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Examiners' Report/ Principal Examiner Feedback

Summer 2012

International GCSE
Human Biology (4HB0) Paper 01

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Two general points to be drawn to the attention of candidates is that firstly, the term 'germs' should never be used. There are never any marks awarded for the term. The correct words are bacterium (a)/virus(es)/pathogens, as appropriate. The second point is that candidates should always refer to a water potential gradient and movement down a water potential gradient. The use of this concept avoids confusion that occurs in the minds and answers of candidates who will mix up high concentration solutions with water and completely unacceptably, talk about a high concentration of water.

Question 1

Candidates scored well on the multiple choice questions but (b) and (h) caused most problems. In (b), many candidates thought that the cilia trap bacteria and in (h) many thought that B was the correct answer.

Question 2

This question overall, caused problems for many candidates. In (a)(i) 'pupil' was a common incorrect answer and in (iv) many candidates gave the answer as 'retina' rather than fovea or yellow spot. In part (b) many candidates forgot that the rays of light are refracted at both the cornea and lens and that the rays cross over behind the lens thereby, giving an inverted image.

Question 3

Part (a) was usually well scoring but, in describing functions of the parts candidates often lacked clarity. The cell membrane controls the substance/molecules enter and leave the cell, not particles. The function of the nucleus should have specific reference to genetic material being present rather than the usual vague answer that was seen repeatedly 'controls the activities of the cell'.
Answers to (b)(ii) were often general and vague. For example, 'the electron microscope is more powerful'; 'the electron microscope is more expensive'. Reference to greater magnification and resolution are the main concepts required.
Part (c), which used to be a standard experiment in classrooms, caused great difficulties. It was intended to test principles so that the four steps were quite distinct and the answers should have drawn on an expected understanding of the principles. The removal of bacteria in step one followed by the precaution of using a sterile pin to prevent pathogenic transfer. The spreading of the smear to ensure that individual cells could be seen followed by the staining of the otherwise invisible/hard to see white cells. It is not unreasonable to have expected candidates to have seen at least a photograph of a human blood smear with the white cells stained.
Differences between blood and cheek cells were generally well known.

Question 4

There were many who still could not sequentially describe the generation of acid in the mouth by bacteria. The critical stage that eluded many candidates is the use of glucose by the bacteria as a respiratory substrate.
Still there are many candidates who do not know the correct sequence for carrying out the Benedict's test. Heating in a water bath is the last stage in the process, though many candidates heated the food/glucose before adding the Benedict's reagent.
In asking for suggestions as to a property that a good mouthwash should possess, it was anticipated that the candidates would have used the information in the graph and come up with the idea that it should be alkaline. However, many chose to state, the addition of fluoride coupled with antibacterial properties.

Question 5

In giving conclusion in answer to part (a)(i) most candidates scored one mark but failed to note that the increase each time is 3.1/3.2 kJ. The mark allocation should have informed them that more than a simple statement was required.
Also in part (ii) most candidates recognised that more energy would be required but failed to note that this would be required at all speeds. Many spoke of the speed slowing down which was not the case.
Part (c)(i) caused problems for weaker candidates as they failed not only to state that the carbon dioxide passes from the muscle cells by diffusion but also, they failed to note that it was transported in solution in the blood plasma.
Most candidates could give an adequate test for carbon dioxide and also appreciated that increased exercise would result in the production of more of the gas.

Question 6

This was usually well answered but there were problems experienced by candidates in identifying the uterus as the organ in which the fetus develops as opposed to it being the site of fertilisation.

Question 7

The spelling of the names of the bases, by many candidates was awful and as a consequence many lost marks because the words were undecipherable. What was thought to be an easy question caused problems apart from the spelling of the words, to many candidates who clearly had not learnt the names. Please remind candidates that in answering questions the use of letters, as opposed to the words is not acceptable and will result in marks not being awarded.

Question 8

This question was usually well answered the only real problem being the transmission method of poliomyelitis where many candidates stated food or food/water.

Question 9

The answers to part (b) were variable. Many candidates failed to make a statement to the effect that there was no, or 0% protein or glucose in the filtrate or urine. Many candidates appreciated that protein molecules are large but, found difficulty in translating that concept into the idea that this would cause problems in filtration. Whilst many candidates discussed the reabsorption of glucose from the filtrate, many failed to state that it was all reabsorbed. Indeed, in some cases the statement was made that most of it was reabsorbed which is a rather strange comment, bearing in mind the data provided.
Many candidates thought that it was the kidney that produced the urea.
Problems experienced in answering (c)(ii) were often a failure to give full and clear details of the process. For example, candidates would often refer to sweating without qualifying the statement to the effect that more water is lost on a hot day due to increased sweating. The role of ADH was usually well understood but often candidates failed to make the point that more ADH is released on a hot day. Many candidates stated that the amount of urea in the urine would remain the same or even decrease because more would be excreted in the sweat. The question clearly refers to the percentage of urea and candidates must read the question carefully.

Question 10

This experiment or a variant on the same theme is one that used to be performed very regularly in classrooms. Again, the Examiners were looking for general principles and for the candidates to use a little thought. Few had the idea that the person being experimented upon should not see when the pin was going to be touched onto the skin and few made reference to the sensation being reported so that it could be recorded.
Whilst many candidates recognised that there would be more touch receptors on the fingertips than the back of the hand few made the point that they would be more concentrated in their distribution.

Question 11

The comments made about water potential in the introduction apply particularly to this question. Although most candidates recognised that there would be an increase in the height of the water in the capillary tube, few gave a clear and unambiguous explanation as to why this would be the case.
There were some interesting diagrams of a blood cell with many thinking that the cell took in water and would burst. Many simply drew a diagram of a standard red blood cell. Whilst many did recognise that water would move out of the cell by osmosis, far fewer went onto say that the cell would shrink or become crinkled. A sizeable number made reference to the cell becoming plasmolysed.

Question 12

Many candidates failed to score maximum marks by naming the two mineral ions because they gave ‘phosphorus’ as one of the ions.
There were some excellent diagrams drawn of the triceps muscle however, a significant number of candidates drew both biceps and triceps but placed no

labels on the diagram, so scored no marks. Another common mistake was a failure to indicate the points of attachment of the triceps to the bone by tendons. In describing the movement of the two types of joint candidates are much better to describe in terms of 360^0 vs. 180^0 or 3 planes vs. 1 plane. In that way there is none of the confusion seen in many answers in describing a variety of types of movement.

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