on the value used for pi. Some candidates lost marks for incorrect rounding or giving too many decimal places in the ratio. The less able candidates really struggled with expressing ratios correctly.

In part (b)(ii), several responses focussed on the circulation in the mammal and did not mention anything about a butterfly, missing the need for a comparison. Many responses referred to surface area to volume ratios without realising that this was irrelevant in the context of this question. Only a few candidates referred to the small diffusion distance between cells and blood, or to why this was important in the delivery of oxygen and nutrients, or the removal of carbon dioxide. Slightly more able candidates recognised the difference in oxygen demands (or metabolic rates) between the 2 organisms, but again often found it difficult to express the importance of diffusion here, or why the oxygenated and deoxygenated blood do not need to be kept separate in the butterfly.

Part (b)(iii) was familiar to many candidates and those candidates who had been prepared for this exam using past papers scored well. Responses generally produced 2 out of the 3 marking points (and sometimes all 3) to score the available 2 marks. Most candidates referred to fibrous protein and the triple helix and it was very encouraging to see a reasonable number referring to short, repeated amino acid sequences of glycine or high proline or hydroxyproline content.

Question 5

In part (a), most candidates were able to score the first mark point with a statement like that in the mark scheme or a statement about directly proportional changes or a positive correlation between increase in age and the rate of miscarriage. However, very few candidates extended their answers to include a reference to the fact that there was no evidence of causation. This is an example of where candidates need to use the mark allocation to help them determine how much to write.

Part (b)(i) was a challenging question for many candidates who did not understand the question demands and focussed on the cause for miscarriage such as age of mother without reference to the data given in the table about aneuploidy in screened or non-screened embryos or other factors such as alcohol intake levels, relating to miscarriage numbers. The key to this question was realising that once the conclusion had been identified it needed explaining.

The more able candidates were able to score all the mark points were in (b)(ii). Many more candidates may have done better if they considered the mark allocation for the question.

In Part (c) the marks were lost by candidates who listed the implications instead of discussing them. For example, responses referencing false results without giving the

possible consequences of this were seen. There was several candidates who misinterpreted the question and gave implications of procedures such as CVS or amniocentesis. Marks were also lost for incorrect references to baby or fetus instead of embryo.

Question 6

In part (a), the most common reference was to the sample size being too small or that it should be larger. However, a large proportion of candidates thought that the two groups needed to be the same size. Very few candidates realised on the fact that the disease was very rare and that this limited the sample size.

The calculation in (a)(ii) scored reasonably well provided candidates added the units and the calculation in part (iii) was done very well with most candidates realising that their answer had to be a whole number.

In part (b) only a few candidates made mistakes in part (i) but part (ii) saw a much wider range of marks. The bonds most frequently written about were the phosphodiester bonds and the hydrogen bonds between the base pairs. This is another example of where candidates should look at the mark allocation to help them design their answer; if there are three marks then that is a good indication that there must be at least three types of bonding.

It was surprising that there was only a small minority of responses gaining full marks in part (b)(iii). Many responses gained only 1 or 2 marks and there were many references or descriptions of transcription rather than translation.

Question 7

Most responses to part (a) fell within the range of 1 to 3 marks. Some candidates tried to describe the graph without looking at the major trends and others ignored the graph and listed risk factors. Candidates needed to note that the command word was 'explain' to score more marks and to recognise that they needed to explain both the graph and the risk factors.

'Compare and contrast' questions do tend to cause candidates problems, but this particular question scored very well by most. Candidates do need to use the mark allocation to inform them of how many points they need to make and to remember that at least one similarity and one difference is required for full marks to be accessed.

A sizeable number of responses to (b)(ii) made comments on the importance of antioxidants in reduction of plaque formation / atheroma and risk of heart disease. The less able candidates tended to describe what antioxidants do and did not write what would happen without them, as asked in the question.

Question 8

The definitions in part (a) produced a range of responses, but surprisingly the definitions for a gene were frequently confused whereas those for an allele were clearer. For the full three marks, each term had to be illustrated by the information in the question, something that the less able candidates tend to omit.

Candidates tend to score well on genetic cross diagram questions, and this one was no exception. There were a few candidates who did not draw a diagram, as instructed in the question, and these restricted to 1 mark. The proper use of symbols is extremely important in genetics. The mark scheme was made as lenient as possible. No marks were awarded for alleles linked to the sex chromosomes.

A range of responses were seen for part (c). The table was correctly completed by many candidates, but a surprisingly high number expressed their answer as a fraction. Answers expressed in this way in the table were accepted as they formed part of a calculation. However, the fractions were to be evaluated in part (iii) which was the final step in the calculation.

Summary

A few suggestions for improving candidate performance are given below.

- Candidate should avoid repeating information in the stem of the question in their answers as this will not gain marks.
- In calculations, candidates should always check if units have been given at the end of the answer line. If there are no units given, then candidates should consider whether there are no units to the answer or whether they are expected to include the units with their answer.
- 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.
- Consider the questions asked in the early question parts as they are quite often trying to give you a clue to what is expected in the latter question parts.
- Check the command word for each question before attempting your response. In particular, if the command word is 'explain, then make sure you have used some science to say why something has happened. Your answer should include terms like because, therefore, as a result, so. Appendix 7 in the specification lists all the command words and their meanings.
- Use appendix 6 in the specification to check that you can carry out the range of maths skills that can be asked in the paper.
- Always read through your answers very carefully as it is easy to make some silly mistakes under the exam pressure. Think about each word you have used and make sure that you have written what you meant to write. This applies to calculations too.
- In levels-based questions, before you start writing, identify the command word and then each component in the question. Each component must be addressed if you are to access the higher-level marks.
- Any information you are 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 make sure you use it.