



General Certificate of Education

Biology 2410

**BIO6X Externally marked Practical
Assignment**

Report on the Examination

2010 examination - June series

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General comments

The candidates coped well with the practical task and were well rehearsed in the statistics. They experienced greater difficulty, however, with the data on the resource sheets. Less able candidates were not always able to interpret the data with which they had been provided. Where they could, they often lacked basic skills such as those involved in describing trends and patterns.

TASK 1

This was generally well done with most candidates scoring at least 6 out of the 8 marks available.

Question 1

Candidates identified the part of the seedling measured but often failed to give a more detailed explanation than that "it was easiest". Examiners were looking for a reference to size or straightness.

Question 2

- (a) For two marks candidates were expected to give details of their method of randomisation. This was sometimes missing. For full credit they needed to give information on how the random numbers were generated or qualify their responses with a reference to position.
- (b) Almost all candidates appreciated that random sampling would remove, or reduce, bias.

Question 3

Most candidates identified the curled growth of the root as a problem, but weaker candidates merely referred to straightening it. A few candidates pointed out that the start of the root was difficult to determine but could not suggest a reasonable method of dealing with this.

Question 4

- (a) Most candidates could calculate the running mean correctly. A few failed to gain marks because they did not use decimal points but rounded to whole numbers. Others misunderstood the instruction and calculated the mean of the means.
- (b) The better candidates appreciated that if the running mean showed less fluctuation then the values it was based on would be more similar.

TASK 2

Question 5

Generally this question was well answered with many candidates scoring full marks. There were some difficulties over expressing the null hypothesis with some candidates offering such confused statements as “There will be no difference between the concentrations of salt solution and the length of roots”. Other responses were appropriate and succinct.

Approximately three quarters of candidates stated they would carry out standard error and 95% confidence limits as their test statistic while the remainder suggested using Spearman’s rank correlation test.

Candidates could generally justify their choice of test and calculate the test statistic correctly, although many candidates did not determine the 95% confidence limits. Many candidates produced very a good graphical representation of their data and were usually ably to link correctly this with rejection or acceptance of their null hypothesis. A few decided to ignore standard errors if they overlapped.

Section A

Question 6

This question was generally well answered by all candidates, although a few had the volumes of water and sodium chloride the wrong way around.

Question 7

- (a) This produced some vague answers with very few mentioning statistical tests.
- (b) Approximately half of the candidates referred to competition, but others gave vague responses like “not interfering with each other.”

Question 8

- (a) Many candidates answered this well, but others referred to evaporation of the *solution* or of sodium chloride and followed this with vague answers referring to *changes* in the concentration of the solution.
- (b) This was one of the most poorly answered questions with seeds “drowning”, “bursting”, or “not getting oxygen for photosynthesis”. Only about half the candidates correctly identified possible lack of oxygen and its effect on respiration.

Question 9

- (a) Most candidates could describe the effect of increasing sodium chloride concentration on the length of the roots and the percentage of roots emerging, but only the better candidates mentioned the effect on standard deviation. Only a minority of candidates commented on the effect of a sodium chloride solution of concentration 0.05 mol dm^{-3} causing a decrease in root length but not in percentage germination.

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- (b) Most knew this well, although a few thought that sodium chloride would have an impact on the pH of the solution.

Question 10

This produced many vague responses. A few suggested ropes or tapes being used and even fewer stated that these need to be at right angles to the road. Transects were taken across the road, along the road or up the road. Some candidates used quadrats but many intended to “see how many dandelions there were” or even considered digging up the plants and measuring their roots. Many sampled randomly rather than at regular intervals, and there were few references to repeating the transects.

Section B

Question 11

- (a) A poorly answered question with many candidates just re-stating the data. The main mark gained was for recognising that the enzymes involved may become denatured at higher temperatures.
- (b) Another poorly answered question with “easier” and “quicker” as common responses.

Question 12

Again this produced many poor answers with candidates repeating the data and not referring to trends.

Question 13

- (a) Many could describe a method of heating to evaporate water, but some candidates wanted to ‘burn’ the plant. The second mark proved a good discriminator as only the better candidates gave a full description.
- (b) Generally well answered.

Question 14

Most candidates picked up on the idea that three paper birch trees was too small a sample, although the idea was often poorly expressed. Surprisingly, very few commented on the subjective nature of the descriptions. Many misunderstood the data, confusing the ion concentration inside the tissues with the ion concentration in the outside soil, even though they were told that the trees were all in similar soil conditions. Many did not realise that the high salt concentration in paper birch could indicate that it could tolerate salt or that the low concentration in red oak meant it may be able to prevent ions entering. Many stated that the “experiment” was invalid as different numbers of trees had been used or because they were not all healthy, failing to realise it was salt making them unhealthy. Very few candidates commented on the other trees and the conclusions that they were salt intolerant.

Question 15

Most candidates could link the data in resource B with that in D but weaker candidates became sidetracked over the effects of temperature in resource A. Resource C was used by most candidates but weaker ones failed to gain credit because they either did not read the graph carefully enough or gave a vague response. No candidates referred to the ability of some species to prevent salt entering the tissues.