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Edexcel

Examiners' Report
Principal Examiner Feedback

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Pearson Edexcel International Advanced
Subsidiary Level
In Biology WBI13
Paper 01 Practical Skills in Biology I

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1(a)

Many students did not give a clear statement about a correlation between vitamin C and CVD. Most wrote statements about the effects of free radicals/antioxidants. However, a significant number did give a specific effect of vitamin C on CVD, most referring to damage to artery endothelium or LDLs/cholesterol. Very few students gained both marks.

1(b)(i)

Almost all students gained the first marking point, although a few missed out by stating that 'it went colourless' (which had already provided stated in the question) without giving the start colour. Significantly fewer gained the second marking point and a few incorrectly stated that the vitamin C oxidised the DCPIP. Most failed to address DCPIP is reduced. There appeared to be some confusion as to the role of reduction.

1(b)(ii)

A significant number of students scored full marks. Whilst a few either did not attempt the calculation or calculated incorrectly. The main reason full marks were not achieved was incorrect rounding or not giving the answer to 1 decimal point, as indicated by the numbers in the table.

1(b)(iii)

Slightly fewer students gained full marks for this question compared with the previous question. A few students had the calculation the wrong way around and divided 9.4 by 0.4 and many incorrectly rounded to 4.25.

1(b)(iv)

Most students gained mp1 but mp2 was a little less common; many either did not draw any error bars or did not correctly draw the error bar for orange juice in a carton. A few labelled the x axis as 'juice' or 'type of juice' but did not individually label each bar and few missed 'mean' from the y axis label. These mistakes were not frequently seen.

1(b)(v)

Most students recognised that fresh juice had more vitamin C than carton juice however many provided uncreditworthy explanations for this. Some students were able to state that the SD was greater for fresh juice (or converse) but fewer were able to recognise that the difference between fresh juice and carton juice was probably significant because the error bars did not overlap. Some answers referenced SDs but were vague as to which SDs they were referring to and so could not be given credit. SDs within fresh or within carton not overlapping is not comparative and so not creditworthy. More common were descriptive, itemised responses that did not give any comparison between fresh and carton juice. Stating that fresh lime had the highest vitamin C and carton lime had the lowest but not commenting upon the *difference* was extremely common.

2(a)

Many students gained full marks for this question, and bar a few, but a small number of cases, gained *some* marks. Marking points 1 and 2 were common – the best examples including a clearly labelled diagram in their answer. Many were able to identify several variables that should remain constant although not all were appropriate. Most commented upon repeats but not all were clear that it was each plant that needed to be repeated.

(b)(i)

Most students scored 2-3 marks on this question. Most stated that a coverslip should be placed over the specimen on the slide, that the diameter should be measured, and that the area can be calculated using πr^2 . Whilst most mentioned a graticule and micrometer, 'calibration' was less common, and descriptions of calibration were generally not very clear. Descriptions of the need to cut a thin section of the fibre were often omitted or not very clear. Very few students described how to convert to a measurement, using the calibration data.

2(b)(ii)

Most students who drew a table gained all three marks with only a few failing to gain marking point 3 due to inappropriate data entered and a handful of students who put units in the body of the table.

2(b)(iii)

Most students scored at least one marking point, with most scoring at least two. The common problems were rounding errors or not starting with the correct strength for jute (250) read from the graph.

There was an issue with some answers which converted the tensile strength of jute into pascals but then failed to convert the area from square metres to square millimetres so being a factor of 106 out

3(a)(i)

Most students correctly identified the independent variable.

3(a)(ii)

Most students scored at least one mark here most commonly for 'temperature'; pH was also a common choice.

Some incorrectly stated 'light' and others 'humidity'. A minority stated a biotic variable.

3(a)(iii)

Most students gained the mark for this question but for those who did not, the most common error was mentioning a water bath but not specifying that it needed to be thermostatically controlled. Credit was given to students who chose an inappropriate variable in 3a(ii) but gave an appropriate control of that factor as their answer here.

3(a)(iv)

Most students probably understood the *idea* of marking point 1 and marking point 2 – but not all of those communicated it clearly enough to achieve the marks, failing to communicate clearly that there would be more damage to the discs and more betalain would leak, since the disc was already damaged by the detergent. Marking point 3 was much less common, owing to the confusion of validity, reliability and accuracy.

3(a)(iv)

Many students did not explain the reason why replication is carried out. There were some answers related to anomalies but not often that replicating would help to identify them.

Paper Summary

Based on their performance on this paper, students are offered the following advice:

- Make sure you are very familiar with every aspect of each of the 9 core practicals and the 5 recommended practicals, any of these may form the context for questions on this paper.
- For each practical, you should consider the variables involved. The DV, the IV, and the CVs. How is the DV measured? What range of values would be appropriate for the IV? What values would be chosen for the CVs and how would they be determined? These, amongst others, are questions which you may be required to think about in the examination.
- Think about how you might design experiments to answer all sorts of questions and get used to this way of thinking. The context of the design will always be one of the 9 core or 5 recommended practicals, but you may have to discuss how you might conduct an investigation you have not previously carried out within this context.
- In all experiments, you change a variable, the IV, and look at the effect of these changes on another variable, the DV. All other variables which may affect the DV are kept constant, these are the CVs.
- It is very important to remember that the DV has to be measured in some way. It might be a mass measured on a suitable balance or a length with a ruler or maybe callipers. In some cases, a count may be an appropriate measurement; for example, the numbers of leaves on plants growing in different nutrient solutions. In this case, for example, it would not be satisfactory to note down leaf colours as this is not a quantitative measurement.

