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Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel GCSE

In Biology (1BI0) Paper 1F

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Introduction

Paper 1BIO/1F was taken by candidates doing GCSE biology. It was taken as part of a linear assessment model at the end of the course. The paper consists of 100 marks assessed by a mixture of different question styles, including multiple-choice, short answer and extended open-response questions. Candidates are expected to answer all questions in 1 hour and 45 minutes. In the extended open-response questions marks are also awarded for the ability to structure a response logically; these questions are marked with an asterisk (*). In addition, the specification assesses practical knowledge and maths skills in the examination papers. There are eight mandatory core practicals in the specification that candidates must complete prior to the examination. Up to five core practicals may be assessed in Paper 1BIO/1F. Aspects of working scientifically are also assessed in questions throughout the paper.

The paper contained questions assessing the content from topics 1 to 5. These included cells, DNA, GM crops and pest control, selective breeding, enzyme activity, the eye and communicable diseases. Questions based on practical work included food tests, diffusion, devising a method for an investigation, using a microscope, controlling variables and safety precautions. More specifically, the practical skills assessed included interpreting the method for a food test and the results of a food test, improving an investigation and preparing a microscope slide of a sample of cells.

The maths skills assessed included calculating the length of a microscope image, calculating the distance diffused by a substance and interpreting data to calculate the number of people diagnosed with a disease.

Comments on individual questions are given below.

Question 1

The majority of candidates could give at least one specific safety precaution to observed when performing the Benedict's test for reducing sugars and most could give a relevant reason for placing the test tube in boiling water. Fewer than half of the candidates were able to give a relevant variable to control, but the majority were able to interpret the data in Figure 3 to state two conclusions.

Question 2

The majority of candidates could state the function of a flagellum, but only half of them could identify a difference, other than the presence or absence of a flagellum, between the bacterial cell and animal cell in Figure 4. It was pleasing to see that most candidates could use the data given to calculate the length of a magnified image. Some candidates may have scored one mark out of two if they had shown their working for the calculation.

Question 3

It was pleasing to see that the vast majority of candidates could complete the bar chart correctly to score two marks, then go on to score at least one mark for describing the trend shown by the data in Figure 5. Few candidates could give a reason why growing high-yielding GM crops could reduce the destruction of forests and less than half of candidates could explain an advantage of using predators to control insect pests. Only a very small proportion of candidates could state one disadvantage of genetically modified crop plants (that are resistant to attack by insect pests).

Question 4

Approximately half of the candidates scored at least one mark for attempting to calculate the distance diffused by hydrochloric acid in one second for cube B. This question is not based on a core practical, but nevertheless, it is important that candidates are familiar with investigations such as this. The majority of candidates could give an improvement that should be made to confirm the results of the investigation. The ability of candidates to devise methods did not show through strongly in this question, with only half of them scoring marks. Candidates were expected to use information already provided in the question to devise a method to investigate how temperature affects the rate of diffusion. This question also showed the need for candidates to practise using data presented in different formats.

Question 5

This question showed a good knowledge of the principles of selective breeding. More than half of candidates scored at least two marks on the first part of this question, with half of them also being able to give one benefit and/or one risk of selective breeding. Approximately half of the candidates could calculate the number of chromosomes found in a sex cell when given the number of chromosomes in a body cell, but far fewer could name the type of cell division that produces sex cells. The concept of the Human Genome Project and sequencing DNA bases was not well understood, with only a small proportion of candidates stating at least one benefit of sequencing bases in the DNA of all plants and animals.

Question 6

This question was about enzymes. The majority of candidates showed that they could describe trends in graphs, with nearly half of them scoring full marks on the first part of the question. However, the ability of candidates to explain results (for a particular temperature range) was less successful. It is important that candidates are aware of the distinction between the command words describe and explain. The majority of candidates could identify the product(s) of digestion for at least one food, but this is a certainly an area that could be improved upon. The last part of this question allowed candidates to demonstrate their knowledge and understanding of enzyme action. Most candidates could explain at least one relevant point, such as one of the substrates not being complementary to the enzyme, but there were few full explanations scoring full marks.

Question 7

Candidates were not able to demonstrate a great deal of knowledge and understanding of the structure and function of the eye in this question. Only a small proportion of candidates could name the structure that controls the amount of light entering the eye and very few could explain the functions of the two types of cells in the retina (rods and cones) that detect light. Approximately half the candidates could state the type of drug used to treat (eye) infections caused by bacteria. The majority of candidates scored marks on the extended open-response question about eye defects, but in general, they did not make good use of the diagrams provided in Figure 12, nor did they demonstrate good knowledge or understanding of these eye defects.

Question 8

This question was about communicable diseases and it was pleasing to see that the majority of candidates knew the meaning of the term communicable disease. The majority of candidates found it very difficult to describe how the specific immune system defends the body against disease, with only a relatively small proportion scoring any marks and an even smaller proportion scoring all three marks. Using data to calculate the number of people in a population with a particular disease is a typical style of maths question on this topic. Unfortunately, the majority of candidates failed to score, but those who understood the question usually scored full marks. Reasons for presenting data about diseases as the number of cases per million of the population, were not well understood.

Question 9

In this question, few candidates could describe the function of a meristem in the growth of a plant, but more than half could describe, at least in part, how a microscope slide of a sample of cells could be prepared. Knowledge and understanding of structures in eukaryotic cells was not strong, with fewer than half scoring marks on that part of the question. It was surprising that approximately 60% of candidates did not score marks on the extended open-response question on DNA structure and extraction. There was a small proportion of very detailed answers, with those candidates writing very detailed descriptions about both structure and extraction from plant cells.

Question 10

Approximately half of candidates scored one mark on the first part of the question explaining the phenotype of tall pea plants. More than half of the candidates understood the reasons for growing plants in a controlled environment. The majority of candidates completed the Punnett square correctly, but fewer could predict the percentage probability of green-coloured peas. Surprisingly, only a small proportion of candidates could explain an advantage of using sexual reproduction to produce offspring. In addition, descriptions of a test to identify fat were usually confused with other food tests and only a small number of candidates scored marks.