Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

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In Human Biology (4HBI) Paper 01

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It was pleasing to see that Centres appear to have taken note of comments made in previous reports about the plotting of graphs. The vast majority were drawn using a sharp pencil and straight lines were drawn using a ruler. This maximised the scoring for candidates on the graph question. It was also pleasing to note that many candidates coped well with the mathematically based questions. One area for improvement lies in the answers to questions that ask for trends or changes. It is not sufficient just to repeat data in answers that call for a description. If there is a significant change this needs to be described as such, if a change is sudden then this also needs to be described in that way. A further area for improvement, which is a long standing issue is the need for candidates to focus their answers on the question set. Too many continue to spot a word in a question and write all they know about that topic rather than on what the question is asking.

Question 1

For part (a) many candidates scored very well achieving maximum marks. Of those who did not there was no apparent pattern of incorrect answers.

In part (b) candidates scored well on this question, with many referring to preventing excess blood loss, preventing the entry of pathogens, and preventing disease or infection. Fewer referred to a mesh or plug forming, with some explaining in depth how a clot forms which was not required. Not many at all referred to protection of the skin whilst healing.

Question 2

In part (a)(i) most candidates drew reasonable graphs with axes labelled, correct scales, lines labelled, and points plotted correctly. Some candidates started the Y axis from 60/65 without breaking the axes, though this wasn't penalised. Overall, candidates scored well on this question. Candidates need to be careful in labelling axes to ensure that what they write is legible and if mistakes are made they are much better to start with a fresh separate piece of paper rather than cross out and overwrite.

For part (a)(ii) most candidates scored two marks.

In their answers to part (a)(iii) candidates often scored MP1 and MP4. Fewer referred to the difference in peaks values between the two people or the differences between their highest and lowest values. Weaker candidates often tried to explain the changes or simply quoted data with no comparative terms used, this latter point being a recurring theme. Many candidates were able to contrast the return to normal blood glucose levels in the person without diabetes with the slow decrease in blood glucose levels of the diabetic person.

In their answers to part 2(b) candidates scored reasonably well giving the correct test and the correct colour change if glucose/reducing sugars are present. However, some candidates referred simply to 'putting the test tube of urine (if they even mentioned a test tube) in a water bath' without saying it needed to be hot/heated. Many forgot the heating part entirely. Many candidates referenced gloves but not goggles being worn. For the test strip responses, very few referenced a colour chart comparison. Some candidates went to great lengths to explain the reactions taking place that caused the test strip to change colour for no credit, again a failure to focus on the question hat has been asked.

Question3

Nearly all candidates answered (a)(i) correctly

In their answers to part (a)(ii) the most common error here was candidates either dividing together 17500 and 5600 or 11900 and 17500 (multiplied by 100) to get 68%.

Many candidates realised that blood flows to other organs and some gave examples like the lungs in their answers to part (a)(iii). The most common mistake was an explanation of why the different parts

of the body need more blood/oxygen delivered the command term appeared to be misinterpreted by quite a few.

Answers to part (b)(i) were poor, often stating simply that blood flow during exercise increases or blood flow to the muscles increases, rather than describing the change (large/great increase). The candidates who did score a mark on this question referenced the fall in the blood flow to the gut during exercise.

Candidates scored well on part (b)(ii), with many references to increased blood flow to the skin and heat loss from the skin by radiation. Quite a few candidates referred to vasodilation of blood vessels close to the skin's surface. Better candidates referenced increased respiration rate.

Question 4

Most candidates could correctly identify RNA as the required nucleic acid in answer to part (a)(ii).

In answer to part (a)(iii) candidates struggled, especially with the spellings of thymine and uracil. Weaker candidates would miss the different types of sugar, or incorrectly refer to them as 'ribonucleic acid', for example. Some candidates were using double helix and 'single helix' for RNA. Most did get MP1. A few did not put the two comparators side by side decide being given a table to assist them with their answers.

Very few candidates scored four marks in answers to part (b)(i). The most common mark points achieved were DNA replication and complimentary base pairing. Quite a few candidates described the stages of mitosis which weren't relevant to the question. There were some excellent descriptions of DNA replication included in some answers, with the correct enzymes given (but not credited). There were a few references to 'the base pairing rule' which were a bit too vague. Very few referenced the fourth marking point of DNA mass doubling which was quite clearly shown in the diagram.

The answers to part (b)(ii) were generally, poor. Candidates did not appreciate that the cell was dividing and in some cases described mitosis. Few candidates mentioned cytokinesis.

The answers to part (b)(iii) were varied, with few achieving three marks. Most achieved MP1. Few scored MP3.

Question 5

Although part (a) was mathematically very simple, many candidates calculated 3^4 rather than 4^3.

Candidates performed well on question (b)(i). Plenty of references to changes in base sequences. Weaker candidates confused bases sequences of DNA with amino acids, but overall the definitions of mutation were good. Some candidates even named different types of mutations (deletion, substitution, etc.) Weaker responses referred to changes in DNA sequence without referring to bases. Many candidates were able to link proteins to phenotypes.

A common mistake in the answers to part (b)(ii) was to state simply 'radiation' without any qualification.

Many candidates were able to link a change in the shape of the active site to substrates no longer being able to bind with the active site in their answers to part (b)(iii). Some candidates went on to state that the changed active site might fit different substrates (which was strange), therefore catalysing different reactions. Not too many referenced the rate of reaction slowing, with some candidates just saying the enzyme stops working.

Many candidates referenced the same amino acids potentially being coded for by different base sequences or codons in their responses to part (b)(iv). Weaker responses referenced recessive

alleles not impacting the phenotype. Quite a few references to silent mutations and even the degenerate nature of the genetic code!

Question 6

The answers to part (a) were varied. Many candidates scored full marks. However, a common error was to transpose Bowman's capsule and glomerulus. The collecting duct was not always given its full name and some candidates thought that it was a convoluted tubule.

Quite a few candidates referenced ultrafiltration in their answers to part (b)(i) with fewer referring to water or fluid being forced into the glomerulus. Weaker candidates were very vague about where the pressure was high and which substances were being squeezed into the glomerulus. Quite a few simply referred to larger molecules like proteins remaining in the bloodstream.

Most candidates could name at least one component of the blood that was not filtered but most could not name two.

The line labelled 'G' appeared in many places and a significant number of candidates failed to draw a line but instead, simply place a letter 'G' where they thought it should be making it very difficult to spot in some cases.

Most candidates in their responses to part (c) referenced increased sweating and quite a few referred to increased ADH production. Fewer referenced the permeability of the collecting ducts to water increasing and more water being reabsorbed.
Not many references to the volume of the filtrate were made, rather than the volume of urine decreasing (for no credit). Not many referenced the concentration of urine increasing. Not too many referenced a lowering of water potential in the blood being detected by the hypothalamus. Quite a few mentioned the hypothalamus detecting increased blood/body temperature and this being the signal for increased ADH release.

Question 7

Whilst many candidates correctly identified the pulmonary artery, there was a significant number who thought that it was the pulmonary vein or aorta.

Most candidates scored at least three marks in their answers to part (b), referencing the thicker wall of the left ventricle and how a higher pressure is generated to pump blood to the whole body. Some candidates referred to the thickness of the wall resisting high pressures of blood. Not many referred to the aorta, and even fewer scored a mark for more muscle allows stronger contraction.

Candidates scored well in their answers to part (c), with lots referring to a lack of oxygen supplied to the heart/cardiac muscle. Weaker candidates simply stated that blood flow to the heart was reduced. There were quite a few references to less aerobic respiration and lots of references to heart attacks. Overall candidates did fairly well on this question.

Candidates really struggled with part (d). They didn’t refer to the movement of oxygen, glucose, or carbon dioxide from capillaries to muscle cells, or from muscle cells to capillaries/blood. Instead, responses referring to tissue fluid as an exchange material, or as a lubricant (!) There were vague references to nutrients and oxygen or waste products diffusing from the blood to the fluid, but nothing specific enough to gain marks. Very few scored three marks here.

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