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Examiners' Report

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Pearson Edexcel International Advanced Subsidiary Level in Biology

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Introduction

We saw a wide range of responses from candidates, covering all the points that we had on our mark scheme. There were noticeably fewer blank responses this series with some really excellent responses from the more able candidates. The MCQs generated a range of responses as did the calculations. Further improvements were seen in the responses to the levels-based questions; candidates are clearly being taught how to approach these questions more logically so that all aspects of the question are covered in their responses.

Question 1

Many candidates were able to gain all three marks for the first part of this question. We did allow pentose for the name of the sugar, which the majority gave us, but we had hoped for deoxyribose as this would have been a more specific answer. A few candidates named ribose as the sugar, which we could not allow and there were some candidates who wrongly named the bond as a hydrogen bond.

The MCQs in part (b) yielded a surprisingly wide range of combinations, with only the more able candidates selecting the correct pair.

Question 2

Presenting the genetic code as a wheel is a new style for this paper and many candidates were able to interpret it and select the correct genetic code for leucine in part (a).

Part (b) was correctly answered by the majority of candidates but as expected, there were number of candidates who confused uracil, thymine and adenine.

There were some good responses to part (c) but there were a number of candidates who thought that the reason was to produce a degenerate code to limit the impacts of mutations.

Candidates are clearly being well-schooled to answer questions with the command words ‘compare and contrast’. A number of candidates even put side headings to clearly indicate the similarities and differences. A high proportion of candidates wrote that the three peptides had the same amino acids in positions 1, 2, 4, 5, 6, 7 and 9 which we allowed for 1 mark but really the answer should have referred to the actual amino acids. Some candidates were unable to be awarded the marks for the differences as they did not state the names of the amino acids that were different. For example, they wrote that peptide A had a different amino acid in position 3 whereas we required them to be more specific and state the name of the amino acid that A had and the name of the amino acid that peptides B and C had. The question does ask about amino acid sequences not positions.

Question 3

Candidates mostly selected the correct answer for the MCQ in part (a).

Describing two differences in the graph given in part (b) caused more issues than we had anticipated. Candidates had no problem in describing the rate of reaction being lower in type 2 inhibitor than type 1 inhibitor. However, fewer candidates picked out that the rate of reaction with type 2 inhibitor levelled off whereas the rate with type 1 inhibitor did not or not unless there were higher substrate concentrations. A common error, which we have seen before, was to phrase the answer as though time was along the x axis.

Candidates coped well with interpreting the two diagrams that we gave them in parts (ii) and (iii) and we saw some excellent responses describing the mode of action of the two inhibitors. A common error in part (iii) was to omit stating that the inhibitor had to bind to the enzyme (in order to cause the change in shape of the active site).

Question 4

We saw a range of combinations for the two MCQs in (a) part (i) of this question. The correct answer was selected for the peptide bonds in general but the number of candidates who appreciated that proteins retain their secondary folding in their tertiary structure was limited.

There were some excellent responses to part (ii), presumably centres used a recent paper as a mock for this exam. However, there were still a significant number of candidates who could not be awarded mark point 2 as their answer included a reference to the haemoglobin being soluble in blood.

In the past, questions on oxygen dissociation curves have caused candidates problems. However, the question in this series' paper was generally well-answered. Candidates used both the table and the graph in their response and we frequently awarded combinations of the first four mark points. The last mark point was not awarded that many times as candidates did not take their responses far enough to explain why the camel could ultimately survive at the higher altitudes.

Question 5

The MCQ in part (a) was high scoring; candidates clearly know the dipole nature of water.

The calculation that followed in part (b) was also high scoring with candidates following the instruction to give their answer in standard form. It was evident that centres are preparing their candidates for the maths questions on thee papers as there were fewer answers expressed in incorrect standard form that in previous series.

Part (c) was generally answered well, except by candidates who did not give a comparative answer; the vast majority opted for the increase in population idea.

A range of responses were seen to part (d). Most candidates could tell us that water is a polar solvent or had a dipole nature; we did try and give candidates a clue in part (a) to this. Fewer thought about what else they should write to gain the second mark.

Candidates coped well with part (e); forward osmosis is a completely new concept to most of them, but they looked at the diagram and generally wrote some good responses. There were two common errors. Firstly, to write that the sea water passed into the hydrogel which was too wrong to accept. Secondly, to simply repeat the information in the diagram and write that the hydrogel was squeezed to remove the water; mark point 5 could not be awarded for stating what we had told them in the question.

Question 6

Candidates generally selected the correct option for the MCQ in (a) part (i). However, completing the diagram in (ii) was less well-answered with a high number of candidates omitting to indicate the hydrogen atom on C1 and C4. The other common error was to draw a zigzag line for the glycosidic bond which we felt could not be accepted as the corners of the zigzag represent carbon atoms.

Both marks for part (iii) were frequently awarded; candidates have a good knowledge of this part of the spec.

Generally, candidates scored either one or two marks for this calculation as they gave us either 29 or 30 with correct units. Presumably, those who responded 29 had not read the question carefully enough to realise that their answer had to be expressed to one significant figure.

Part (c) was the first levels-based question on this paper and required candidates to draw on their knowledge of the structure and function of carbohydrates, enzymes, the circulation and cell transport mechanisms. We saw some good attempts to answer this question but many, unfortunately, wrote extensive accounts about the digestive process which is not a paper 1 topic; we did try to pick out information that was on spec to award marks for where we could. There are still several candidates who are not identifying the command word to these levels-based questions and therefore not accessing the higher-level marks. Encouragingly, many candidates were consciously structuring their response to cover the four aspects that we asked for in the question which is good practice in responding to these levels-based questions.

Question 7

The majority of candidates could give us two reasons for the approximations given in (a) part (i), although weaker candidates simply told us that you cannot count everyone without giving us a reason why not, or that carriers would not know they had CF.

The calculation was more challenging with errors made in the magnitude of the answer, the number of figures given and the format for expressing a probability.

The first part of (b) caused candidates a few more problems than we had anticipated. Some candidates did not name the type of mutation that could have caused a single amino acid to be missing or else named several types of mutation often including an insertion mutation which just would not be possible. Others did not tell us how many bases would need be deleted if they went for a deletion mutation story or that a different amino acid would be inserted if they wrote about a substitution mutation.

Part (ii) asked candidates to complete the diagram of an amino acid, which is something we have asked in previous papers. We saw several correctly drawn structures and we saw the mistakes that we have seen in the past. Typically, no central carbon drawn, no H on the central carbon, N_2H instead of NH_2, NH_3 without the + sign and COO without the – sign.

Relatively few questions relating to issues with the male and female reproductive systems in people with CF have been asked in the past. Candidates clearly know that the thickened mucus is predominantly the cause of these issues. In (c) part (i) candidates could tell us that the mucus would be reducing the access of the sperm to the egg cells; those candidates who used the mark allocation would explain why the mucus would be thicker. Part (ii) was not well answered with many candidates writing pretty much the same answer as they did in part (i) but talking about the sperm ducts being blocked instead. It was clear that the candidates had not read the question carefully enough and had missed the bit about two types of sperm being produced.

Question 8

Surprisingly, part (a) was not high scoring. We have asked about the structure of arteries in relation to their function on numerous occasions and expected this question to be straight forward for the majority of candidates. We saw responses that mentioned the stretching of the elastic fibres or the collagen providing strength but very few references to the change in the diameter of the aorta.

The first part to (b) was a calculation that we have frequently asked candidates to do. Generally, they could do the magnification part of the calculation but selecting an appropriate number of decimal places to give their answer in was an issue for

many. The second calculation in (b) scored well. The third calculation generally yielded the correct digits but to too many decimal places or sig figs.

We have asked about antioxidants in previous series, so candidates generally scored at least one mark for (c)(i). The second mark was gained by candidates who realised that the context of this question was AAA and that their answer therefore had to be about AAA.

The final question on this paper was another levels-based question. There were four visuals presenting data for the candidates to use and many candidates worked through each visual in turn, which is an excellent way to approach this type of question. The less able candidates simply described the data, the middle ability candidates focussed on the treatment with drug D and the more able candidates commented on the effect of injection C as well.

Summary

A few suggestions for improving candidate performance are given below.

- Candidates should avoid repeating information in the stem of the question in their answers as this will not gain marks. This was particularly common in responses to 4(e).

- 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. This would have helped candidates in 7(c)(i).

- Candidates should consider the questions asked in the early question parts as they are quite often trying to give a clue as to what is expected in the latter question parts. In question 5, part (a) was building up for part (d) and in question 6, parts (a) and (b) were building up for the levels-based question.

- Candidates should check the command word for each question before attempting their response. The meaning of each of our command words can be found in appendix 7 of the specification. This would have helped many candidates with 6(c).

- Candidates should be familiar with the maths skills outlined in appendix 6 of the specification; there will always be approximately 10% of the marks allocated to maths questions. Candidates in general struggle with expressing their answers in correct standard form or to a specified number of significant figures. Many do not appear to know how to select an appropriate number of significant figures or decimal places to give an answer to.