Examiners' Report
Principal Examiner Feedback

October 2018

Pearson Edexcel International Advanced Level
In Biology (WBI03)
Practical Biology and Research Skills

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Introduction

Overall, the standard on this paper was generally in line with previous series.

Some still have an issue with their understanding of the difference between a control and controlled variable. Fewer students, but still a significant number, have an issue with distinguishing the dependent variable from the independent variable.

The approach to testing the understanding of SDs and significant differences proved rather more challenging on this occasion.

Question 1

1 (a) (ii)

The vast majority of candidates were able to gain this mark.

1 (a) (ii)

Marks of 2, 3 and 4 were fairly evenly spread, with only a tiny minority gaining no marks on this question. A number of candidates discussed variables which were already given, such as number of seeds and even the pH, which is the IV. Quite a few knew that light was important to control but did not state intensity, being content to quote just light or sunlight. Another group discussed plant, rather than seed, related variables. Type of seed was quite common and regarded as too vague. When discussing methods of control of variables, temperature was well done, with most realising that a thermometer would not do the job. Light intensity was the next most commonly quoted variable after temperature and control methods were quite well known, although 'put in the same place' was quite a common answer, which is too vague.

1(b) (i)

The graph plotting was well answered by most, over three quarters gaining 4 or 5 out of 5. The commonest error by far was to fail use the word mean in the y-axis label. Other errors included various mis plotting of SDs (asymmetrical, as a separate graph or +, but not + and -). Few extrapolated and there were very few with the axes reversed.

1 (b)(ii)

Only a tiny minority were able to gain all 3 marks on this question and one mark was by far the commonest score. Nearly a third of candidates failed to score at all. The most commonly seen MP was 1, but it was sometimes given in passing and did not lead on to anything else that was markworthy.
It was generally the case that candidates were not clear what was being asked of them here. They were told that 'the grass plants grew taller in the soil at pH values 6.5 and 7.0 than in the soil with other pH values'. The hope was that they would recognise this as a conclusion based on the results. Clearly, the grass plants are taller at 6.5 and 7.0, but to be able to state this as a conclusion they would need to note that the SDs do not overlap and that this is a strong indication that the observed difference is significant. The second statement is justified by the fact that the SDs do overlap.

1(c) (i)

Again, this proved to be a very demanding question for most, with, once again, only a tiny minority gaining full marks. That said, it was pleasing to see a significant number able to gain 2 out of the 4 marks. The weakest answers simply gave a blow by blow account of availability of

minerals at different pH values and may no reference to the growth data in part b. The commonest mps were 1 and 2, and probably accounted for the common score of 2 out of 4. Mp 3 was rarely seen and mp 4 hardly ever.

1(c) (ii)

Unsurprisingly, this question was well answered, although a significant number scored zero. The least well-known mineral in terms of use was Calcium. The weakest candidates simply said they were all needed for good growth.

Question 2

2 (a) (i)

This question gave a more or less 50/50 split between 0 and 1 mark. By far the commonest error was to quote a solution rather than the problem. After that, a significant number were content just to put Ebola with no qualification, which is too vague.

2 (a) (ii)

Most were able to gain 3 or 4 marks on this question. Some got the main and alternative solutions the wrong way around and limited themselves to 2 marks.

2 (b)

This question proved very easy for the vast majority.

2 (c)

This was a somewhat novel question and it was pleasing to see a good number of candidates able to score quite well, 3 out of 4 being the commonest mark. The least often seen marking point was 3.

2 (d)

Again, a rather different approach to the reference writing question than in the past but most were able to score well, with nearly three quarters gaining full marks. The 10% or so who scored zero usually did so because they had misunderstood what was needed and wrote out a reference.

2 (e)

A surprisingly good discriminator, this question was answered very well by about 15%. Many gained only 1 mark because they gave 3 'uses of animals in research' related answers.

2 (f)

A well answered question with over half gaining all 4 marks. The commonest error was to put the calculated mortality rate in Sierra Leone into the table as 29.2, rather than making it consistent with the given percentages, which were quoted to the nearest whole number.

Advice to students:

In order to improve their performance candidates should: -

- Ensure that you are familiar with all the nine-core practical's

- Within the context of the 9 core practicals learn the details of the scientific method including variables, accuracy and validity

- Be aware that a dependent variable must be something that can be measured to give a numerical answer in a scientific experiment

- When making suggestions for the control of non-experimental variables, be sure to think whether they are relevant to the situation described in the question. For example, light intensity is very unlikely to be of any consequence in an experiment on rate of enzyme catalysed reaction, but temperature would be.

- Ensure that you understand the idea of a significant difference as opposed to a difference. For example, if the mean height of plants under treatment A is 7.3 cm and under B 8.5 cm, there is a difference. But if you are told that the mean height of plants under treatment A was 7.3 ± 2 cm and under B 8.5 ± 1.5, the difference would no be significant as the mean ± the SDs overlap (A is from 5.3 to 9.3 and B 7 to 10).

- Do not restrict answers about ethics to just those involved in using animals in research.