Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

Summer 2023

Pearson Edexcel GCE

In Biology B (8BI0)

Paper 01: Core Cellular Biology and Microbiology

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Introduction

This paper was fairly typical of previous 8BIO1 papers with questions covering a range of spec points, some of which have been assessed before and some which have not. The paper performed as expected with most mark points being awarded, despite the low number of candidates that sat this paper.

Candidates tended to score well in the more straightforward recall questions and simple maths questions but struggled with the practical-based questions and the more complicated maths questions.

Question 1

The MCQ at the start of this question did see all combinations selected but most candidates were able to select the correct option.

Part (b) caused candidates problems for two reasons. Firstly, candidates seem to think that all data demonstrates a pattern. Most picked out the relationship between age and incidence but many tried to describe a trend for incidence and birth order. Secondly, many candidates did not appreciate that the command word 'determine' requires a calculation to be made. These two reasons limited many candidates to one mark for this question.

Question 2

In part (a) the majority of candidates scored a mark for stating that the acrosome breaks down the zona pellucida. A few stated that the egg membrane was broken down or the egg cell wall, which we did not think was acceptable at this level. The second mark was less frequently awarded as a large proportion candidates wrote that the sperm could then fertilise the egg cell which is pretty much just a repeat of the question.

Candidates who identified that this question was asking them about protein synthesis scored reasonably well, demonstrating in particular good knowledge of the tole of the Golgi. The commonest error was in the last mark point where many candidates described the enzymes leaving the sperm cell by exocytosis.

Question 3

Marks were picked up in part (a) by many candidates but we did see the expected errors of fructose being present and the monosaccharides being joined by peptide bonds.

The type of calculation in part (b) has been used in previous series yet many candidates are not using a tangent, despite being instructed to do so, and therefore calculated the mean rate of growth. Some candidates are not able to express their answers to a suitable number of decimal places or significant figures; we tried to be generous on these but this did not help some candidates.

Candidates are not good at drawing conclusions so part (c) scored poorly on many scripts. Candidates tend to describe the data instead of making generalisations of what the data shows. As in question 1, many candidates were trying to find correlations in the data.

In part (d), despite being asked to give two reasons, many candidates gave one. This was usually the mark point stating that lactose is in milk or not found in plants. Attempts at giving a second reason frequently focussed on the idea that glucose and galactose are monosaccharides and therefore better for the plant.

Question 4

Generally the two MCQs at the start of this question were high scoring, especially the first one.

There were a range of responses seen to the question in part (c)(i) and the candidates who scored well were clearly the ones who had been trained to give both similarities and differences in their answer and to write the differences as pairs in one sentence and not as two separate descriptions. A number of candidates did not pick up on the question asking for structure and we saw lots of attempts to compare properties and function.

Part (c)(ii) was reasonably high-scoring but there are still a very high proportion of candidates who think that every RNA virus is a retrovirus so we saw numerous references to reverse transcriptase, viral DNA being incorporated into host cells and latency.

Question 5

Most candidates could work out the correct order for the stages in the root tip squash method in (i) of part (a).

The second part of (a) saw a range of responses with some remembering their GCSE and using the term meristem for plant stem cells. Many candidates realised that the tip has to be used as this is where cell division takes place but there were a significant number who thought the tip was used as mitosis is faster here.

The MCQ that followed was well done; candidates are good at recognising the stages of mitosis and have learnt 'PMAT' to help put them in order.

Reasonable estimates for the duration of S phase were seen but again, marks were lost when answers were given to an unreasonable number of decimal places.

As expected, the MCQ at the start of part (c) did not score highly but it was targeted at the more able candidates. The second MCQ scored better.

Although the third part of (c) was completely knowledge based it was not answered well and many candidates simply left it blank. The marks awarded were almost exclusively mp 3 and 4. Very few candidates appreciated that the two polar nuclei have to fuse before fertilisation can take place.

Question 6

The calculation at the start of this question scored well.

Part (a)(ii) scored poorly but it did highlight a number of misconceptions that candidates have. Quite a number of candidates think that prokaryotes do not respire and even more think that they only respire anaerobically. Others think that prokaryotes are non-living and therefore do not need energy or that they are smaller and less complex so do not need energy.

Part (b)(i) highlighted that candidates cannot calculate dilutions and do not know how to express ratios correctly. A number of responses were left completely blank. A common answer was a 1:4 ratio for the values of 1.25 and 5.

In part (ii) were impressed with how carefully should be held vertically candidates looked at the diagram. We had expected them to state that the pipette should be held vertically so that the bottom of the meniscus could be read. However a number picked up on the pressure being put on the pipette bulb and the small volume that was being pipetted by this

particular pipette. What was evident is that a number of candidates do not appreciate that pipettes are designed to have a small volume of liquid remaining inside them once fully expressed.

The percentage error was correctly calculated by a number of candidates.

The MCQ was scored correctly by a reasonable number of candidates; the commonest wrong distractor selected was C which was understandable.

The first of the levels-based questions saw the full range of marks awarded. The less able candidates simply described the data and limited themselves to a maximum of two marks. Only the most able candidates attempted to explain the remaining radioactivity in the 'other' column. The three organelles which candidates had the best knowledge of were the smooth ER, ribosome and Golgi. Surprisingly few seemed to appreciate the role of rough ER.

Question 7

We have asked the question in part (a) on a number of occasions now so were not surprised to see the usual confusion between the two types of fatty acids and the poor expression that saturated fatty acids have no double bonds.

In (a)(ii), the first and third mark points were most frequently awarded, once we had reluctantly agreed to accept 'traps heat'. The even numbered mark points were very rarely awarded as candidates either did not extend their answers of simply did not know the reasons.

Answers to part (b)(i) were disappointing. Candidates could tell us a stain had to be used and that something had to be calibrated but were not sure which piece of equipment is used to do what. The last mark was not awarded as frequently as we had expected; candidates either failed to give the formula for area or gave it incorrectly.

The second levels-based question on the paper saw a similar range of marks awarded and a similar pattern with the less able candidates simply describing the data and only the more able extending their explanations to cover all three graph. Candidates need to be taught that these types of questions require all aspects of the question to be covered for the highest level to be accessed. They also need to be taught that they do not have to write reams about each aspect. A little about a lot is what is required.

Question 8

The calculation in part (a) saw many correct answers. Marks were lost by candidates who put the decimal place in the wrong place having done the correct calculation, gave their answer to too many decimal places or expressed their answer in standard form incorrectly.

Part (b) scored well; candidates know that bacteria produce enzymes.

In part (c) we saw lots of references to optimum temperature but all too frequently in the context of the bacteria and not the enzymes. Very few made any reference to the conditions in the cow's stomach.

The responses to part (d)(i) again saw desperate attempts to find patterns in the data. Surprisingly few commented on the error bars, so although they picked up mark point two they did not go onto score mark point three. Mark point four was rarely awarded; candidates do not appreciate that the size of the standard deviation represents the extent of variability of data.

A mixture of responses was seen to this practical description question, including several blank responses. We were quite lenient on how we allowed candidates to express the first mark point as they clearly did not appreciate where these fatty acid chains were; we were awarding the mark for the idea of a range of values or the values given in the graph cited. The most frequently awarded mark was the fifth one as candidates know to list control variables. Candidates also know that a mean should be calculate but we felt at this level, candidates should be able to tell us why. Disappointingly, mark point two was rarely seen.

In the last question of this paper the responses by candidates were very muddled; either the data had been misunderstood, the candidates had run out of steam or they simply do not understand how digestive enzymes work. Mark point two was the most frequently awarded and surprisingly, mark point one rarely awarded.

Paper Summary

The following advice is offered to help fully-prepare candidates for future exams:

• read the whole question carefully, including the introduction, to help relate your answer to the context asked. Quite often, early parts of the question will be designed to give you clues to latter components which might appear more obscure due to an unfamiliar context. If you are not sure wat is expected from you in a question, go back and look for the clues

• use all of the information provided in the question to help you with your answer, e.g. graphs and tables of data including the labelling; this is especially important in the levels-based questions

• when asked to explain your answer make sure you have effectively included terms such as because, so, therefore, as a result, in your response. In other words, do not just describe what is happening but say why it is

• set out calculations carefully showing each stage of your working in case a mistake is made at the final step and check that the magnitude of the answer and the units makes sense in the context of the question

• be specific in your vocabulary avoiding vague terms such as amount and use something measurable such as volume or mass

- all questions should be attempted and leaving blanks avoided; a blank response guarantees you zero but an attempt at an answer might pick you up a mark

- when analysing or commenting on data do not assume that there will always be a pattern

• look at the appendix 6 and 7 of the specification to familiarise yourself with the command words and the examples of the mathematical calculations you are expected to be able to perform at AS level.

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