

Examiners' Report/  
Principal Examiner Feedback

Summer 2015

Pearson Edexcel International GCSE  
in Human Biology (4HB0) Paper 01

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## **Examiner's Report International GCSE Human Biology 4HB0 01**

### **Overview**

As is usual, there were some very high quality papers seen by the Examiners. However, there were a number of themes running across the papers that led many candidates not to perform as well as they should. The first issue is one of an inability to use the correct terminology in answering questions. This often makes it difficult for Examiners to follow the thrust of an answer which often then, appears to be very confused. Good examples of this issue are illustrated by question 3(a) (ii) where a simple statement about 360 degree movements would have secured a mark. Also question 8(a) (ii) illustrates the point whereby candidates often refer to 'clogging' and cilia 'being killed'.

The other major concern is the inability of many candidates to give what could be termed the 'reverse argument'. This is very well illustrated by questions 7(b) (i) and (ii). Whilst many candidates gave details of what happens during photosynthesis i.e. carbon dioxide in and oxygen out, they were unable to translate that into the effect of fewer trees being present. Similarly, answers to (b) (ii) described how tree roots hold together soil particles, that fact could not then be translated into the effects of the removal of those tree roots. In short, it would seem that many candidates can only give positive answers rather than negative ones.

### **Question 1**

The multiple choice questions proved to be very accessible for the majority of candidates. Only (i) caused any significant problems for a sizeable number of candidates and within that question there was no one distractor that stood out as causing particular problems.

### **Question 2**

The majority of candidates correctly identified the appropriate tooth type.

Most candidates scored at least two marks on part (a) (ii) with accounts of chewing and also, correctly naming the teeth. Far fewer made any reference to mixing the food with saliva, though a good number of candidates mentioned the term 'enzymes'. Far fewer made any reference to amylase or to the effect of amylase in digesting starch to maltose.

Candidates largely coped well with part (b). Many recognised that the presence of cusps was an issue but had some difficulty in describing this problem because they did not know the term cusp. Many recognised that food would become stuck and there would be some difficulty in cleaning these teeth because of their location. Far fewer could adequately explain the sequence of events involving the role of bacteria in converting sugar into lactic acid. Most candidates still fail to realise that this acid actually 'dissolves' the enamel instead, used words such as 'corrode' or 'attacks'. Most candidates correctly identified calcium or fluoride as the correct mineral though a number put the answer 'fluorine'.

### Question 3

Joint X was usually correctly identified, though some candidates did insist that it was a ball and socket joint. Most scored well with their accounts of joint Y. Correct references to synovial fluid, cartilage and their role on the reduction of friction were common. Most candidates correctly identified it as a ball and socket joint. Difficulties arose for some candidates with their descriptions of the actual movement of the joint. Most candidates correctly assigned the structures listed to the correct parts of the skeleton though, the skull and pelvis caused more problems than the first two in the list.

In part (b) candidates scored well. The main problems lay with the first blank where 'involuntary' and 'antagonistic' were not uncommon. Many thought that the bones were pushed rather than pulled and a sizeable number filled in the last blank with 'ribosomes' rather than the correct 'mitochondria'.

### Question 4

Whilst many candidates recognised that the descriptions concerning the starch and amylase solutions were areas for improvement they often failed to use the correct terminology. The Examiners were expecting references to known volumes of the two solutions but instead, the term 'amount' was used quite liberally as was 'weight'. Some candidates recognised the need for a full temperature range to be investigated though many often just specified two temperatures one of which included the optimum of 37°C.

### Question 5

Most candidates knew that a non-pathogenic organism is one that does not cause disease.

The answers to part (a) (ii) were often vague and incomplete. References to bacteria being more active in summer were common but often, were not coupled with a reference to higher temperatures in the summer. A number of candidates went down the route of the effect of temperature on enzyme activity which was given credit but, very few made any reference to an increase in the rate of cell division resulting in more bacteria that could increase the rate of decomposition.

Whilst in answer to part (a) (iii) many candidates described, often in a very convoluted manner the mixing of the organic matter with itself and bacteria, very few made any reference to the rotation facilitating the entry of air/oxygen to support aerobic respiration of the bacteria present.

Part (iv) was well answered with many correct references to nutrients or nitrates encouraging the growth of plants. Very few candidates made any reference to protein or amino acid formation even though they may have mentioned nitrates.

Most candidates recognised that there are two secondary consumers in the food web.

The changes to the food web as a result of the introduction of flatworms led to some very tortuous answers. A common failing, was to only give half the story. For example, there would be a correct reference to the change in numbers of a particular organism but there would not be an associated narrative to justify or explain the statement about the change in numbers.

### **Question 6**

The accounts of how the apparatus could be used often lacked clarity. There was often a failure to indicate that the initial and final temperatures of the water were measured. Often, candidates failed to mention that the burning food was used to heat the water or to suggest that it was held underneath the test tube.

Although many candidates had the correct idea that control should be exercised over the food and water far too few mentioned that it should be mass and volume respectively that should be controlled. Many thought that it was the 'amount' yet again, and many thought that it was the temperature that should be controlled.

Many candidates scored full marks for plotting a correct bar graph. However, a few, despite the instruction to plot a bar graph, insisted on plotting a line graph. Common mistakes were to not label the axis and in particular, a failure to include units on the Y axis.

Understanding of the variability of available energy was poorly articulated. Few made reference to butter yielding the highest level of energy because it consists largely of lipids which are energy rich. References to bread consisting of starch/carbohydrate were sporadic with little appreciation that there is energy to be released from carbohydrate though not as much as with lipid. References to orange and broccoli were usually limited to vitamin content.

Most candidates recognised that teenage males are still growing and therefore, required more energy.

### **Question 7**

Most candidates correctly calculated the change in level correctly though a number gave a negative figure.

The trends were usually well described though occasionally candidates confused deforestation with carbon dioxide emissions. Whilst many noted that deforestation during 2008, few commented on the static nature of the figures for deforestation between 2009 and 2011.

Candidates were generally quite poor in explaining how this imbalance was achieved instead, often gave a potted account of photosynthesis.

Candidates were familiar with the role of tree roots in preventing the movement of soil but would insist on using the word 'erosion' in trying to explain the term.

The consequences of global warming were well known.

Although the principles behind the process of eutrophication were well known candidates often found it difficult to describe the process of leaching because they did not use the term.

### **Question 8**

The diagrams of the ciliated cell were variable. Most lacked the correct shape and many possessed cilia that were more reminiscent of villi. Despite being given three labels to include there were a significant number of candidates who chose to ignore this and provide their own. Many diagrams seemed to indicate the presence of a cell wall.

Poor quality of expression prevented many candidates from securing all of the marks for the effects of smoking on the functioning of cilia. It doesn't help the argument when a candidate, as many did, describes how the cilia move/waft bacteria rather than mucus. The term 'clogged up' was used repeatedly and many candidates incorrectly thought that an outcome of the non-functioning cilia was the onset of emphysema.

The majority of candidates were able to draw the two lines correctly but there was a significant number who thought that they had to use every box in the right hand column, so lines went everywhere.

The lack of birth weight in the babies of smokers was understood insofar as many candidates reported that less oxygen would be transferred. However, far fewer were able to give a reasoned explanation as to why this was the case or how this caused the effect of lower birth weight.

### **Question 9**

Most candidates could name the three parts of the brain correctly and identify the part that links the senses to voluntary muscles.

Many candidates misunderstood the thrust of (b) (i) and spent much, if not all of their answer describing how the eye focuses light to form an image. Scant regard was paid as to how the light is transduced into an impulse and the pathway and mechanism by which this impulse undergoes onward transmission to the brain.

Most candidates understood the mechanism involved in controlling the size of the pupil and could therefore, correctly state which muscles were relaxed and which were contracted.

The role of the hypothalamus is not well understood by the majority of candidates. Few recognised its role in monitoring blood temperature and when that was mentioned few translated that information as to how the hypothalamus responded to bring back blood temperature to normal levels. Many candidates talked about capillaries being widened, as opposed to arterioles many thought that the capillaries moved nearer to the surface.

### **Question 10**

Although the figures used in the calculation were cumbersome, nevertheless, candidates, on the whole coped very well. There were a number who used completely the wrong information but, the commonest error was to use either too many or too few noughts in the 15.6 million. Part (b) was generally well answered though in a number of cases candidates, rather bizarrely, placed diarrhoea in the column for 'nutritional disease' despite it having already been printed in the 'communicable disease' column.

The majority of candidates understood the losses to the body as a result of diarrhoea and consequently what needs to be administered via way or oral rehydration. However, far fewer made any reference to dehydration or to the effects of dehydration on the body.

### **Question 11**

The common mistake was a failure to shape an answer in terms of a gene or allele. Far too many simply referred to a 'characteristic' as given in the question but failed to amplify their answers by discussing changes at the gene level. Although 'survival of the fittest' was often quoted far too few candidates were able to relate this to survival to reach breeding age and the concomitant ability to therefore, pass on the mutated gene/allele which leads to it spreading throughout the population.

## **Grade Boundaries**

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