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Examiners' Report
Principal Examiner Feedback

January 2018

Pearson Edexcel International GCSE
In Biology (4BI0) Paper 1B

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General Comments
The examiners were impressed by the knowledge and understanding shown by candidates on the papers taken this January. Candidates could apply the knowledge and understanding they had developed during the course to analyse and evaluate information including unfamiliar experiments and new contexts. Centres have continued to carefully prepare students for the examination and this was evident in the responses of candidates. Very few candidates failed to attempt all questions and there was no evidence of candidates being short of time on the papers.

Paper 1B.

Question 1
Question 1 required candidates to examine a simple food web from a farm environment. In (a) almost all candidates were able to state how many trophic levels were present and identify the organism that is a primary and secondary consumer. Few responses scored both marks on part (iii) suggesting why the farmer uses a pesticide to control the aphids. Some responses merely repeated the word control without clearly stating that the pesticide would kill the aphids and thus reduce damage to his wheat crop. In part (iv) candidates were asked to explain how the pesticide would affect the population of sparrowhawks. Most responses gained both marks for explaining that a reduction in robins and sparrows would result in less food for sparrowhawks so their numbers would decline.

In part (b) only the best candidates scored full marks for stating three advantages of using biological control rather than pesticide. Weaker responses wrote about pollution or the pesticide harming the crop.

Question 2
Question 2 (a) gave candidates a table to complete showing food components present in a meal and their functions. Most responses earned some credit with a range of marks being seen from 1 to 4. Some candidates failed to earn credit for vague responses such as fibre helping digestion or iron being good for blood.

Part (b) asked candidates to describe a test for glucose that could be used on the meal. The majority of candidates scored full marks for this item. In (c) (i) a surprising number failed to identify the three elements found in lipid and also found in protein. Some candidates seem to have no idea what an element was. In part (ii) most responses scored with many correctly identifying the liver and the pancreas as organs that produce bile and lipid.

Question 3

Question 3 described an investigation into the effect of carbon dioxide on photosynthesis. In part (a) most could gain some credit by explaining why a leaf becomes destarched if kept in the dark. The best responses explained how the starch is used up in respiration and cannot be replaced by photosynthesis.

In part (b) many candidates could describe how a leaf could be safely tested for starch but only the very best were able to draw the results of the starch test in (ii) clearly showing the exposed end of the leaf as blue / black and containing starch and the end deprived of carbon dioxide as remaining yellow with no starch present.

Question 4

Question 4 (a) gave a diagram of a simple reflex arc. In (i) almost all candidates could correctly identify neurone R as the sensory neurone. In part (ii) most could identify a junction between neurones and the best responses describing how this synapse enables the link between the sensory and relay neurones by diffusion of neurotransmitter. In part (iii) candidates could accurately draw and label a motor neurone with many responses scoring full marks. In (iv) most could explain the role of the motor neurone as conducting the impulse to the effector and enabling muscle contraction.

In part (b) candidates had to draw a genetic diagram to show the offspring that two heterozygous parents could produce. Most could correctly do this but only the very best students could understand how probabilities can be combined to calculate the probability of these parents producing a male child with the condition. In (b) (iii) almost all responses could calculate the number of children born with Krabbe disease each year.

Question 5

Question 5 gave a diagram of a yeast cell and while most could, in (a), identify the part made of chitin many fewer could identify the part made of glycogen. In (b) many candidates were able to write the word equation for anaerobic respiration in yeast. Those who did not score full marks often included oxygen or the production of lactic acid.

Part (c) required candidates to plot a graph of the effect of temperature on the rate of anaerobic respiration in yeast. This item discriminated well across the grade range with almost all responses scoring marks and the only the best gaining full marks. Common errors included nonlinear scales, graphs that were too small, extrapolating the line back to zero and omission of units. In part (ii) most candidates were able to explain that the parrafin prevented oxygen entering the tube but fewer explained that this prevents aerobic respiration. In part (iii) students were asked how they could modify this experiment to improve the results. Candidates were evenly divided into those scoring zero, one or two marks. There were different ways of modifying the method, such as repeating the readings to increase the reliability and calculate an average or measuring the volume of gas produced using a gas

syringe. In (iv) students needed to explain the results at 20 °C and 52 °C. Only the very best candidates scored full marks by explaining that at 20 °C the enzyme and substrate molecules would have low kinetic energy and thus would collide less frequently as this temperature was below the enzyme optimum. At 52 °C the enzyme's active site would change shape, as the enzyme is denatured, and the substrate could no longer bind.

Question 6

Question 6 (a) required candidates to describe how the water content of the blood is regulated in a person who has drunk a lot of water. Most answers gained some marks and about 25% gained full credit. Some responses failed to write about the person who has drunk a lot of water and instead wrote about how the body can respond to water shortage. Candidates need to be reminded that they must read the full question and ensure their answer is specific to the context given. In part (b) most could explain the effect of high water content in the plasma on red blood cells. Many gained full marks for explaining how water would enter the red blood cells by osmosis, from a dilute solution in the plasma to a more concentrated solution in the red cells. This would lead to the cells bursting as they have no cell walls.

Question 7

Question 7 was the experiment design item. As usual this discriminated well across the grade range with most responses gaining at least 3 marks. Many centres have suggested the use of a prompt such as CORMS but candidates need to be apply this to the specific context of the question in order to gain good marks. The weakest responses merely wrote about micropropagation but did not suggest an experiment.

Question 8

Question 8 (a) showed a diagram of part of a human thorax and in part (i) most responses correctly named the bronchiole, trachea and the bronchus. Some candidates tried to write an amalgam of bronchus and bronchiole which did not result in credit. In (ii) many candidates gained full marks for explaining the role of the diaphragm in breathing out.

In part (b) candidates were given a photograph and step by step instructions for a peak flow meter. They then had to suggest reasons for the steps in the procedure. In (i) only the best candidates could suggest a suitable unit for the measurement of peak flow. In part (ii) most responses could explain that the meter should be reset to zero to ensure the next reading was accurate but fewer response were able to explain that if your fingers touched the slider they would prevent its movement. In part (iii) candidates were asked why the instructions required the readings to be repeated. Most response could score at least one mark for increasing reliability, calculation of average or detection of anomalous results. Some responses suggested that repeating the reading would lead to more accurate results.

Finally, part (c) asked candidates to suggest how bronchodilators might work. About half of the responses were able to link the use of bronchioles and dilation to expanding of the airways.

Question 9

Question 9 (a) gave students a table of human cell types and students needed to give the number of chromosomes present in each cell. Many could correctly give the number of chromosomes in an egg cell and in a white blood cell, but some were unable to remember that a red blood cell does not contain a nucleus.

In part (b) candidates had to name two processes, other than growth, that use mitosis. Many could give one but only the very top students could correctly identify asexual reproduction and repair as the two processes. In part (ii) candidates also struggled to describe how the chromosomes in cells produced by meiosis differed from the chromosomes in the cells produced by mitosis. As in previous items some candidates wrote about differences in meiosis and mitosis rather than carefully reading the question and writing about differences in the chromosomes. In (iii) most responses could correctly identify the male part of the flower where meiosis occurs.

Question 10

Question 10 gave candidates a passage describing hormones and coordination. Candidates had to complete the passage by writing a suitable word in each space. The majority of candidates scored good marks with two thirds scoring 7 marks or higher.

Question 11

Question 11 provided data on the distribution of two plant species sampled from two fields. In (a)(i), most candidates could correctly use quadrat data to calculate the mean number of plantains per m^2 in one of the fields. In part (ii) about half of the responses earned at least one mark for explaining how the student should decide where to place the quadrats in his study. In part (iii) only the very best candidates were able to gain all three marks for describing the differences between the plant populations in each field. Most could describe that there were more plants in field B and some candidates added that field A had more clover than plantain but only the very best noted that the species numbers were more even in field B.

In part (b) candidates were asked to explain two abiotic factors that could cause differences in plant populations. This item also discriminated well between candidates with most scoring but only the best gaining full marks. The best responses explained that, for example, increased light intensity would lead to increased rate of photosynthesis and that low temperatures could reduce the rate of enzyme-controlled reactions and thus slow growth.

Question 12

The final question concerned movement of substances in and out of cells. In (a) candidates had to name the process used in three examples. Most could identify diffusion as how carbon dioxide moves into a leaf, active transport as how nitrate ions move into a root hair cell against a concentration gradient and osmosis as how water moves from the collecting duct into the blood plasma.

In part (b) candidates needed to explain how the structure of the small intestine is adapted for efficient absorption. Only the very best students gained full marks. To gain full credit candidates needed to identify a structure such as the many villi and then explain how they provide a large surface area for faster diffusion. Some responses listed the features but did not explain how the feature enable efficient absorption.

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