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Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel International Advanced Level

In Biology (WBI16) Paper 01

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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 the 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 effect of different wavelength of light on the rate of photosynthesis. Very few candidates named different colours or values of light filters they used. Only a small number of candidates used sodium hydrogen carbonate to ensure carbon dioxide was not going to be a limiting factor.

Counting gas bubbles was not given credit, at this level a volume of gas was required. Very few candidates collected gas in a suitable stated time.

#### **1b**

Candidates were asked to explain how the features of the grana in a chloroplast enabled photosynthesis to occur. Although all the marking points were seen, many of the descriptions were insufficient to gain credit. There were very few references to membranes creating a large surface area for photosystems for example.

Only a small number of candidates gave clear descriptions for three marks.

## **Question 2**

The context of this question was a graphical record of human breathing rate.

### **2ai**

Many candidates correctly interpreted the graph and calculated the number of breaths per minute.

A minority of candidates could not extract the appropriate information from the graph.

### **2aii**

Some candidates seemed to find it difficult to estimate the tidal volume and then proceed to estimate the respiratory minute ventilation.

### **2aiii**

Most candidates attempted an explanation as to why the respiratory minute volume increases during exercise. However, many answers lacked the clarity required to gain credit. For instance, more oxygen is needed to increase respiration during exercise. An answer that just stated that oxygen is needed for respiration was not a sufficient explanation.

### **2bi**

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

### **2bii**

Many candidates described their control of a variable adequately. Most candidates went on to describe an appropriate effect if the variable had not been controlled.

## **Question 3**

This question was about investigating the effect of antibiotic resistance.

### **3a**

Most candidates identified one sensible risk and a method of reducing this risk when carrying out an investigation in the field.

### **3bi**

Most candidates realised that the null hypothesis should be stated in terms of a correlation rather than a difference. However, many candidates did not refer to the mean length of leaves.

### **3bii**

Nearly all the candidates presented correctly plotted and labelled graphs.

### **3ci**

Most candidates worked through the given formula and correctly calculated the correlation coefficient.

### **3cii**

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

### **3d**

Candidates found it difficult to describe improvements that were appropriate to this investigation. The candidates that thought about the information given at the beginning of the question usually described at least one suitable improvement.

### **3ei**

A significant number of candidates suggested light intensity as an abiotic factor that could cause a difference in leaf length, this was not given credit as although it may be a suitable factor in laboratory experiments it would not be a factor in this instance.

All the factors listed in the mark scheme were seen regularly.

### **3eii**

Candidates usually gained a mark for describing how the factor could be measured. However, very few candidates gave further details as outlined in the mark scheme.

### **4a**

The context of this question was growing bacteria 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. 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.