

OXFORD

INTERNATIONAL
AQA EXAMINATIONS

INTERNATIONAL A-LEVEL BIOLOGY

(9610) Paper BL03

Report on the examination

June 2022

REPORT ON EXAMINATION: INTERNATIONAL A-LEVEL BIOLOGY 9610 BL03 JUNE 2022

Many students produced excellent responses to this paper while others found it challenging. Scripts at the lower end scored slightly better than on other papers. There was no evidence that students were unable to complete the whole script within the time allowed.

Students found some command verbs easier to deal with than others. In general, command verbs like name, state and give resulted in correct answers. Students were able to describe trends in data (01.2) and sequences such as the light-independent stage of photosynthesis (04.1) very well. Most students were able to draw (02.2) and interpret the more straightforward graphs (03.1, 03.2). Similarly, interpretation of the food web (07.2) and genetics cross (05.1) were handled well.

The students were less successful when the question asked them to explain (04.7, 05.4) or evaluate (03.3, 06.1). Questions concerning statistics (04.5, 04.6) were poorly answered as were questions that required students to state definitions (02.1) or equations (05.2). Despite the skill shown in other graphical questions, the students found 06.1 difficult, perhaps put off by the unusual axis title. Students found comparing two processes challenging (07.4). Many gained most of their marks for the description of one of the processes.

Questions on the required practicals produced variable responses. When asked directly which variables to control (04.2), almost all students scored both marks. However, when describing an experimental setup in 06.2, less than half mentioned suitable control variables.

QUESTION 01

This question considered how respiratory quotients indicate the use of different respiratory substrates. It also looked in detail at Krebs cycle and the function of ATP and reduced NAD.

- 01.1 The paper was intended to start with a gentle introductory MCQ about how to calculate RQ. It proved so, with over 90% of students gaining the mark.
- 01.2 The students were asked to describe the trend in the supplied data. They found this straightforward, with around 90% gaining the mark.
- 01.3 Students found this question more challenging, with less than 10% gaining all 3 marks. They found it difficult to use information from both Table 1 and Table 2. For example, several students noticed that a change in RQ indicates a change in the respiratory substrate. However, they failed to use Table 2 to indicate which respiratory substrate was used. Very few students were able to link the idea of needing more energy to maintain body temperature when the weather was very cold. A small number of students continued to refer to energy being made.
- 01.4 The vast majority of students correctly named Krebs cycle.
- 01.5 However, fewer students were able to correctly name both the 1C and in particular the 2C compounds.
- 01.6 Again, students found this part more difficult than expected. More were able to identify the use of ATP, with the vast majority choosing an energy source. Fewer knew the use of reduced NAD. The majority of correct answers named it as a carrier (of hydrogen/electrons). Together questions 01.4-01.6 suggest that students have an overview of respiration but struggle with the details.

QUESTION 02

This question looked at the nitrogen cycle. A novel context of heavy metal contamination of the soil was used.

- 02.1 Students were asked to state what nitrogen-fixation means. Only about two thirds were able to do this. The most common error was to describe the conversion of nitrites into nitrates.
- 02.2 The students were asked to plot a graph of the supplied data. Compared with previous similar questions, they seem to have improved this skill, with around half gaining 3 or 4 marks. Most students produced the expected line graph in the correct orientation. Some students selected inappropriate scales, which made it difficult to plot the given values. Most provided full axes titles including units. However some incorrectly plotted the data points. Students should be reminded to check this carefully. Drawing the line cost some students a mark. Sometimes their lines extended beyond the first or last data points. Alternatively, they selected to draw a straight line of best fit when the data points are clearly a curve.
- 02.3 The students found this question more difficult. A small number failed to explain and simply quoted the relationship with or without some data points. The students that did score found making the link between heavy metal concentration, number of nodules and number of bacteria the easiest to achieve. Fewer were able to suggest a function for the nitrogen fixation, and so explain the decreased dry mass.
- 02.4 More than half of the students scored this mark. By far the most common idea was that natural fertilisers are cheaper. There were some vague answers with the idea of natural fertilisers being 'better' for the environment, which did not gain a mark. .

QUESTION 03

Phenotypic variation and changes in allele frequency were considered in this question.

- 03.1 Students were asked to select evidence from a figure to support a suggestion. Overall, this was well-answered with only around 5% of students failing to gain marks. However, students were asked to provide evidence in support of the suggestion only. Many students also provided evidence against the suggestion. They were not penalised for this but care should be taken to provide only the required evidence. Many students failed to gain marking point 3. This was because they stated that the 'results were significant' rather than the difference being significant. Few students considered sample size.
- 03.2 This question also presented students with data. Again, the students did well, with less than 5% failing to gain marks. Almost all students were able to link the mutation with reduced β -endorphin production. However, only around half of these students were able to explain why this led to heavier dogs.
- 03.3 Students found this question much harder than the previous two. A range of scores from 0-5 was recorded with a mean score of 2 marks. All marking points were seen, with marking points 2, 3 and 4 slightly more often than the others. Some students became distracted with ethical issues or tried to answer in terms of natural selection. There were still issues with students confusing the terms gene and allele.

QUESTION 04

This question looked at various aspects of photosynthesis. It also covered required practical 7.

- 04.1 Students were asked to describe the light-independent stage of photosynthesis. Most handled this well, with over 80% gaining 2 or more marks. Common errors included no mention of rubisco and confusion between reduced NADP and reduced NAD.
- 04.2 This question was answered very well, with all students gaining at least one mark. . The vast majority gained both marks with light intensity and temperature.

- 04.3 The students had a clear understanding of why samples should be random, with the majority gaining some marks on this question.
- 04.4 Around 75% of students were able to complete this simple calculation correctly.
- 04.5 In general, this question was poorly answered. A small number of students did not use the P values at all. Others realised the importance of a P value less than 0.05. However, they failed to gain further marks because they did not look closely enough at the data. They claimed that $P < 0.05$ for both number and diameter.
- 04.6 Most students were able to correctly name the Spearman rank test. However, both χ^2 and t-tests were also suggested.
- 04.7 As before, the students found the 'explain' question the most difficult. Few gained all 3 marks. Many more were able to link more leaf area with more photosynthesis. However, they were not able to explain why that would result in more flowers.
- 04.8 Many students find suggest questions challenging. However, many of this cohort were able to apply their knowledge and suggest a reasonable cause for the yellow leaves.

QUESTION 05

This question used inheritance as the context. This was then linked to energy transfer and food production.

- 05.1 Students handled this genetic cross very well, despite the unfamiliar context. More than half gained all four marks. The most common error was failing to identify the phenotype and sex of the offspring.
- 05.2 This question proved difficult. Less than a quarter of students gained the mark for the correct equation even though it is stated in the specification. Many students incorrectly gave the equation for net primary production by producers.
- 05.3 Students found this calculation more difficult than others on the paper. Less than half gained full marks. Common errors included missing out one of the steps.
- 05.4 The majority of scoring students suggested using cages to restrict movement and so reduce respiratory losses. Some gained only one mark as they were unable to explain why cages would improve the efficiency of egg production.

QUESTION 06

The basis of this question was competition between organisms. It incorporated questions on required practical 9.

- 06.1 Students had to use data from a figure to evaluate a decision. They found this question more difficult than other data questions on the paper. Less than 10% gained full marks and a similar number did not attempt it. All marking points were seen but the idea of increased wheat density reducing black-grass number was the most common. Many students only mentioned points in favour of the decision. Several students mentioned inter- and/or intra-specific competition but did not comment on its effect on wheat yield.
- 06.2 This question was based on required practical 9. There were some very well-written answers, providing a clear method. The mean mark gained was two marks. Many students mentioned growing the two types of seed together and measuring length at set intervals. Fewer mentioned control variables or the need for replicates.

- 06.3 This question proved more difficult for the students. By far the most popular marking point was the variability of water content. Many more understood that dry mass removed water but were not able to say why this is desirable.

QUESTION 07

This question covered various ecological concepts. This question required continuous prose and scored a total of fifteen marks.

- 07.1 A number of students struggled with this question. In most cases they could define population but found the idea of community much more difficult.
- 07.2 Overall this question was answered well. The majority of students scored two or more marks. Most identified that grouse and vole numbers would increase due to reduced predation. They also commented on the golden eagle as a predator of grouse only. Fewer went on to suggest that vole numbers would therefore increase more than grouse. Some students also considered hare numbers, which was not required. Students should be reminded about the need to only answer the question asked.
- 07.3 This question was less well answered, with a lower mean than the previous one. Genetic bottlenecks are in section 3.3.7.1 of the specification. However, some students had clearly not heard of them. Many of those that had, focused on a reduction in the gene pool without mentioning a small population. There were some common mistakes. Students referred to 'less allele frequency' when they meant less variety of alleles. Also, many students suggested that the small population of hen harriers would be 'more susceptible to disease.' This implies all diseases. In fact, a small gene pool might make all individuals susceptible to the same (single) disease.
- 07.4 Students found it challenging to compare primary and secondary succession. Some had learned the order of primary succession and simply described that. Commonly credited marking points included changes to environment and climax community reached. Students found it difficult to suggest differences. The most common difference was the idea of secondary succession occurring more quickly.

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