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Examiners' Report  
Principal Examiner's Feedback

January 2022

Pearson Edexcel International Advanced Level  
In Biology (WBI16) Paper 01  
Practical Skills in Biology II

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## **Some general points:**

Question one always asks candidates to describe a method based on a core practical they are expected to have personally carried out.

Question two can be based around any biological context, the key parts of the question are always the same, data presentation and analysis.

Question three is based on a core practical, the context should be familiar. This question focused on data processing and points of methodology.

Question four is based on a core practical.

In general, candidates showed knowledge of the core practical methods. Students clearly identified variables that needed to be controlled but their descriptions as to how monitoring or control could be achieved frequently lacked the precision required for this examination. However, most students did try to tailor their answers to the context of each question.

## **Question 1**

### **1a**

Candidates were asked to describe a method to investigate the tensile strength of fibres. Many descriptions of the method were logically presented. The most frequent omissions were providing a statement clearly identifying the dependent variable and a method for calculating tensile strength.

### **1b**

Candidates were asked to describe the structure of a cellulose molecule. All the points on the mark scheme were regularly given by candidates. However, there was a tendency to describe how cellulose molecules were joined together, this was beyond the scope of this question.

### **1c**

Only a small number of candidates gave a clear answer that demonstrated they understood the concept of biofuels being carbon neutral. Many candidates made reference to biofuels being renewable without further elaboration.

## **Question 2**

The context of this question was the reaction of snails to a change from dry to wet conditions.

### **2a**

Most candidates did not seem to appreciate that this invertebrate animal has a simple nervous system and does not feel pain. Short statements such as the snails are not harmed were not given credit.

### **2b**

Most candidates attempted to calculate the volume of water added. Candidates were allowed marks from an error carried forward such as failing to multiply by 2. Some candidates did not give their answer to two significant figures.

### **2ci**

Many candidates stated appropriate variables. A small number of candidates failed appreciated the difference between abiotic and biotic variables.

### **2cii**

Many candidates described their control of a variable adequately.

### **2ciii**

Most candidates went on to describe an appropriate effect if the variable had not been controlled.

### **2d**

Candidates were asked to suggest why an increase in the rate at which water was added did not significantly alter the response of the snails. Candidates found it very difficult to propose any of the ideas outlined in the mark scheme.

### Question 3

This question was about investigating the presence of mayfly nymphs in two streams.

#### 3a

Most candidates provide a clear null hypothesis.

#### 3b

Most candidates presented a suitable table of raw data. However, a good number of candidates did not present both mean values consistently. They should have either given 36.0 and 31.6 or 36 and 32.

#### 3c

Nearly all the candidates presented correctly plotted and labelled graphs.

#### 3di

Most candidates worked through the given formula and correctly calculated the value of  $t$ . The substitution of the given values of  $(SA)^2$  and  $(SB)^2$  were incorrectly squared again.

#### 3dii

Most candidates correctly identified the critical value from the table and compared this with the calculated value of  $t$ . The explanations that followed were usually worthy of credit.

#### 3e

A significant number of candidates commented on the variability of the data as shown by the overlapping range bars.

Other variables were often identified in the context of controlling the variable. In ecological investigations variables can be monitored to reduce the possible impact of a variable but they cannot be controlled in the same way as in a laboratory.

## **Question 4**

### **4a**

The context of this question was growing yeast in liquid culture.

Candidates were asked to describe preliminary work to ensure a proposed method would work. The candidates that had engaged with the context of the investigation gave descriptions that covered at least one of the points on the mark scheme.

Candidates were not given credit for the idea of practising the method to see if it works unless they provided some specific details.

### **4b**

Nearly all the candidates described a method of their investigation in a logical sequence. However, a significant number of answers had the potential to gain more marks by making clear statements, for example, specifying exactly how to control a variable.

All the marking points were seen regularly and there were a significant number of good answers gaining maximum marks.

### **4c**

Candidates were asked to explain how the data from their investigation would be recorded presented and analysed. Most candidates either described or drew tables with headings and graphs with labelled axes. It should be clear what type of graph is being proposed either in the drawing or in the supporting text. Only a small number of students suggested a statistical test that was not a suitable statistical test for the raw data they envisaged collecting. Tables should only have headings with units for raw data.

### **4d**

Most candidates suggested at least one of the points on the mark scheme.

**Advice for students:**

- 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.

