Examiners' Report

Principal Examiner Feedback

Summer 2017

Pearson Edexcel International GCSE in Biology (4BI0) Paper 2BR

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The examiners were, once again, impressed by the knowledge and understanding shown by candidates on this summer's papers. Candidates were able to apply the knowledge and understanding they had developed during the course. They were able to analyse and evaluate information including unfamiliar contexts. Centres have worked hard to prepare students for the examination and this was evident in the responses of candidates. Few candidates failed to attempt all questions. There is no evidence of candidates being short of time on this paper.

Question 1 provided candidates with a passage about blood doping and this seemed accessible to most candidates who were able to respond appropriately to the items. The mean score on this question was higher than that of some previous papers. In part (a) the majority of candidates could calculate the number of blood tests from the data in the passage. In part (b) candidates were asked to explain how an increase in the number of red blood cells would help improve stamina. Almost all candidates scored some marks with the many gaining full marks by explaining how more red cells would provide more haemoglobin for the transport of oxygen. Thus enabling aerobic respiration to continue, providing most energy, without anaerobic conditions and reducing the production of lactic acid. In part (c) most responses suggested that vacuum sealing the blood would exclude oxygen and potential pathogens and keeping in a fridge would provide a cold temperature to reduce metabolic reactions by slowing enzyme activity. In part (d) almost all candidates could name the ion required for the production of red blood cells. In (e) candidates were asked to suggest why an athlete uses their own blood for blood doping rather than blood from someone else. Most gained one mark for suggesting that disease may be transmitted from another athlete's blood and the better candidates also explained that blood from another athlete may be of a different blood group and thus lead to a rejection or immune response to the antigens on the injected red cells. In (f) candidates had to suggest how dehydration increases the risk of a heart attack. Again most candidates scored one mark with the best clearly stating that the water content of the blood would decrease, leading to red cells crenating, sticking together, and an increase in viscosity as the blood becomes thicker. This would increase the blood pressure and cause the heart to work harder. Part (g) proved difficult for candidates with less than half scoring any marks. The best responses noted that a pulmonary embolism would reduce blood flow to the lungs and thus reduce the oxygen carried around the body in the blood. In part (h) almost all could sate how EPO is carried from the kidneys to the bone marrow.

Question 2 (a) asked candidates to suggest what enzyme a spider would use to digest the muscles of its prey. Most candidates correctly suggested a protease or named protease, some weaker candidates suggested amylase or lipase. In part (b) candidates were required to place the stages of the cloning process in the correct order. Most got 4 of the 5 stages correct with the most difficult being the enucleation of a haploid cell.

Question 3 (a) gave candidates a very simple diagram of the nitrogen cycle, most were able to correctly name the processes shown. In (b) (i) almost all candidates found no difficulty in explaining what is meant by anaerobic and in (b) (ii) most could name the group of organisms that carry out process C. In part (c) (i) most responses could give an effect of adding too much nitrate to the soil with many giving eutrophication or leaching or preventing plant roots from absorbing water. In (c) (ii) most candidates could give another way that farmers could increase the fertility of the soil without using chemical fertilisers.

Question 4 described the inheritance of roan coat colour in horses. In (a) (i) most candidates gained full marks for correctly showing show how the red-coated parent and the white-coated parent can produce a roan-coated foal. Candidates who made errors usually tried to use the wrong symbols or changed symbols in the middle of their response. If the question paper tells the candidate to use a particular symbol candidates should use that symbol. In (ii) most scored full marks but a few lost credit by not giving the phenotypes to match their genotypes. In part (iii) almost all candidates could give the probability of producing a white-coated offspring from a roan and white horse. Probability should be given as a decimal but we allowed percentage or fraction on this occasion. In part (b) candidates were asked to explain how the genetic control of height in pea plants differs from the control of coat colour in horses. Some wrote about environmental factors but the better candidates recognised that the allele controlling height in plants shows dominance and that only two phenotypes are observed. In part (c) almost all responses suggested an advantage of using mice rather than horses.

Question 5 described an experiment to find the energy value of some food samples. This experiment is given in the specification and we would expect all candidates to be familiar with its method. In (a) most could give two safety precautions when carrying out this experiment. In (b) (i) almost all candidates could correctly calculate the energy released from the sample of popcorn. In (b) (ii) fewer could explain why the energy is calculated in J per g. The best students were able to clearly explain that because the samples had different masses they must be expressed in this form for a valid comparison to be made. In part (c) (i) candidates had to suggest why there is a difference between the student's calculation of the energy released and the energy value on the packet. Most could score one mark for the idea of energy lost from the apparatus or not all transferred to the tube. The best candidates also noted that not all of the popcorn sample may have been burned or that as it was not in oxygen complete

combustion has not taken place. In c (ii) candidates could often give two ways that the student could modify the apparatus to make his calculation of the energy released closer to the energy value on the packet. Common correct answers included fitting a lid, using a larger volume of water, burning in oxygen or providing insulation. Some candidates tried to change the method but did not suggest improvements to the apparatus.

Finally question 6 (a) required candidates to perform a percentage calculation and most were able to do this. In (b) (i) almost all could correctly name the uterus as the part of the female reproductive system where the placenta forms. In (b) (ii) candidates had to suggest how of the placenta is adapted to allow the exchange of substances between the mother and the fetus. Most responses scored some marks with many gaining full marks for explaining that the villi provide a large surface area to enable rapid diffusion. The distance between the mother's capillaries and the placenta capillaries is short. Some candidates wrote about the substances transferred rather than how the structure enables efficient gas exchange. In part (c) most candidates could suggest how the components of milk help calves to develop. Most responses scored 2 or 3 marks with the best responses earning full credit by, for example, explaining that milk provides calcium ions for development of bones and teeth, that lactose in milk is a source of energy and that milk provides protein for tissues growth. Weaker students merely stated the components but did not give their function or included incorrect components such as glucose.

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