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Examiners' Report

Principal Examiner Feedback

October 2021

Pearson Edexcel International Advanced Level  
In Biology (WBI13) Paper 01

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In general, there seemed to be a decrease in experience of practical method. For example, fewer candidates knew the DV this year than in previous seasons.

Comments on Individual Questions:

1 ai

Most knew the biuret test although spelling it was a problem for which there was no penalty so long as the word's spelling meant something else e.g., burette

There was some confusion with Benedict's test.

1 aii

Many good answers. The commonest mistake was to describe the use of the filtrate rather than the 'preparation' of it.

1 aiii

The distinction between semi-quantitative and quantitative is not well understood, which is surprising given the use of both in food test practical's.

1 aiv

The general statement of mp1 was the commonest mark awarded.

The commonest mistake was to try and use the food extract as it is to compare with the colour chart rather than the results of a food test carried out on the filtrate. This is probably due to the rather imprecise use of language.

1 bi

Many correct calculations carried out here. Most scored at least one mark. Some sadly lost a mark because they did not read the instruction to give the result to one decimal place.

1 bii

Many quoted DNA, amino acids but many answers of lipids and carbohydrates. This shows a lack of knowledge about molecular structure of basic biochemicals.

2ai

It was pleasing to see that most candidates knew that valid measurements required constant conditions and accurate measurements. Zeroing was commonly described as was keeping the light source constant.

The idea of 'objectivity' was also seen in many answers.

2aii

Most scored well here. However, there were some candidates who don't realise you can't control the temperature with a water bath unless it is controlled thermostatically.

2bi

Most tables were well drawn but some misreading of data was seen.

2bii

Many candidates latched on to the small fall in the loss of betalain with ammonium sulphate above a concentration of .002 rather than seeing it as a simple plateau. Consequently, there was an erroneous conclusion that both salts cause a reduction in the loss of betalain, rather than both affect the leakage but in opposite directions.

Many, however, did see that the salts cause different affects and so scored mp3.

One mark was common. Few scored more than this.

2biii

Most scored both marks here. There was allowance made for figures being read incorrectly off the graph but then applied in the correct fashion.

2ci

This was the most challenging question on the paper and required candidates to see that at zero concentration of calcium chloride or ammonium sulphate the beetroot was in water.

This was not appreciated by many and they therefore failed to see that in the second investigation the beetroot was losing betalain because of water plus ammonium

sulphate or water alone and so the effects of ammonium sulphate could be clearly seen.

Without ammonium sulphate there was a decrease in betalain as calcium chloride increased in concentration. With ammonium sulphate betalain loss also decreases as calcium chloride increased in concentration. The loss of betalain was always higher in the presence of ammonium sulphate at the same concentration of calcium chloride.

Many candidates referred to the 'rate of decrease' between the two conditions but the decrease in the betalain loss as calcium chloride increased was actually the same for both conditions, with and without ammonium sulphate.

The commonest mark to be awarded was mp3 about the pattern in the second investigation.

Few candidates used both investigations and most answers were only referencing the second investigation.

Mp4, that the intensity of colour was virtually the same at 0.01 mmol dm<sup>-3</sup> of calcium chloride, was the second most awarded mark. However, there were some answers which simply quoted figures without stating what they signified which scored no marks.

Very few answers came to any conclusion about the relationship between calcium chloride and ammonium sulphate effects on the membrane, mp5

2cii

This question required candidates to appreciate that the original experiment did not include the value of 0.002mmol dm<sup>-3</sup>, therefore answers needed to be framed in the context of carrying out repeats at this concentration to gain credit. Most knew to repeat and to find SD but few mentioned that conditions needed to be kept the same.

3ai

Disappointedly many candidates did not seem to know which was the dependant variable, this is a significant change from previous years.

3a ii

Most answers referred to using a range of pH, less often was constant conditions mentioned. Sadly, the idea that the fastest rate of reaction was the best was seen from many candidates, not appreciating that this is not necessarily the case in most experiments. If the reaction proceeds too fast, it will not be measurable practically.

3b i

Most graphs were produced to a very high standard and scored full marks. If a mark was lost it was usually for not joining up the points accurately.

3b ii

Describing the increasing rate of reaction with increasing enzyme concentration was a common answer. However less common was an explanation of this, the word 'explain' was in the question and had to be addressed.

Sadly, there seemed to be a lack of knowledge about the plateau achieved in this type of reaction and so many answers talked erroneously about a 'decrease' in the rate of reaction at higher enzyme concentrations. However, there were many references to the substrate being limiting.

3c i

There appears to be a lack of knowledge as to the benefit of using 'initial rate'. The simple idea that the rate of reaction changes as the reaction proceeds due to substrate being used up was not expressed by many.

Even more rarely seen was the idea of a valid comparison being possible when initial rates are used.

3c ii

This question was poorly answered showing that many candidates did not seem to understand what is meant by 'initial rate'.

Many answers were still measuring simple rate by measuring the time it took to ..... What is needed is repeated measurement at time intervals. Then, plot these time intervals against ..... The gradient measured must then be at the start of this plot.

3d

Many knew a formula to work out this answer, but this was not necessary. The dilution factor can be worked out from first principles or using a formula. Once the dilution factor was found then this needed translating into the volume of 5% stock to be used along with the volume of water.

Many vague answers were seen where water was added to the stock solution but with no values given that made any sense.

### **In Summary:**

- Despite this being mentioned in 2020, it was still clear that many students were not at all familiar with the concept of initial rate of enzyme-catalysed reactions. They are reminded that this is specified in core practical 4 and needs to be covered.
- Failure to properly read the question is a perennial issue. On this paper, on question 1aii a very significant number of candidates discussed features of the filtrate itself and gained no marks.
- The terms qualitative, semi-quantitative and quantitative are all likely to feature in many contexts, now they are not well understood.
- Much the best way to tackle compare and contrast questions is to look systematically at the similarities and then the differences.
- 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.