



**General Certificate of Education (A-level)
June 2011**

Biology

BIO3X

(Specification 2410)

**Unit 3X: Externally Marked Practical
Assignment**

Report on the Examination

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General Comments

Most candidates attempted all the questions and there was no evidence to suggest that candidates found any of the questions on this investigation inaccessible. In Tasks 1 and 2, very few candidates scored low marks. Although the questions in Sections A and B of the written test proved more demanding than these tasks, the majority of candidates still obtained more than half the marks available. Examiners felt that the general use of scientific terminology was of a higher standard than last year and that there was a significant improvement in answers to questions testing similar skills.

BIO3X: Task 1

Question 1

Very few candidates had difficulty giving at least one reason why the tube was rotated every ten seconds. Most candidates referred to 'mixing the contents' or provided more precise answers relating to enzyme-substrate collisions. Many candidates gained a second mark for indicating that rotating the tube enabled the curd to be seen.

Question 2

- (a) Most candidates obtained one mark for appreciating that it was difficult to decide when the curd was present. Fewer candidates gained a second mark by linking this to judging the time at which the curd appeared. A limited number of candidates suggested that different methods of rotating the tube would make the results unreliable.
- (b) Many candidates suggested timing how long it takes for all the milk to solidify as a method of measuring the rate of reaction. However, very few candidates obtained a second mark for suggesting another suitable method such as weighing the mass of the curd produced. Many candidates incorrectly referred to the biuret test.

Question 3

Most candidates gained this mark for the idea of getting better at recognising the appearance of curd.

BIO3X: Task 2

Question 4

Very few candidates were unable to complete the table correctly.

Question 5

The construction and completion of the table frequently gained maximum marks. Omission of units was the main occasional error. Almost universally, candidates gained both marks for the trend in their results.

Question 6

Whether or not candidates attempted to process the data in order to calculate the rates of reaction was very centre dependent. Those candidates who did try generally did so successfully, although a significant minority incorrectly divided volume by time. Over 50% of candidates gained full marks on the graph. The most common errors candidates made were misuse or omission of axis breaks and incorrect scaling.

BIO3X: Written Test Section A

Question 7

- (a) A similar question to this was asked last year. Not surprisingly, this year a much larger percentage of candidates gained the mark. However, there was still a significant number of candidates who did not. These candidates often limited their responses to 'reaching the same temperature'.
- (b) Most candidates gained a mark by referring to using a thermometer to measure the temperature of the milk or water. Weaker candidates suggested that the thermometer itself would maintain the temperature. Many candidates gained a second mark by suggesting the addition of hot water to maintain the temperature or described how the water bath could be insulated.

Question 8

Almost invariably, candidates correctly mentioned using a buffer.

Question 9

- (a)(i) The vast majority of candidates gained at least one mark, many gained both. Candidates failing to gain the second mark often quoted the wrong rate or concentration value at which the graph levelled out.
- (a)(ii) This question was generally well answered. Many candidates provided good explanations of the shape of the graph and scored at least three marks. However, candidates often failed to gain maximum marks due to poor expression, such as in suggesting that 'active sites are used up'.
- (b) Better candidates had little difficulty obtaining this mark but others often failed to provide enough detail in their answers.

BIO3X: Written Test Section B

Question 10

Many candidates gained both marks by stating that 'Chymosin is a protein'. However, a significant number of candidates stated that a purple colour in the biuret test indicated that no protein was present.

Question 11

Most candidates realised that removing water would increase the percentage of protein in mature cheese.

Question 12

Most candidates gained a mark for realising that rennet has less chymosin. Many of these candidates gained the second mark by mentioning the presence of another protein-digesting enzyme in the rennet. There were a few correct references to vegetarians but answers relating to ethical considerations often lacked focus and were too generalised.

Question 13

Many candidates failed to gain this mark as their answers suggested that the animal gene was present in chymosin.

Question 14

- (a) Candidates had little difficulty gaining this mark, clearly recognising that vegetarian rennet reduces the coagulation time or has greater activity.

- (b) Approximately 60% of candidates obtained both marks for this calculation. Between 5 to 10% gained one mark for an incorrect answer which indicated that the fall in coagulation time was 3 minutes.

Question 15

Although a significant number of candidates gained three marks, this question still provided some discrimination. A large percentage of candidates did not specify which type of bond breaks during denaturation or incorrectly referred to peptide bonds being broken. Similarly, the idea of the shape of the active site being altered was not always evident. Nevertheless, the overall high quality of the answers demonstrated that enzyme activity is generally well understood by most candidates.

Question 16

The vast majority of candidates had little difficulty providing two symptoms of lactose intolerance. Spellings however left a lot to be desired.

Question 17

- (a) Only better candidates clearly understood the idea that some individuals did not eat the food due to discomfort from eating it in the past.
- (b) Most candidates clearly described a positive correlation in one form or another. Candidates failing to gain this mark often provided only part of the information in the column heading C.
- (c) Better candidates had little difficulty explaining that correlation does not mean that there is a causal relationship and that some other factor may be involved. However, many candidates only provided part of this explanation for one mark or provided answers that bore little relevance to the wording of the question.

Question 18

Many candidates gained both marks in this question, often for understanding that self-diagnosis and subjectivity of 'discomfort' could make the data unreliable. The idea of untruthful responses was also often credited.

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