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Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel International GCSE  
In Human Biology (4HB1) Paper 01

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## General Comments

As usual, there were a variety of responses with there being some very good answers. There are many candidates however, who have a scant lack of knowledge or understanding of the practical elements of the specification and therefore, don't necessarily have the knowledge to apply themselves to more novel practical situations. A pleasing development has been that many candidates seem to be more mathematically literate. The common problem for many candidates is not including details of how they reach the final answer, simply writing the final answer. This is not a problem if the final answer is correct but, if not, they lose all of the marks for the question when, in reality, had they included the various stages, may have scored some marks.

### Question 1

This question was generally well answered with many candidates achieving full marks. Common errors included confusing cerebrum with cerebellum and not knowing which part of the ear is responsible for maintaining balance.

### Question 2

Many candidates scored 2 for their graph, with correct plots and labelled axes with units. Most candidates missed scoring all three marks as they didn't use an appropriate scale (often starting from 0 on the Y axis). The standard of graph plotting overall, was poor with plots squashed into a small part of the paper.

Many lines of best fit were not appropriate with points joined with free hand lines or curves used. Lots of candidates drew a line beyond the data but this was ignored.

Most candidates have a correct and simple description of the trend for one mark.

In part 2(b) weaker responses simply described the pH changes in the graph without explaining them with reference to the digestion of fats/lipids. Some candidates referred to lactose digestion. There were quite a few candidates who were able to relate the breakdown of fats to fatty acid production which lowered pH. Very few scored the first point which required a reference to lipase.

In answer to part 2(d) most candidates identified at least one control variable, usually enzyme concentration or volume of milk. Not many referenced type of milk. There were still uses of the term amount instead of volume and this was not given credit.

The majority of candidates recognised that it would be necessary to repeat the investigation in answer to part (e)

### Question 3

Very few candidates understood that the optic nerve is a mixed nerve and therefore made no reference to impulses travelling from the brain. Many candidates recognised that impulses travel from the eye for one mark but then failed to state precisely that in this case it was from photoreceptors or rods and cones. Some candidates were still using signals/messages instead of impulses, these terms should never be used.

In answer to part (a)(iii) many candidates referenced the lens getting flatter, with some giving explanations of the roles of the suspension ligaments and ciliary muscles. Not many referenced light being refracted less for the second mark.

In their answers to part (a)(iv), candidates seem to focus on cataracts rather than the shape of the cornea, so they were referring to more light entering the eye rather than correct refraction of light. Candidates tended to pick up the last point about clearer image mostly, with very few indeed getting 2 marks. Many candidates simply restated what was in the stem of the question, with quite a few describing what a cornea transplant was rather than its benefits.

Candidates struggled with question part (b), with many simply referencing changing the light intensity (from the question stem) and observing the changes in the eye. Few referenced measuring the diameter of the pupil in a dark or the use of a flashlight.

### Question 4

Many candidates knew that glycogen consisted of glucose but failed to extend their answers with references to the joining together of the molecules. Some talked about condensation reactions but still didn't reference the joining together of the molecules.

Most candidates knew the name of insulin, but many struggled to give glucagon as the correct answer to part (a)(iii). The issue was the spelling of the word and there were many hybrid versions with glycogen. This is one of those few terms that must be spelt correctly.

In answer to part (b)(i) and (ii), most candidates scored two and one marks. Those that didn't forgot to square the height measurement in the BMI equation.

In their answers to part (c), candidates often scored the first two points, but very few scored the second two, which on this occasion wasn't an issue as there were only two marks for the question. There were many references to reduced blood flow to heart rather than heart muscle or tissue. There were also many references to cholesterol levels in the blood being high and depositing in the arteries (rather than fatty deposits). Not many candidates used the term atheroma.

## Question 5

Most candidates scored two marks for part (a)(i).

For part (a)(ii) many candidates scored at least one mark for identifying that person A was suffering from a disease or infection, with many picking up a second mark for linking white blood cell production to killing pathogens or producing antibodies. There were some weak responses that referenced fighting infection which wasn't enough for a second mark. The use of terminology such as fighting infection, should be discouraged.

Candidates scored well on part (a)(iii) question, with many referencing excess bleeding and poor or slow blood clotting. Fewer mentioned more time for pathogens to enter wound or slower wound healing. There were some descriptions of the clotting process that weren't necessary. Most candidates could make the connection between platelets and blood clotting.

Candidates scored well on this part (b)(i), with many referencing tiredness or fatigue and also linking a lack of oxygen carried by fewer red blood cells to less aerobic respiration and energy release (though they tended to say energy production). ATP came up a few times. Weaker candidates just stated less respiration. Not many referenced increased heart or breathing rate.

Candidates really struggled with part (b)(ii). Many referred to sex linked conditions and used the X and Y denotations to try and explain the inheritance pattern. Some thought the condition was caused by a recessive allele. Very few scored marking points three and four, with the most common marks awarded for identifying the condition was caused by a dominant allele and that the parents must be heterozygous to have healthy offspring (without the disease). Some students used punnet squares to show their understanding, but the explanations weren't convincing. Some candidates went on and discussed fertilisation and haploid cells and mixing of genetic information.

## Question 6

There were a variety of answers to part (a)(i), with candidates often just describing spaces in between cells or that a particular muscle was voluntary or involuntary. Some got striated/striped but not many referred to branching. Quite a few candidates stated that cardiac muscle cells had multiple nuclei.

There were a range of answers to part (a)(ii). Quite a few went with an organ in the digestive tract. There were references to the heart, eyes, biceps, and various other muscles. Not many referenced sphincter muscles.

Q6bi

Most candidates scored two marks for part (b)(i)

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In their answers for parts (b)(ii)/(iii) candidates were mostly able to give the correct mode, but not many used a tally to show frequencies (numbers were used instead but this was accepted). Column headings were mostly fine but some of the tables weren't organised well in terms of the percentages.

In their answers to part (c) candidates understood that biceps contracting and triceps relaxing. Many also used the term antagonistic (with some spelling issues). Fewer scored the mark point for pulling the radius upwards and simply restated what was in the stem of the question (raising the forearm).

### Question 7

In their answers to part (a) candidates scored marks mainly for taking the initial temperature, burning the food, and taking the final temperature. Fewer scored marks for measuring the mass of the food and repeats with different foods or comparing the temperature change of different foods. Lots of candidates included the equation for calculating the energy content of food which was nice to see. Lots of candidates included control variables too and mentioned fully burning the food before measuring the final temperature.

Most candidates scored two marks with their answers to part (b), with active transport and from a low to high concentration. There were some responses that stated low concentration gradient to high concentration gradient, but not many.

### Question 8

The answers to part (a) tended to be a little vague, describing an exchange of nutrients without stating where the nutrients or waste products were moving from or to. Candidates might get a mark for oxygen/nutrients to cells but then didn't state that waste products like carbon dioxide moved from cells to capillaries/out of cells. Lubricant/cushioning was seen a few times. Transports substances into and out of cells was a common response that didn't score.

Part (b) was a challenging question, and candidates didn't score too well. Some understood the high pressure created when blood entered capillaries from arterioles, but not many referenced pores in capillaries. Many candidates referenced plasma or fluid leaking and not water or small molecules/glucose. Not many at all mentioned arterioles/arteries (into capillaries). Q8c

In their answers to part (c) most candidates scored two marks for osmosis and high to low water potential. Some were using the term water concentration.

Candidates scored well in part (d), often referencing cells bursting (fewer mentioned swelling). However, some did refer to cells filling with water and becoming turgid.

