Examiners' Report
Principal Examiner Feedback

January 2024

Pearson Edexcel International Advanced Subsidiary Level in Biology (WBI13)
Paper 01: Practical Skills in Biology I

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The general standard was maintained in this series, with most students being able to attempt all questions.

1a
Well known on the whole. If a mark was lost it was often for vague descriptions of the damage that is caused by free radicals. Some confusion existed between atheroma and clotting.

1b
The method was partly remembered but extraction standardisation often missed out and there was confusion over what the outcome would be if adding DCPIP to extract, saying still blue to colourless, which is incorrect. It simply eventually remains blue. Number of drops often reported rather than volume added.

1ci
A substantial number of candidates did not know what n represented. Those who did not get it right most often chose 0.95, the mean. That led to a value of -0.05 which should have raised warning signs that they would then calculate the square root of a negative number. One candidate wrote, "What is n?"
Most candidates were able to quote to 2 decimal places.

1cii
This question required great attention to detail.
Many were able to present the scale on the vertical axis correctly.
Labelling of the axes had many minor errors, most commonly missing out 'mean' in the label on y axis.
Many did not attempt to plot the standard deviations, but, of those who did, most were correct.

1ciii
Most candidates reported a clear difference and scored a mark.
However, the majority did not refer to the SDs at all and many that did make a reference did so in general but not related to specific to seasons or soil types. One of the commonest mistakes was just to say that overlapping SDs showed unreliability of data.

2a
A range of answers from exactly right to names of organelles, elements, etc.

2b
This question proved to be a challenge because candidates didn't answer what was being asked. Most reported the correlation, but that is only a description, the question asked for an explanation. Here they needed to say why this correlation existed.
An answer that considered the data as evidence about the nature of the membrane as flagged in the stem viz, "Some of the evidence for the structure of cell membranes comes from studies of permeability." was needed.

2ci
This was another "explain" question, and many scored well. Many referred to phospholipids and how temperature would affect them. In addition, the levelling off was often well accounted for. However, a significant minority confined themselves to discussing the effect of temperature on light transmission, failing to translate this into pigment leakage or membrane permeability, either of which would have provided an explanation.
There is still a significant number of candidates who think that enzyme denaturation is the cause of increased pigment leakage as a consequence of increasing temperature around plant tissue.

2cii
This experiment was well known to most.
Several unrewardable comments came up regularly, most of which indicate a rote learning of practical requirements and a failure to translate these or select these for the particular situation at hand.
The question said "Describe a procedure that could have been used to obtain the results shown in **this graph**." **This graph** was often ignored. These comments included

Repeating the question by starting, "A procedure that could have been used…."
Listing the independent and dependent variables
Listing irrelevant controlled variables such as pH and humidity
Stating that beetroot had to be of the same species
Drawing a table for results and plotting a graph

Marks were most commonly lost for

Not stating the temperatures to be used, or choosing wrong ones, i.e. not choosing temperatures between 5 and 30 degrees, to mirror the data on the x axis.
Not giving an appropriate time span (which candidates should know having done or seen the experiment themselves).
Not stating fixed volume of water, or equal sized beetroot pieces.
Not saying the purpose of repeating an experiment.

3ai
Most scored this mark but not all. Commonly 'Benedict's' was quoted by some.

3aii
Most knew this but some gave incorrect colours or failed to give the start **and** end colour.

3aiii
This was poorly answered with many not giving a range as the question directed.
It would seem that the procedure of making semi-quantitative estimates using colour standards needs some practice.

3aiv
The key word which candidates missed was *accuracy*. Many described repetitions which won't address the accuracy.
Some had difficulty in explaining what they meant in terms of the 'extra' concentrations needed.

Others suggested a colorimeter which was allowed a mark.

3bi
This table construction question is a regular feature of this paper, and it is therefore surprising to see a number of candidates still losing marks. The main reasons for loss of marks were including units in the table cells and not giving full detail for the protein content heading. Data entry was usually accurate.

3bii
Many responses lacked units, despite the fact that they were asked for in the question. The question required candidates to look at the data and work out the units.
This question required accurate readings from the graph and **if** this was done **and** shown clearly then there were marks available for the correct answer using the values quoted.
As always, laying out working clearly can help as marks can be gained in a complex calculation.

3biii
Candidates managed to pick out the trends and describe them.
However, there was a general issue in muddled descriptions of the data from 7 days and 5 days of heating.
Much reference was made to lack of error bars which are not relevant in identifying trends.

3biv
This experimental procedure should be well-known to candidates who should have carried it out or seen it done. Adapting the procedure to deal with acids rather than antimicrobials therefore should have been straightforward. A significant number invented experiments with fish, microscopes and other irrelevant approaches instead of considering how this question might relate to work they had done in the laboratory. It has regularly been pointed out all the questions on this paper will relate to one or more of the nine core practicals and five recommended additional practicals.
The most frequently seen issues were
Not explaining the step of preparing an agar plate seeded with bacteria clearly enough.
Suggesting that the bacterial lawn should be grown for days before adding acid.
Failing to mention the method of adding the test substance on filter paper discs or by placing it into wells. A significant minority simply suggested adding acid with no detail.
Not stating an incubation temperature, or not stating all temperatures should be the same.
Not stating that all incubation times should be the same or suggesting inappropriate ones such as 10 minutes or an hour. “A known time” is not sufficient.
“from 24h to 4 days” is too loose a phrase.
Vague statement about *observing* the area of inhibition, with only the good candidates suggesting rulers or other approaches to *measure* it.

General Comments

- Reading the question carefully and giving a bit more time to interpreting what is being asked would improve candidates' answers. Also giving more detail in questions about describing methods.

- Calculations need to be laid out clearly so that credit can be given for working, even if the final answer is incorrect.

- 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.

- It is important to remember that the DV has to be measured in some way, it needs to be quantitative. It might be a measurement on a suitable piece of equipment or maybe a count or an appropriate measurement with a ruler.

- It is very important to be familiar with the meanings of some key terms used throughout science. Accurate is a case in point in this paper.

- Try to think about how you might design experiments and get used to this way of thinking. 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.

- Make sure you understand what is required from each command word. For example, explain may involve some description, but what has been described must then be accounted for. Determine needs some quantitative element. Comment on needs a synthesis of factors to make a judgement.

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