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Examiners' Report/ Principal Examiner Feedback

January 2016

Pearson Edexcel International GCSE In Human Biology (4HB0) Paper 1

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Many candidates had insufficient grasp of the correct scientific terminology and as a result, were unable to express themselves in a concise, clear and relevant manner. This comment has been made as a prefix to previous examination series yet candidates fail to heed the warning. A classic example is the use of the term 'germs'. This word has no biological basis yet it continues to be used by a significant number of candidates.

Question 1

All of the multiple choice questions proved to be very accessible with only 1(c) causing a problem for a significant number of candidates. Although sulphur dioxide is a pollutant it is not a green house gas.

Question 2

Part (a) and part (b)(i) were answered correctly by the vast majority of candidates. A significant number used hydrogen carbonate/bicarbonate as the indicator of choice. Part (b)(ii) proved to be much more challenging. In part this was because of an inability of candidates to describe in an unambiguous way how the apparatus would be used. For example, instead of stating that a person would breathe through the mouthpiece they simply said breathe through' the tube' or 'middle tube' or 'top tube'. Many were confused as to which test tube would receive exhaled air and which would provide inhaled air with some candidates believing that the air passed from one test tube to the other.

Less than half of the candidates could give correct figures for the composition of expired air, with many believing that there was no oxygen in expired air and that more/less nitrogen was present.

In (c)(ii) many simply stated the differences, often by repeating figures from the table but then failed to give an adequate explanation. Only a small minority included an explanation of the figures for nitrogen in their account.

Question 3

Most candidates could correctly identify the three structures in part (a). However, there was confusion over the IUD. Many candidates had no appreciation as to where this device is inserted despite the clue being in the name. A sizable number confused the device with a cap or diaphragm.

The advantages and disadvantages were not well articulated with many focussing on the effectiveness of the method, which is not relevant to this question.

Question 4

Part (a) proved to be very accessible with the majority of candidates correctly matching the organ with the correct part of the skeleton. Although the differences between the two types of joint were generally well known, a fairly common mistake was to suggest that the sacroiliac joint allowed 'limited' movement and there was the usual crop of answers describing a ball and socket joint as one that 'allows movement in all directions'. A simple reference to 360° movement or movement in three planes is the way candidates should describe this movement.

There was some confusion between the axial and appendicular skeleton and there were many different forms of the spellings for the variety of bones that were listed.

Part (b)(iii) was poorly answered with many diagrams bearing little resemblance to long bone. Whilst most candidates recognised that the compact bone was situated on the outside, few could correctly locate the spongy bone and epiphysis.

Question 5

This proved to be a very accessible question with only the last blank causing problems with the commonest mistake being to insert 'kidney' rather than 'liver'.

Question 6

Candidates struggled to express themselves fluently in answering part (a)(i). Many appreciated that differences in mass could lead to a difference in time of burning but few recognised that a different volume of water would cause differences in the temperature rise. Most candidates gave the correct food but in a number of cases working was not shown and in a few cases the figures were added rather than subtracted.

Answers to part (a)(iii) usually did not go beyond a reference to differences in energy content or differences in composition.

Most candidates could describe the Benedict's test though only a minority remembered to grind the food and some heated the food before the Benedict's solution was added.

Most candidates referred to the use of safety goggles or glasses as a safety precaution. However, a large number continue to refer to the use of gloves which is not acceptable. Some referred to the handling of the test tube but few actually used test tube holders or tongs. Many used forceps which is not acceptable.

Question 7

The drawing of a suitable table proved to be challenging for many candidates. Many did not include the units of 'beats per minute' and many failed to appreciate that the results should be recorded at one minute intervals, and therefore, did not include an adequate number of columns. A significant number were clearly not in possession of a ruler and so, the tables they produced were messy and would probably have been difficult to use in practice.

Many referred to health issues as being an important safety factor, though a number simply referred to 'health and safety'.

In part (a)(iii) many candidates were baffled by the causes with the majority making only a reference to damaged lungs. It was very rare to see any reference to atheroma formation and the consequent narrowing of arteries. Part (b) was well answered.

Question 8

Both parts of (a) proved to be challenging. Although the myelin sheath appeared to be well known, many candidates referred to X as an 'axon' rather than the correct dendron. Few candidates identified the cell body correctly with many calling it the 'nucleus' despite the fact that the label does not point to the nucleus. The functions of the parts proved difficult if the candidate couldn't identify the part. Common errors were to refer to impulses as 'messages' or 'signals'. It is difficult to understand why candidates cannot use the term 'impulse'. The concept of the receptor transducing a stimulus into an impulse was mentioned only very rarely.

The missing information was usually filled in correctly. Although most candidates named the synapse correctly the description of the transmission of the impulse across the synaptic cleft was often flawed. Although many candidates mentioned the production of a neurotransmitter, few were then able to discuss its diffusion across the cleft with its ultimate attachment to receptors on the post synaptic membrane.

Question 9

The spelling of glucagon, as ever, caused problems in answer to part (a)(i). A lack of fluency again, caused issues for candidates in describing differences between the two responses. Many failed to read the question properly and described the mode of transmission rather than the response itself. Many failed to indicate which response they were referring to e.g. candidates simply said 'faster'/'slower'. Further, candidates should expect, where there is a question asking for differences, to relate the information in a comparative format e.g. the response brought about by neurones is quicker than the response brought about by hormones.

In describing the graph many candidates simply repeated the stem of the question and few candidates could read the value off the graph correctly let alone supply the appropriate units.

The effects of alcohol on the liver proved challenging. Many candidates referred to insulin and glucagon as being produced by the liver. The commonest marking point was a reference to alcohol causing liver damage; very few discussed reduced sensitivity to insulin and fewer mentioned absorption of glucose into the liver.

Question 10

Surprisingly, half of the candidates could not identify the left ventricle as being the correct chamber. Most candidates understood the process of blood oxygenation. Though some confused the pulmonary artery with the vein.

The structure of the pulmonary vein was generally well known, though many candidates failed to mention the little amount of muscle/elastic fibres present in the vessel wall.

The vast majority of candidates calculated the volume of blood correctly however, few could give a full explanation for more blood being pumped out of the heart of an athlete. Many appreciated that the heart would be 'stronger' or more muscular but then failed to explain that this would result in a more forceful contraction.

Question 11

Parts (a)(i) and (ii) were answered correctly by a large number of candidates. Part (a)(iii) was more difficult. Candidates often recognised that high blood pressure was involved but didn't explain how that was achieved. Some were able to give the term 'ultrafiltration'. However, few candidates tied in the high blood pressure to small molecules being forced into the Bowman's capsule. The idea that some molecules were too large to pass was well understood. However, the fate of glucose and urea was not well understood or described. Too few candidates used the term 'reabsorbed'. Some used the term 'absorbed back' whilst many others simply used the term 'absorbed'. Few candidates stated that urea was not reabsorbed, though they were able to score marks with references to it passing to the bladder or ureter. Many candidates described the reabsorption of water and subsequent changes to the concentration of the urea, neither of which was relevant.

Candidates did quite well in interpreting the graph, not least because there were so many relevant points that secured credit. Most recognised that there was a general increase in the incidence of CKD during the time frame and that in the older group there was a greater increase.

Most candidates only gave one reason as to why a transplant was not always possible. Most referred to the issue of rejection or non-matching of kidneys, though many discussed non matching blood groups. Fewer made reference to the overall shortage of donors.

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