Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

October 2024

Pearson Edexcel International Advanced Subsidiary Level in Biology (WBI13) Paper 01 Practical Skills in Boilogy I

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Introduction

The paper was as accessible as those in previous series. As always, candidates need to be reminded of the necessity to cover all of the core practicals and all of the recommended additional practicals, any of these may be examined on this paper. The importance of having a clear grasp of what command words mean was also illustrated well in some of the questions on this paper, and comments are made in what follows.

Question 1a

This question was a good starter for candidates, with most attempting it and doing well. It was gratifying to see that, despite the possible confusions about different bond types, most were able to navigate this successfully.

Question 1bi

This question proved much more differentiating than the previous one, with candidates often scoring 0 or only one mark, usually the first marking point.

Question 1bii

Candidates appear to fully understand how to produce a suitable table. It is interesting though to note that some still lose a mark for such things as putting the units in every cell in the table, rather than just in column headings.

Question 1biii.

This proved to be one of the most difficult questions on the paper. A reasonable number of candidates were able to quote the standard deviation correctly but far fewer were able to explain what it tells us. There were several errors, the most common being that candidates frequently think that the standard deviation is the same as the range. Others failed to get the mark due to sloppy use of language, where they talked about variation of the mean rather than variation about the mean.

Question 1biv.

This was another difficult question, almost entirely due to a lack of understanding of the command word justified. On the specification it is described thus, “give evidence to support either the statement given in the question or an earlier answer”. But most read

it as give the conclusions or describe the conclusions rather than justify them, and consequently received no marks.

Question 1ci.

This question proved difficult for candidates, which is somewhat surprising. Calculation of initial rate from data such as this should forms part of core practical 4 (specification point 2.8). In addition, calculation of initial rate of enzyme catalysed reactions is highlighted as a mathematical skill on page 14 of the specification. Many candidates were not aware that they should take the gradient from the steep part of the graph at the beginning. Such candidates had a variety of incorrect approaches, including looking at the beginning and end of the graph when clearly the initial rate has been passed.

Question 1cii.

As one would expect, the graph question is generally well answered, and it was no exception in this series. Those who did lose marks did so most commonly due to selecting an inappropriate scale which then made it very difficult to either plot the points or check that they had been plotted correctly. Candidates should be steered away from choosing scales of this kind, for example making a large square equal to three. Practice at graph plotting would prove useful.

Question 1ciii.

Again, this question was surprisingly badly answered considering that determining initial rate is a core practical as mentioned earlier. The attention of centres is drawn to the practical guide which is available on the Pearson website. Various detailed references to this core practical are made in that document. For example, on page 19 there is a detailed discussion of how this practical allows progression from the simpler approach adopted in GCSE or IGCSE level. This is also developed in the section on progression on page 8 where the core practical on initial rate of enzyme catalysed reactions is taken as a good example of how progression from GCSE or international GCSE to AS level is handled. It is suggested that much more is made of the theory and principles surrounding core practicals such as this so that they can contribute fully to the development of the students' understanding of biology.

Question 2ai.

Centres should be fully aware by now that recommended additional practicals are just as frequently examined as the core practicals. All of question 2 was based around the recommended core practical which appears between specification point 4.8 and 4.9.

There were some very good answers however, for the rest they ranged from a very simplistic description of a water culture experiment which wasn't really adapted for the specific situation under consideration, to any experiment involving plants that they could remember, for example a root tip squash was frequently seen. So, marks were gained for control of a biotic and an abiotic variable by quite a few candidates, far fewer talked about having a setup with an and without the VCL, even fewer thought to remove the roots and an understanding of drying to constant mass was rare. Only a very small minority of candidates discussed the use of a water culture or soilless compost.

Question 2aii.

This did not present itself as an easy question, but many were able to gain at least one mark for the correct identification of the bars. As is so often the case with percentage calculations, a significant minority showed that they didn't really understand what they were doing because they divided by the wrong number.

Question 2bi.

This was another one of the half dozen or so questions which candidates found difficult on this paper. Rather careful use of language was required to gain marks. Many candidates knew that drying the plant would remove the water from it, but could not go on to secure the mark by stating how this would affect accuracy.

Question 2bii.

This slightly unusual question was reasonably well answered and a good number of candidates gained full marks. For others the habit of not showing working really lost them a mark as a wrong answer with no working will always get 0. Candidates should be encouraged to include their working in calculation questions

Question 2biii.

Possibly not surprisingly on a rather demanding 5-mark question, full marks was hardly ever obtained, less than 1% of the entry and under 5% gained either four or five marks. The most common near miss came from those candidates who interpreted the situation which gave the greatest effect of VCL as the one where potassium was lacking when in fact it was the one where phosphorus was lacking. It could have been confusion about the chemical symbols of these two elements, but it is more likely that their approach to the differences was rather simplistic and just looked at the absolute effect rather than the relative effect of the VCL in these two cases. The instruction to use all the information hit home to some candidates who discussed some way in which VCL may be

environmentally friendly. Those who repeated that it is environmentally friendly did not gain credit as this was in the stem of the question.

Having reported that fewer than 5% gained four or five marks, it is more pleasing to report that nearly 60% gained two or three marks and very few got 0 for this challenging question.

Question 3ai.

This is a further example of a question where candidates had half the idea but did not finish it off to gain the mark. For example, many would say that 48 hours was sufficient time for the bacteria to grow, which is not quite enough. We want to know what they are growing to do, the answer being become visible. Whenever candidates see something about temperature in a question at this level their mind will often go straight to enzymes, and this is what happened in relation to 30°C in this question. A very simple “it's the optimum temperature for the enzymes” was a frequent and incorrect answer.

Question 3aii.

This question turned out to be one which candidates found difficult. Only a tiny proportion of the entry gained 3 marks and less than 10% gained two or three marks. The problem seems to be in relation to the command word not conveying to the candidates what it is they were expected to do. The question asks them to explain three aseptic techniques, most candidates simply described three aseptic techniques, and thus gained no marks. Lessons on the meanings of command words, particularly those that can be shown by analysis to be used frequently on papers, would repay many times over the time spent on them. The meanings of these words are all clearly stated in the specification (appendix 7). In addition, a very good use of past papers is to analyse how the command word has been interpreted by the examiners in relation to specific questions and then see how the candidates interpret it and compare the two.

Question 3bi.

This question was reasonably well done with many candidates gaining 1 mark, they found it more difficult to translate this into a second mark. The measurement of the radius was much more commonly discussed than the use of squared paper. A surprising number of candidates did not know the formula for the area of a circle. Again, this draws attention for centres to the parts of the syllabus which are not concerned with straight biological content. In this case the relevant part is that which details the maths skills which are required. All the details of this very important part of the specification can be found in appendix 6.

Question 3bii.

It is quite surprising that nearly half of candidates were unable to gain the mark for this question. Again, concentration of a lesson or two on the different types of variables in scientific investigations would more than repay the time spent on it.

Question 3biii.

This is another question where candidates demonstrated a relative lack of understanding of the meaning of the command word. In this case the command word is determine. Again, the specification statement about the meaning of this word as a command word is as follows "the answer must have an element which is from the stimulus provided or must show how the answer can be reached quantitatively". In other words, some sort of calculation is going to be required. Very few candidates attempted one suggesting that they had not taken on board what determined means in this context, this restricted them to just three marks out of four. Advice on helping candidates interpret command words has already been given.

Question 3ci.

This question was very well answered with nearly all candidates scoring at least one mark.

Question 3cii.

Another question which proved challenging to many, about half failing to score, but those who did understand what was going on could usually manage to get both marks.

Paper summary

The advice in this section will include nothing particularly new in comparison with this section in previous series. The highs and lows do not seem to change much.

- Make a thorough study of all the command words, although an analysis of the many past papers now available would allow this to have some focus on those most used.

- Make sure all nine core practicals and all 5 recommended additional practicals have been addressed in some way or other. Every question will be in the context of one or more of these 14 practicals.

- Think carefully about the way in which scientific experiments are designed. It's the same for all of them regardless of what the topic is.

- Read every question very carefully, do not be tempted to rush. Particularly important in some cases is the command word much having been said about this in the body of this report.

- Make a habit of setting calculations out whenever you do one so that anybody looking can see how you got to the answer. In that way, if you do get it wrong, you may still get credit for what you did.

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