



## **General Certificate of Education**

# **Biology 1411**

**BIO3X      Externally Marked Practical  
Assignment (EMPA)**

# **Report on the Examination**

*2009 examination - June series*

Further copies of this Report are available to download from the AQA Website: [www.aqa.org.uk](http://www.aqa.org.uk)

Copyright © 2009 AQA and its licensors. All rights reserved.

#### COPYRIGHT

AQA retains the copyright on all its publications. However, registered centres for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to centres to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Set and published by the Assessment and Qualifications Alliance.

**TASK 1****Question 1**

Most candidates gained one mark for this question, usually by referring to identifying anomalies. Few candidates were able to state that the mean would be more reliable and gave responses that were vague or out of context, e.g., 'make the results more reliable' and 'make the mean more accurate'. These were not credited.

**Question 2**

Most candidates gained one mark for this question, typically for stating the need for the same end point or placing the syringe at the same angle each time. However, many weaker candidates simply repeated parts of the method given, e.g., 'I made sure I used 10 cm<sup>3</sup>'. These responses were not credited.

**Question 3**

- (a) This was answered very well indeed across the ability range. Virtually all candidates could calculate a mean.
- (b) Only the stronger candidates were able to answer part (b) correctly. The most common error for part (b) was to divide the answer from part (a) by ten, rather than divide ten by the answer from part (a).

**Question 4**

- (a) Better candidates were aware that results would be more accurate due to the increased drainage time or smaller percentage error. However, a number of weaker candidates thought that using a larger syringe would increase the flow rate due to it having a wider nozzle, and so make it less accurate. A considerable number thought it would make no difference.
- (b) Many weaker candidates thought that the results would be more accurate due to a greater number of decimal places and forgot about the impact of human error on timing. Candidates from centres that had not received the erratum notice were not penalised for stating that the accuracy would not be affected because they used a timing device of the same accuracy.

---

**TASK 2****Question 5**

Virtually all candidates correctly showed how their range of dilutions was produced. A few candidates made up volumes of 6 cm<sup>3</sup>, making the task more difficult for themselves.

**Question 6**

Most candidates scored at least two marks for presenting the table. However, some weaker candidates lost marks for incomplete labelling of column headings and inserting units in the body of the table.

**Question 7**

This was answered well across the ability range, with most candidates scoring at least three marks, and stronger candidates often gaining full marks.

Common errors made by weaker candidates included incomplete labelling of the axes, scaling errors and extrapolating the graph well beyond the chosen range. Some candidates chose awkward scales in an attempt to use the whole of the page and this made plotting errors more likely. Plotting points was generally done very well indeed by those candidates who had chosen a logical scale. Some candidates drew a curve of best fit with very little evidence for its positioning.

**Section A****Question 8**

This was answered well across the ability range, with most candidates gaining the mark for stating that 30 °C was close to optimum temperature or that the reaction rate was highest at this temperature.

**Question 9**

Weaker candidates tended to give answers that were vague, e.g., 'use water only' or 'don't use enzyme'. However, the idea of what the enzyme would be replaced by was needed to gain the mark, otherwise the viscosity or volume of the solution would change. Stronger candidates were aware of the need to use boiled enzyme or water instead of the enzyme. Fortunately, more candidates were aware of why this control was needed.

**Question 10**

- (a) Many candidates could correctly identify the COOH group as being the acidic part of the pectin molecule, although some circled the whole of a monomer.
- (b) Most candidates gained a mark for mentioning condensation or the removal of water. Some weaker candidates confused condensation and hydrolysis.

---

**Question 11**

Most candidates scored at least two marks for this question, with better candidates scoring maximum marks. Weaker candidates tended to reiterate theoretical knowledge without relating it to the graph.

**Question 12**

- (a) This question was answered well across the ability range, with nearly all candidates giving a pH within the range of 5.0 to 5.5. Many then went on to explain that this was the optimum pH or that it gave the fastest rate of reaction. However, a number of weaker candidates lost the second mark for simply stating that the rate was constant at this pH value. A few candidates failed to gain credit as they referred to the optimum pH for *pectin*.
- (b) This was only answered well by the very best candidates. The weakest candidates usually failed to score.

**Section B****Question 13**

This question was answered well with many candidates gaining credit either for the idea that the gene had been altered or removed, or that the primary structure of pectinase differed. However, some weaker candidates simply repeated what was in the question stem and gave vague responses such as that the DNA for pectinase had been altered so no pectinase was produced.

**Question 14**

Many weaker candidates produced vague responses, simply suggesting that by using tomatoes of the same size, it would be a fair test. These answers were not credited. Better candidates were aware that variation in size would affect the amount that tomatoes flattened. However, relatively few mentioned that this would enable a comparison to be made.

**Question 15**

Most candidates gained one mark for the idea that the normal tomatoes showed greater variation in ripeness. However, only the very best candidates went on to mention that the error bars did not overlap or that the difference in ripeness was significant. Weaker candidates tended to simply refer to which tomatoes had the wider error bars or higher standard deviation. This was not credited as the question required an explanation of what this meant.

**Question 16**

The weakest candidates tended to give answers that only mentioned pectinase concentration and ripeness, which was given in the question stem, or described the graphs without showing an understanding of what they showed. However, most other candidates did score one mark,

either for linking pectinase concentration with softness, or linking softness with ripeness. Only the best candidates gained full marks on this question. Some of these candidates were also aware that ripeness may be due to another factor or that correlation does not necessarily mean causation.

### **Question 17**

This question was answered well across the ability range, with most candidates gaining at least one mark for stating that the fresh mass decreased. The most common reason for candidates not achieving the second mark was for a lack of detail in describing the effect on the dry mass stating 'dry mass increases' without reference to the small size of this increase.

### **Question 18**

Weaker candidates often gave answers to this question that were out of context. Such answers typically referred to the sodium chloride solution moving by osmosis, reference to water potential being lowered without mentioning where, and the lack of a water potential gradient. However, better candidates were aware that the water potential outside the plant was lowered. Typically, candidates scored at least two marks on this question.

### **Question 19**

Most candidates scored one or two marks on this question for referring to the mean taste score being higher for GM tomatoes watered with sodium chloride and that the sample size was small. Weaker candidates tended to recite individual taste scores from the table, without the appreciation of the overall trend. A number of weaker candidates did not read the question carefully enough and spent too long writing about normal plants. Similarly, answers that referred to the tasters being biased were not credited as it can be assumed that scientific standards were observed in carrying out the trial. Stronger candidates were aware that measuring taste is subjective.