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Pearson Edexcel International Advanced Subsidiary Level in Biology

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Introduction

The paper was as accessible as those in previous series.

It is essential that candidates cover all of the core practicals and all of the recommended additional practicals (RAPs), any of these may be examined on this paper. Question 1 was based on a recommended assessed practical and, in contrast to the situation in the January series, candidates seemed to know it well.

The importance of having a clear grasp of what command words mean was also illustrated well in some of the questions on this paper, and comments are made in what follows.

1ai This was answered well with many candidates talking about osmosis in terms of water potential or sugar concentration. However, still quite a big minority could only talk about it in terms of water concentration or simply concentration. A significant number of candidates failed to link relative water potentials or sugar concentrations to the actual situation at hand. This restricted them to a maximum of one mark.
In general, though, the question was well answered with a significant majority gaining both marks and only just over 10% achieving zero.

1aii There was a significant number of answers which focused on the effects of heating on enzymes. This is an all too often predictable outcome when heat or temperature is mentioned in a biological context. Candidates are simply failing to think deeply enough about what they are being asked to do in a particular situation. Many other answers talked about the burning of fruit.
Fewer than half the entry gained the mark.

1bi Most candidates correctly identified sucrose concentration. However, some still struggle with the concept of independent and dependent variable, and such candidates listed water loss as the independent variable.
One rather specific point to note is that some talked about the effect of sucrose, concentration which, of course, is the dependent variable.

1bii A rather large number of candidates struggled to get the two marks here, only 20% doing so, almost a third achieved no marks. There is still confusion about terms such as reliability, accuracy, precision and validity. Unusually on this occasion, increasing reliability was allowed as well as validity. However, the many candidates who thought it would affect accuracy did not gain a mark. Elaboration of the specific effect that fluctuations in temperature would have on water loss alluded many.

1ci As mentioned in the introduction, performance on the experimental details of this recommended additional practical was very pleasing, with almost half of candidate gaining all five marks. Perhaps the advice to concentrate as much on these practicals as the core practicals is having an effect.
The most frequently lost marks were the first one where many candidates were content to just *use* sucrose solutions with which they had presumably been provided or when they talked about preparing them, did so in general terms rather than specific to the situation in the question. Again, a deeper engagement with the question would have helped. it said:

"Describe how the *results shown in the table* could have been obtained.
Assume that a *sucrose solution and distilled water* were provided." (italics mine).

So, it should have been clear that it was required to talk about the specific range of sucrose solutions used, and to generate the solutions from a given sucrose solution and distilled water. Candidates need to spot the "clues in the question".

A surprising number tried to measure the effect of water loss by measuring the volume or mass of water in the bathing solution.

Quite a few forgot to blot surface dry before weighing the pumpkin pieces.

1cii The most notable problems the plotting were graphs that were far too small, candidates having started their Y axis at zero, which is not a wise move when the lowest point is over 60. This made judging the plotting of both the points and the standard deviations quite difficult. Very few produced histograms or bar charts, which is pleasing. But a larger number drew a line of best fit rather than joining the points as requested. A good number knew what to do with the standard deviations, but there was a significant minority who plotted the standard deviation on a separate Y axis on the right hand side of the graph.
A very significant issue which arises every year, is candidates' choice of scale. Scales based on three or multiples of three are almost impossible to use to plot points accurately. Graph plotting is a recurring skill, tested on this paper, and centres are advised to spend time on such matters as a choice of scale, but also orientation of axes, using a linear axis and thorough labelling.

1ciii A pleasing number of candidates gained both marks on this quite challenging question, where they were required to take some specific evidence from the data and use it to come to a conclusion. This is the basic requirement in a question using the command word evaluate. For the rest there were those who wrote about both halves of mp2 and made no conclusion. Then those who really did not understand the question at all and simply described the trend in the graph.

1civ This question was generally well answered with a majority gaining both marks. By far the most common reason for the loss of one mark was not quoting the answer in the form requested, that is to the nearest whole number. Some did not know the formula for gradient.

2a Again, the question was well answered with a majority gaining books marks. A minority clearly did not have any clear knowledge at this level of the role of vitamin C, and therefore made vague statements about it being good for immunity, health, etc.

2b There was good spread of marks on this question, with a very small number of candidates scoring zero and the largest proportion scoring all four. Again, it is gratifying to see a core practical being known well.
The most common errors were made by candidates who spent 4 or 5 lines explaining how to produce an extract when the question made it clear that the extract was already provided. Then there were those who titrated DCPIP into the extract, which is fine, but they then got the colour change wrong and still went for blue to colourless. Another common error was to talk about drops rather than volumes and some used Benedict's reagent.
Because they were six marking points it was quite possible for candidates to get full marks without saying how the volume of extract or DCPIP added in the titration would be converted to a vitamin C content. This was not well known.

2ci This proved to be the most difficult question on the paper with only a very small minority obtaining two marks. Not very many more obtained one.
Those who gained a mark generally did so by making the simple statement that some vitamin C was lost. After this, sensible suggestions were thin on the ground. A significant number talked about losses at the extraction rather than the purification stage. Another group discussed changes in water content, somehow suggesting that this would affect vitamin C content.

2cii–ciii this question was well answered with the most common mark being four out of five. Errors were not labelling the column which named the fruits with a heading fruit, filling in the data with inconsistent use of decimal places, and the most frequent, the inclusion of data from the purified part of the graph.
In part iii the calculation was generally well done.

2civ This question gave a very good spread of marks, with only just over 10% of candidates achieving none. The most common error was made by those candidates who suggested that *all the fruits* of local origin had more vitamin C than those that were imported, rather than that this was the *overall* conclusion or the conclusion drawn by looking at the means.

Again, insufficiently, careful reading of the question, lead to candidates comparing fruits with other fruits. For example, quite a few said that the orange had the most vitamin C, which may be correct, but is not answering the question asked.

3ai In previous series, and as noted in the introduction, the relative unfamiliarity with recommended additional practicals has been a feature of this paper. However, on this occasion, it was a core practical with which candidates appeared to be unfamiliar, and rather in the extreme.
Microscopic examination of plant and animal material is the subject of two core practicals, numbers five and seven. Having said that, explanations of how to measure a white blood cell were often quite good, with about a quarter of candidates, gaining two or three marks.

3aii The reasons for the three procedures were again quite well known, and only a very small proportion of candidates scored no marks on this question.
The main sources of error were in suggesting why stain was used, with quite a lot of candidates saying it made the cells visible. Such answers had failed to realise that red blood cells are already visible, so something more specific, such as making white blood cells visible, was required for the mark. For those who tried to talk about cell parts, which could gain the mark use of the terms such as structures was not going to do so.

3bi It was when it came to making a low power plan of a leaf section that things rather fell apart for a large number of candidates. Examiners reported seeing very few plan diagrams, and thus the first marking point was rarely awarded. This is worrying since the core practical upon which this question was based clearly states "*make observations, draw and label plan diagrams of transverse sections of roots, stems and leaves*". This is clearly something that centres should address for the future.
The parts of the leaf were reasonably well known by some, but a significant number labelled things which could not actually be seen, such as xylem and phloem and a worrying number simply drew a vascular bundle from memory.

3bii There were some good attempts at this calculation with a pleasing number of candidates gaining all three marks. Another large number gained two, the most common reason for the loss of the one mark being either a failure to express the answer in standard form or, having attempted to express it in standard form, getting the power of 10 incorrect.

Paper summary

The advice in this section will include nothing particularly new in comparison with this section in previous series. The highs and lows do not seem to change much.

- Make a thorough study of all the command words from pages 68-69 of the syllabus, this can be refined by an analysis of the many past papers now available in order to get a sense of which command words are most commonly used on this paper.
- Make sure all 9 core practicals and all 5 recommended additional practicals have been addressed in some way or other. Every question will be in the context of one or more of these 14 practicals.
- Think carefully about the way in which scientific experiments are designed. It's the same for all of them regardless of what the topic is.
- Read every question very carefully, do not be tempted to rush. Particularly important is the command word much having been said about this in the body of this report. It goes beyond this though. Every detail of the so-called stem of the question is there for a reason I need to be analysed by candidates so that they can answer exactly what they are being asked, in the context in which they are being asked it
- Make a habit of setting calculations out whenever you do one so that anybody looking can see how you got to the answer. In that way, if you do get it wrong, you may still get credit for what you did.