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Principal Examiner Feedback

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In Human Biology (4HB1)
Paper 02R

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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.

Students should also give greater attention to description of values for volume, mass and concentration. Far too often they will use the ubiquitous term 'amount'. This will not be given credit as it is far too vague for use in these papers.

Question 1

(a) Most students were very familiar with the alimentary canal and had no difficulties in listing the structures involved.

(b)(i) The main incorrect answer seen was 'peptidase'.

(b)(ii) Although most students recognised the need for chewing food, very few made reference to mechanical digestion or mastication. Many students described how the food is mixed with the enzyme amylase rather than with saliva which is a solution of salivary amylase. This is a good example of the lack of provision exhibited by many students.

(c) The role of fibre in assisting peristalsis was well known as were its roles in preventing constipation and reducing the risk of bowel cancer. The fact that it also provides bulk to the food was not usually mentioned.

Question 2

(a)(i) Although many students recognised that the genetic material consisted of RNA, few went further for a second mark and stated that there was no DNA present.

(a)(iii) Although many students recognised the need for the donor blood to be compatible, too many used the term 'clotting' to describe the effect of non-compatible blood if transfused rather than the correct term of agglutination.

(a)(iv) Few students understood that freezing the cells would cause them to burst and even fewer explained that this would cause a loss of function.

(a)(v) Few students understood that there would be antibodies present in the donated blood that would destroy the virus in the infected person.

(c) The fact that uracil was present rather than thymine was often the only relevant point made. Some students understood that if DNA was present, the percentages for the relevant base pairs would be the same.

Question 3

(b)(i) The common mistake was to draw a circle around the area covered by both ventricles or to draw one around the series of vessels not supplied by the blocked vessel.

(b)(ii) The most common mistake made by students in answering this question was to state that there would be no/less blood to the heart. This is clearly incorrect as the heart would be full of blood. There should always be a reference to heart **muscles** when referring to the coronary supply. This is another example of a lack of precision shown by many students. Although students recognised that less oxygen or glucose would be supplied, very few made any reference to less carbon dioxide being removed.

(b)(iii) Students found it difficult to express how the by-pass vessel would take blood beyond the blockage.

Question 4

(a) Many students were not careful in how they drew the graph meaning that the optimum temperature was often beyond the level of tolerance. Some decided that its shape should be as the one already drawn which is not correct and this is material that forms part of the specification.

(b) This part of the specification was well known with many students scoring well. Again, there was a lack of precision amongst some students who simply referred to 'temperature' in their answer rather than stating in which direction the temperature was going.

(c) Some students gave simple geographical locations such as 'deserts' rather than just saying 'hot'. Whilst many understood that this was because of the high optimum temperature shown in the graph, fewer quoted an accurate temperature for the optimum.

Question 5

(a)(i) The graph was usually well plotted, though some students found it difficult to draw an appropriate curve. One significant error was a failure by many candidates to use an appropriate scale for the axes which meant that a significant portion of the graph paper was not used.

(b)(i) The only real issue with the calculation was that a number of students didn't round up the figures appropriately.

(b)(ii) Whilst the majority of students understood that the drug travelled in the blood stream and that would cause the time lag, the majority thought that it was the time taken to reach the heart rather than the nerve.

(c) Most students understood that the role of the nerve is to carry impulses to the heart but then failed to elaborate to explain that it caused a reduction in the rate of contraction.

Question 6

(a)(i) Students were able to clearly demonstrate the role of blood clotting and well understanding in what is involved. The only area where they were less secure was in recognising the importance of scab formation in the healing process.

(a)(ii) Many students struggled to express a clear understanding of the term. Few made reference to an **allele** being carried on the X chromosome instead; the term 'it' or 'a disease' was used which is not acceptable. Many did not understand that the allele is passed onto offspring.

(b)(iii) A number of students were unable to work out the simple genetic cross which then made it difficult to correctly calculate the probability. Students will help themselves with this type of question if they remember to write down the cross beforehand.

(b)(iv) This was a challenging question and most students did not proceed beyond a statement that females are carriers. A few were able to discuss possible significant blood loss leading to death but there was a failure to understand that this situation could only arise if the person had a haemophilic father and at least a carrier mother.

Question 7

(a)(i) Students just did not understand that the enzyme was essential to solidify the milk to allow it to be digested properly. The closest that some came to the answer was to discuss milk running through the alimentary canal.

(a)(ii) Students failed to realise that diet changes with increasing age from a totally milk based diet to one consisting largely of solids. Instead, students made vague references to the need for protein in the diet.

(a)(iii) The Biuret test was generally well known though some students called it the Benedict's test whilst others used iodine and looked for black colour. A common error was to not fully describe the colour change, i.e. it changes from light blue to lilac.

(b)(i) There was a lack of precision amongst many candidates who simply used the term 'amount' when they should be using terms such as 'volume' or concentration, as appropriate.

(b)(ii)(iii) Most students found the calculation straightforward and appreciated that they should not use the result when calculating the mean. Some commented that the experiment should be repeated rather than discarding the result.

(b)(iv) Many students thought that the bubbles would be too small rather than they could be of different volumes or that they would be evolved too quickly to count.

Question 8

(a)(i) Most students understood the direction of the impulse travel.

(a)(ii) Most students were unable to identify the structure as being a mitochondrion. Of those that did very, few went beyond the stage of stating that it supplied energy. Very few could give a use for that energy in vesicle transport and neurotransmitter synthesis.

(b)(i) Few students seemed to appreciate that it is skeletal muscles that move the ribs and that blocking neuromuscular junctions would mean that the muscles could not contract and raise the rib cage.

(b)(ii) Most students did not understand that if there is more acetylcholine available as a result of the inhibition of acetylcholinesterase that this would allow the neurotransmitter to out compete the curare. This question required a detailed understanding of synaptic transmission.

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