Version 1.0: 08/2010

General Certificate of Education

Biology 1411

BIO3X Externally Marked Practical Assignment (EMPA)

Report on the Examination

2010 examination - June series

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Set and published by the Assessment and Qualifications Alliance.

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General Comments

The examiners who marked this paper were concerned by evidence which suggested that some centres were not carrying out the practical work necessary to prepare their candidates for this unit. As a result, these candidates were denied full access to the paper and gained limited credit on Task 1, Task 2 and Section A.

TASK 1

Question 1

Many candidates scored at least one mark here. This was most often the second mark when they suggested that fewer enzyme-substrate complexes were formed. Relatively few candidates referred to kinetic energy. Common incorrect answers were those describing the reaction and many also wrote generally about the number of collisions being affected rather that there would be fewer collisions or fewer enzyme-substrate complexes formed.

Question 2

Virtually all candidates gained this mark

Question 3

(a) Most candidates scored at least one mark and many scored two. Common incorrect answers were that sticks should have been put in to the same depth or at the same angle, or sticks should have been taken from the same batch. These answers were not accepted. The third marking point on the scheme (shaking the tube) was seen very rarely.

(b) Generally answered well with most candidates achieved one mark. Only better candidates gained the mark for comparing the colour to get the match. Some candidates had very little understanding of any kind of dilution technique which is a required practical activity.

Question 4

There were some excellent answers to this question, but many candidates incorrectly stated that Benedict's reagent only tested for non-reducing sugars. This did not gain credit.

Question 5

This question was largely centre dependent, with many candidates being aware that rate was the reciprocal of time. However the first mark, measuring the time taken to go a particular colour, was not often achieved. There was evidence that candidates struggled with transferring practical application into written answers. Some suggested using the gradient of a graph. This was given credit.

TASK 2

Question 6

This question was usually well answered with most candidates completing clear tables with units heading the columns. There were candidates from some centres who gave both minutes and seconds, despite instructions in the task. The trend was correctly indicated by many.

Question 7

Graphs were generally well drawn with many candidates achieving all six marks. The commonest error was the scale mark with candidates plotting pH 6.5 incorrectly or not using interrupted axes. A second frequent error was a failure to include units on the y-axis when plotting rate. Better candidates had plotted rate although plotting time was given credit.

EMPA WRITTEN TEST

SECTION A

Question 8

(a) Many candidates gained this mark but a common error was to refer to reaching optimum temperature rather than to equilibration.

(b) This was answered well in most cases.

Question 9

This was generally well answered with most candidates drawing two monosaccharides and gaining the first mark. It was less common, however, for the atoms from water to be in the correct positions.

Question 10

(a) This was well answered although many candidates completed long descriptions of the curve before starting to explain it. The command word in the question ‘explain’ was often misconstrued by candidates. Correct technical terminology was well used and it was encouraging to see less able candidates gaining credit for correctly referring to denaturation. Some candidates used loose expression such as that bonds were “interfered with”.

(b) Many candidates gained one mark but very few gained the second. Candidates need to be reminded that when points are joined with straight lines intermediate points cannot be predicted.

(c) Many good answers were seen here with candidates using the correct pH range and testing to find the same colour on the strip. Fewer realised that a fixed concentration of

glucose was needed. This question differentiated well with more able candidates grasping the concept of immobilised enzymes. Less able candidates often assumed that immobilised enzymes formed a solution added to the glucose.

SECTION B

Question 11

Many generalisations were seen here with candidates using "valid", "reliable" and "fair test" interchangeably. These terms gained no credit when used without further explanation. Better candidates realised that the digestive system needed to be empty while less able candidates focused on the amount of extra glucose in the blood even though it wouldn't have been labelled.

Question 12

(a) Most candidates scored this mark. Those who did not had usually misread the graph.

(b) Many candidates made the link that a larger person would have more blood but the second marking point, that therefore there would be a lower concentration of glucose, was less frequently seen. Candidates frequently described the glucose as being more spread out. This was not given credit. A common misconception was that diffusion distances in larger people were greater. As in question 10, candidates who referred simply to different masses, rather than to masses being high or low, did not gain credit.

Question 13

Better candidates realised that there was considerable overlap between the groups and scored at least two marks. Less able candidates decided that in many cases the test was fine and ignored the overlap.

Question 14

This was answered well with most candidates scoring the mark. Those who did not offered vague descriptions of trend, referring only to the shape of the curve. This should have been supported with data from the axes.

Question 15

This was a very straightforward question and candidates scored well. The commonest error was to refer to curves levelling off without any reference to this happening at the *same* value.

Question 16

There were some really good answers here with many candidates scoring the mark for respiration. Better candidates linked this idea to cells but others often confused ventilation and respiration. Statements such as glucose goes to the lungs and gets breathed out were not uncommon.

Question 17

Many candidates score the first mark stating there was a clear difference between the lactose deficient group and the IBS or control group. Good candidates achieved the second marking point of there being no overlap between the standard deviations. Candidates appeared to understand that a small standard deviation indicated reliable data. However, they were often uncertain of the implications of overlapping values.

Question 18

This question was well answered with most candidates making the required connection.

Question 19

This question was not well answered. The commonest response was that it is not possible to generalise from rats to humans. Only the very best candidates grasped the concept of overlapping standard deviation. As in question 17, although the concept of standard deviation was understood, only the best candidates were clear about an overlap in the standard deviation suggesting an uncertain conclusion.