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Examiners' Report/ Principal Examiner Feedback

Summer 2015

Pearson Edexcel Certificate GCSE Biology (KBI0) Paper 2B

Pearson Edexcel International GCSE Biology (4BI0) Paper 2B

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Examiner's Report International GCSE Biology 4BI0 2B

Question 1

The comprehension tested the ability of candidates to read a passage about alligacin and answer relevant questions.

Part (a) required a definition of the term pathogens and most candidates appreciated that these are organisms that cause disease. Candidates who wrote 'something that causes disease' gained no credit. Similarly, candidates who wrote that they are organisms that cause harm or illness gained no credit.

Part (b) challenged candidates to explain how non-resistant bacteria become resistant. Many answers reflected good understanding and the idea of random gene mutations was often seen. Weaker candidates wrote about reproduction of bacteria failing to mention any of the acceptable marking points, or they wrote about genetic modification.

Parts (c) and (d) expected candidates to select terms from the passage and most candidates scored both marks.

Part (e) challenged many candidates as they struggled to explain that treatment with many antibiotics is needed to make sure that one will be found that ensures all the bacteria are killed. Many simply stated the fact that some bacteria are resistant which leaves the examiner to make the deduction, something that is not allowed.

Part (f) challenged candidates to express themselves in an erudite manner about the process of vaccination. Many appreciated the role of attenuated pathogens but most failed to link antibody production and memory cells in the correct sequence. Candidates continue to confuse antibodies with antigens.

Part (g) was well-answered with many candidates appreciating that alligators with alligacin would survive, reproduce and pass on the allele for alligacin production to their offspring. Marks were lost if candidates did not discuss these ideas by making reference to alligacin, but merely trotted out the theory of natural selection. There were many entertaining answers to part (f), but it was pleasing to note that most candidates were able to offer sensible reasons as to why an alligator would defend territory. Candidates need to be aware that anthropomorphism is unlikely to impress.

Question 2

Part (a) of this question expected candidates to explain why it was important to use the same person in the investigation. There were many excellent answers demonstrating understanding of the controls needed. Common correct responses appreciated that people sweat at different rates and that using the same person allows a valid comparison to be made. The term 'fair test' was also seen in abundance and gained credit.

Part (b) challenged students to analyse the graph and to compare sweat production when resting and running as the air temperature increased. Many correct responses were noted with candidates appreciating that the sweat production increased when resting and running and that the increase was greater when running. A mark was also available for a correct reference to the data.

Part (c) required students to explain why sweating increases when running. Examiners rewarded candidates who appreciated that running would involve respiration in muscles that would generate heat, and that this heat is lost when sweat evaporates. Some candidates wasted time by making references to other methods of cooling the body such as vasodilation and hair erector muscles.

In part (d) candidates were asked to suggest a method that could be used to measure the rate of sweating. Examiners expected to see answers that measured the mass of an item such as cotton wool before and after a period of time, and repeated this for reliability. Candidates were much more creative and all sensible suggestions gained credit. For example, one candidate had a person stand in a tray and run on the spot for five minutes. The sweat collected was then poured into a measuring cylinder to measure the volume.

Question 3

Part (a) required students to describe the process of decomposition. Good candidates wrote about named decomposers, such as fungi and bacteria, and the use of enzymes to digest the wood. Many answers lacked this level of biological detail, for example, describing wood getting wet and breaking up, or thinking that carbon dioxide release causes the decomposition.

Part (b) required students to describe the process of micropropagation. This question discriminated well. Good candidates mentioned explants being sterilised before being placed on agar containing mineral ions and hormones to help the callus grow. Weaker candidates tended to write more general answers such as ‘placing a piece of wood in a Petri dish with all the right conditions’.

In part (c), many candidates were aware that deforestation affects the soil quality by allowing leaching and soil erosion to take place. The ability of candidates to express these ideas with a degree of clarity was often disappointing.

Question 4

This question asked candidates to choose suitable words to complete the passage. Many candidates scored highly but weaker candidates struggled. As such, the question discriminated well. Confusion was evident with the role of phagocytes and lymphocytes, and many wrongly thought phagocytes produced antibodies. The examiners were disappointed with the poor spelling of key biological terms.

Question 5

This question examined candidate understanding of the net exchange of carbon dioxide as light intensity increases.

In part (a), most students struggled with understanding that at a low light intensity there is a net release of carbon dioxide. Many appreciated that as the light intensity increases there is an increase in the net absorption of carbon dioxide up to the point when light intensity is no longer limiting. After this point the net absorption of carbon dioxide reaches a maximum at which it levels. This latter idea was often poorly expressed. For example, stating that the net absorption of carbon dioxide increases up to a point and then stops would not gain credit for the levelling off idea.

Part (b) credited answers that explained that at point A the rate of photosynthesis equals the rate of respiration, a concept that was not understood by the weaker candidates.

In Part (c), the examiners only rewarded hydrogen carbonate as the indicator and the second mark was given for describing the correct colour after being in the dark and in the light. Candidates who chose limewater or iodine as their indicator lost marks, as did those who struggled to appreciate that the hydrogen carbonate will be yellow in the dark or with more carbon dioxide and purple in the light or with less carbon dioxide.

Question 6

This question was about energy transfer and discriminated well. Many candidates were able to correctly calculate the percentage energy transfer efficiency from sunlight to plants as 0.52. Other answers credited were 0.5 and 0.521. Answers that had more decimal places were not credited. If students obtained a wrong answer examiners were allowed to credit one mark if they could see 8863 being used as a numerator in the working, but not if it was a number in a long list of other numbers.

In part (a)(ii), examiners rewarded candidates who appreciated ideas such as light not being absorbed because it would be reflected or it would miss a chloroplast.

Part (c) showed that many candidates do not appreciate the difference in the reasons for loss of energy transfer from producers to primary consumers and compared to the reasons for the loss of energy transfer from primary consumers to secondary consumers. The process of respiration was awarded as it was assumed to be plant respiration. Being uneaten and undigested were other acceptable responses. Many candidates wrote about movement and heat loss which were not acceptable responses.

Question 7

This short question examined understanding of transgenic organisms. Weaker candidates wrote about cloning but many candidates appreciated that transgenic organisms contain genetic material from a different species. Many excellent examples of the use of transgenic organisms were given, with the most common being insulin production.

Question 8

This question examined understanding of how a calorimeter is used to measure the energy content of a food sample.

In part (a) (i), the examiners rewarded those candidates who appreciated that burning in oxygen would help complete combustion.

Part (a) (ii) then rewarded those who appreciated that reducing heat loss for the apparatus would produce a more accurate measure of the energy content. Answers to this question revealed that many candidates struggle to distinguish between the words accurate, precise and reliable.

Part (b) (i) was answered well but the term carbohydrate was not rewarded as there are many soluble carbohydrates.

Part (ii) was normally credited as long as the candidate did not repeat the wording in the stem. Better candidates used data from the tables to justify their answer. It is clear that most candidates are aware of what an anomalous result is, though their descriptions often tended to be that of the layman.

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