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Principal Examiner Feedback

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In Human Biology (4HB1)
Paper 01

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Introduction

Students could improve their performance by ensuring that they are able to use the correct terminology. An inability to use the correct biological terms often leads to an answer that lacks clarity and causes confusion to anyone reading the script. Students should also learn to set down all of their working out when answering questions that require them to calculate an answer. Students generally, need to give attention to the drawing of biological diagrams and the plotting of graphs where simple rules such as using a sharp pencil are not being followed.

Question 1

Students had a good knowledge of the alimentary canal and the processes that occur within it. One area where that knowledge was less than secure was which area of the alimentary canal absorbs the most water with many thinking that it is the small intestine.

Question 2

(a)(i) There was often a lack of clarity in answers, for example, some said 'allows heat', which does not adequately convey the idea of heat transfer.

(ii) Too many students failed to explain the safety precaution they gave, instead they stated two safety precautions. The wearing of gloves is not regarded as an acceptable precaution.

(b)(i) A common error in the calculation was to not give the answer to two significant figures which cost those students a mark.

(ii) Whilst most students understood that some of the heat is lost to the surroundings, very few understood that light is a form of energy and that some of the heat had been converted to light. Some students correctly understood that some of the energy might remain in the food but then failed to elucidate the point that was because it may not have all been burnt.

(c) Many students were able to list four control variables, though a number did state that the food should be burnt for the same length of time and that the water should be at the same starting temperature, failing to appreciate that the significant factor was the rise in temperature generated by the burning food.

Question 3

(a)(i) The bar chart was usually well plotted though a number of students adopted a casual approach to the careful drawing of the bars, using neither a sharp pencil nor a ruler. Some students failed to include labels to the graph axes and a few transposed the x and y axes, all of which incurred a penalty.

(ii) Students were unable to look at the bar chart and state trends. They need to appreciate that this is not the same as quoting figures on their own. Whilst it is always a good idea to illustrate their answers with figures on their own, this is not answering the question. Students need to be able to give an overview of data.

(b) Most students could name at least two factors with many giving all three. Some students gave specific components of a diet such as 'calcium' rather than stating 'nutrition' which would have been the better answer. Some students thought that 'exercise' had a role to play in determining the height of a person.

Question 4

(a) Many students failed to score maximum marks because they did not indicate clearly that in the group AB column there are two separate antigens namely, A and B. Too many simply put AB indicating that it was one entity. In the group O column many students simply put a dash whereas they should have stated 'none'.

(b) there are still too many candidates who do not appreciate the difference between agglutination and blood clotting and they cannot be transposed. Only a minority of candidates recognised that the effects would ultimately lead to death.

(c) Answers were often rambling. The question was about which blood groups a person with a particular blood group could receive as a donation. Many chose to simply focus on the terms 'universal donor' and 'universal recipient' rather than give details as to what each person could receive.

(d) Students found the calculation easy once they had decided which blood groups were appropriate to include in the sum.

Question 5

(a) The definition of a reflex arc was not well known. Many students thought that the brain was involved whilst many overlooked the fact that it is often a protective mechanism.

(b) The diagram of a reflex arc as drawn in the paper was different in that it was on the right, rather than on the left of the spinal cord. This caused some confusion with many students transposing the sensory and motor neurones.

(c)(i) A common mistake was to describe the dendrites as being neurone despite the fact that the question refers to two neurones. For those candidates who did not make that mistake, the question proved to be relatively straight forward. The reference to synaptic knobs was often given as synapses by students.

(c)(ii) Many students described the diffusion of neurotransmitter across the synaptic gap but failed to mention that this was in fact the way in which the impulse was transmitted across the gap. Only a relatively few students made any

reference to the neurotransmitter stimulating a further impulse in the post synaptic membrane.

(c)(iii) Although many students recognised and stated that there were fewer synaptic knobs in the diseased brain, few made any statement to the effect that it is the knobs that secrete the neurotransmitter and that fewer knobs meant less transmitter released.

Question 6

(a)(i) Whilst many students used the term 'sucrase' many called the enzyme by the outdated term of 'invertase'.

(a)(ii) A common error was to describe the Benedict's test rather than the Biuret test and of those who did use the correct test, many omitted to state that they were using that test because they wanted to test for the presence of a protein as the enzyme is a protein.

(a)(iii) Most students understood that the enzymes could be reused but far fewer commented on their increased stability and of those who did, many stated that they were able to resist changes in pH and temperature, rather than use the term stability.

(b)(i) Many students chose to give a standard definition of a partially permeable membrane rather than apply that knowledge to the specific example in the question. Far too many students failed to mention that in this case, the membrane was permeable to glucose molecules.

(b)(ii) Whilst students largely understood that the enzyme broke down the glucose and produced hydrogen peroxide, only a minority went onto explain that this caused the detector to respond to the hydrogen peroxide and register a reading. Far fewer students then went onto say that more glucose would result in more hydrogen peroxide being detected.

Question 7

(a)(i) Many students simply stated 'respiration' rather than making clear that it was aerobic respiration.

(a)(ii) Students often found it difficult to express the changes. The simple terms of 'shorter' and 'fatter' eluded many candidates who used terms such as 'thicker' and 'wider' which are not as clear.

(a)(iii) Whilst many students correctly made the point that the contraction of the muscle generated a tension, they could not, in many cases, adequately explain how that tension is transmitted to the radius of the lower arm. They simply restated words from the stem of the question. They failed to refer to the critical factor of the inelasticity of tendons which transferred the tension to the radius.

(b) Diagrams of this complexity are now a dying art and the quality, overall, was extremely poor. A common error was to draw a standard diagram of a synovial joint, rather than the ball and socket variety as demanded by the question. Pencils remained blunt in many cases making it very difficult to determine the exact positions of a number of the components that were drawn. Many had cartilage floating freely in the synovial fluid whilst others had the synovial membrane covering the cartilage.

Question 8

(a)(i) Some candidates described the structures as DNA and clearly demonstrated that it is a molecule as opposed to a structure.

(a)(ii) Some candidates were confused as to the difference between mitosis and meiosis and drew haploid cells rather than diploid whilst others drew chromosomes that looked nothing like the one in the original diagram.

(c)(i)(ii) When a question asks for something to be named or identified then the full name should be written out and not, as many students did, just put the letter of the nucleotide.

(d) Students understood the importance of meiosis in producing haploid cells which restored the diploid number at fertilisation. Fewer understood that this leads to variation in the offspring with many discussing variation in terms of the sperm and ova produced. Very few made any mention of the implications for evolution.

