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Examiners' Report Principal Examiner Feedback

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Pearson Edexcel International Advanced
Level Biology (WBI06) Paper 1
Practical Biology and Investigative Skills

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Introduction

In general, students showed a good knowledge of the core practical methods. Students clearly identified variables that needed to be controlled but their descriptions as to how the control could be achieved lacked the precision required for this examination. Students were often competent at interpreting the results of the statistical test. Nearly all the students did try to tailor their answers to the given context of each question.

Question 1

1(a) This question asked for a method that could be used to investigate habituation of an earthworm in dim and bright light. Many students described details that indicated they had carried out this type of investigation. Students often referred to controlling temperature. However, they usually did not give any details as to how light intensity could be adjusted in a standardised manner. Some students only used one or two earthworms instead of several earthworms under each light intensity.

1(b)(i) Nearly all the students correctly identified one or two variables other than the independent variable.

1(b)(ii) Students were then asked to choose one of the variables they had identified and explain how it could be controlled. Many students selected temperature, unfortunately some suggested using a water bath rather than a method of controlling room temperature.

1(c) Students were asked to suggest how changes in response could benefit the earthworm. Many identified that a repeated response would waste energy. There were often good suggestions as to how this energy could be used by the organism. Only a small number of students suggested that the earthworm had shown a form of learning.

Question 2

The context of this question was the infection of two varieties of wheat by insect larvae.

2(a) Most students were able to write a clear null hypothesis that gained both marks.

2(b) Most students presented the data in a clear table. In some cases the full headings from the information given were not included. A small number of students made errors in calculating the means or failed to state the means to the same number of decimal places.

2(c) The majority of students presented clear graphs with both axes fully labelled. The plotting was usually easily checked as a sensible scale had been chosen. If a student had calculated incorrect means in part (b) they could still be awarded the plotting mark here as an error carried forward. Only a very small number of students failed to include range bars on their graphs.

2(d) Most students correctly identified the critical value of 37 from the table and correctly compared this with the calculated value of U (44). Only a small number of students made the mistake of rejecting the null hypothesis and suggesting there was a significant difference between the numbers of infected shoots of the two wheat varieties.

2(e) Most students identified the small sample size and high variability of the results as reasons why the investigation might not be valid. Only a small number of students suggested the difficulty of identifying larvae. Only a small number of students named a suitable environmental factor that may not have been taken into consideration.

Question 3

This question was centred around the rate of hatching of brine shrimp eggs.

3(a) Students were asked to suggest two ways the brine shrimps benefit for the ability of their eggs to hatch quickly. Most students gave at least one suggestion worthy of credit. Only a small number of students suggested that the population would grow rapidly, this was frequently only referred to as an increase in population.

3(b)(i) Students were asked to describe preliminary work to ensure a proposed method would work. The students that had engaged with the context of the investigation gave good descriptions that covered at least three of the points on the mark scheme.

3(b)(ii) Nearly all the students described a method of their investigation in a logical sequence. Most answers were focused around selecting suitable time intervals for counting the number of hatched eggs. All the marking points were seen in at least some answers, there was plenty of evidence that many students had carried out a similar investigation. Only a small number of students described how to calculate the rate of hatching.

3(b)(iii) Students were asked to explain how the data from their investigation would be recorded, presented and analysed. Most students either described or drew tables with headings and graphs with labelled axes. Only a small number of students suggested a statistical test that was not suitable for the method employed.

3(b)(iv)

The students that considered the limitations for **their proposed** method usually identified that counting hatched eggs may be difficult and that some eggs might not be viable.

Summary

Based on the performance of students on this paper, the following advice is offered:

- Read the whole question before you start to answer, and check that your answer covers everything the question asks for.
- Make sure your answer relates to the specific context of the question.
- When studying Core Practicals, think about what the techniques might be used for and the types of scientific question they might help to answer.
- Carry out every Core Practical for yourself, so you understand how it works and any difficulties that might be encountered.
- If you are given the procedure for a practical technique, put yourself in the shoes of the person writing the procedure: how would they have worked out the details such as volumes, concentrations and times? They will have used preliminary practical work.
- Consider the strengths and limitations of each Core Practical technique.
- Practice writing null hypotheses for experiments you carry out, even if you will not necessarily be applying a statistical test.

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