



Examiners' Report Principal Examiner Feedback

Summer 2025

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

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Summer 2025

Question Paper Log Number P74628A

Publications Code 4HB1_01R_2506_MS

All the material in this publication is copyright

© Pearson Education Ltd 2025

Staff at many centres must be praised for all their hard work in ensuring that students were well prepared for this paper. There was clear evidence in students' responses of depth and breadth of understanding of the specification content and their proficiency in being able to apply in their wider contexts. Students from many centres have been provided with the opportunity to do experiments contained within the course content which have been aptly described in response to practical questions. It is quite understandable that some centres may not have sufficient resources to carry out the course experiments, it is suggested that online simulations or demonstrations may be helpful in these circumstances. It is also important that students are precise about the names of the equipment used to carry out experiments. For open questions with three marks or more, it is advised that students must learn to extend their answers to maximise the marks available to them.

In **Q1(a)** candidates had to complete sentences about the heart using words that were provided. Many scored full marks. Some candidates used the term diastole, instead of systole for the contraction of heart muscles, while others associated the 80mmhg as the systolic pressure. A few stated that the left lower chamber pumped blood to the lungs.

In **Q1(b)** Candidates were given the formula on cardiac output and values for heart rate and cardiac output. They had to rearrange the formula to calculate the stroke volume. Most scored full marks for this question. In a minority of responses, the formula was rearranged incorrectly and divided 6.1 by 68, so they obtained the wrong answer.

In **Q2(a)(i)** candidates were provided with a diagram of the eye with missing suspensory ligament and the lens. They had to draw in the suspensory ligament and the lens when looking at a near object. Some did not attempt this question, however when they did, they often gained both marks. Some drew the lens but no suspensory ligaments and scored 1 mark, some drew the lens between the iris rather than the suspensory ligament. Those that included the lens, tended to draw the correct shape.

Q2(a)(ii) asked candidates give the names of three parts of the eye identified in the diagram. Many named the three parts correctly. Some occasionally thought that B was the choroid rather than the retina and C the blind spot rather than the optic nerve.

In **Q2(b)** candidates had to describe changes in the eye when looking at a near object. MP1, 2 and 4 were the most commonly seen. MP3 was rarely seen. Many learners missed out on MP3 as they mistakenly stated, 'less light refracted'. A common misconception was that the suspensory ligament contracts rather than pulls tight so missed out on MP2. Some incorrectly mentioned the relaxation or contraction of the suspensory ligament. Some candidates did not score MP5 because they incorrectly said that less light was refracted.

In **Q3(a)(i)** candidates were given a diagram of a tooth which they had to identify. Most scored a mark for molar. A few incorrectly identified it as the incisor.

Q3(a)(ii) asked candidates to name four parts of a cross-section of a tooth. Many secured maximum marks for this question. A few confused dentine and pulp, while others said that D was a blood vessel instead of a nerve.

In **Q3(a)(iii)** candidates were asked to explain the reason why the tooth identified in **Q3(a)(i)** was more likely to have tooth decay than other types of teeth. Many scored full marks for this question with many saying that food was likely to be stuck in the uneven surface and the action of bacteria leading to tooth decay. Some candidates said that this was because it was harder to brush these teeth, but it was not credited. Some mentioned that food got stuck but did not go on to describe the action of bacteria.

In **Q3(b)** candidates had to explain why/how minerals from a balanced diet were important in developing and maintaining healthy teeth. This question did not score very well across the paper. Many only gained a mark for calcium in the diet. Many learners talked about calcium strengthening the teeth but failed to mention enamel and so did not gain MP3. A small number of learners stated phosphorous instead of phosphate ions and very few mentioned fluoride. Very few candidates associated strong enamel with reduced chance of dental decay.

In **Q3(c)** candidates had to state three other ways, apart from minerals in the diet, in which to maintain healthy teeth. This question scored well with many learners scoring full marks with all marking points accessed.

In **Q4(a)(i)** Candidates had to plot a graph of experimental data on concentration of pepsin and the time taken for photographic film to become clear. Many did not use half or more of the grid and obtained a maximum of 4 marks. A small minority had the axes the wrong way round and lost MP2 but still managed to get the other marking points.

In **Q4(a)(ii)** Candidates had to draw a curve of best-fit on the data plotted. Many candidates scored a mark for this question, because they drew a curve passing through most of the points. A few were not credited for joining the points with straight lines.

In **Q4(b)(i)** candidates were asked to explain why the photographic film became clear after being placed in a pepsin solution. Many candidates scored MP1 and MP2 for proteins being broken down to amino acids. MP3 was rarely seen. Many did not realise that the photographic film became clear when the silver nitrate compounds fell off.

In **Q4(b)(ii)** candidates were asked to explain the pH to carry out the experiment on the effect of pepsin on photographic film. Many stated the idea of a pH where pepsin is used in the stomach and explained that this was the optimum pH. Some candidate stated a pH of 7.

In **Q4(b)(iii)** candidates had to state three variables that had to be controlled in the experiment. This was a well answered question with many gaining at least three marks. All marking points were accessed by candidates.

In **Q4(c)** candidates had to explain why the time taken for the photographic film to go clear remains the same at higher concentrations of pepsin. MP2 was the most commonly awarded point. Many learners understood the concept that the amount of protein was a limitation. MP1 was the next most common response with many understanding that if the protein was limited, adding more enzyme would not have any effect on the reaction.

In **Q5(a)(i)** candidates were shown a diagram of a dialysis machine and they had to explain the direction of blood flow from the body. Many learners misunderstood the question and talked about what was happening inside the machine in terms of movement of waste from the blood to liquid X. Many gained two marks for MP1 and 3 for stating flows from artery, through the machine and back into the vein so learners could access these for just describing the diagram.

Question **5(a)(ii)** Students had to state which part of the kidney had the same function as the tube identifies as Y, Question 5a(iii) Students had to explain the reason for the long length of tube. This question was answered well by the majority of learners. Many accessed both marks for 'increasing the surface area for diffusion.

Question **5(a)(iv)** students had to state one difference in the composition of the blood flowing into and out of the machine. Many correctly stated urea. Answers making reference to carbon dioxide, oxygen and glucose were not credited.

In **Q5(b)** candidates were asked to explain why glucose was present in the dialysis fluid surrounding the dialysis tubing. Responses scoring full marks explained the lack of a glucose gradient, therefore less glucose was lost through diffusion. Candidates were not credited for glucose would pass into the blood.

In **Q5(c)** candidates had to explain why people using the dialysis machine had to reduce their protein intake. Candidates' responses included MP1, 2, 3, 4 and 6 were the most commonly seen. This was a well answered question with many learners understanding that protein was broken down into amino acids and that excess amino acids were deaminated in the liver to produce urea. A few secured MP5 for explaining that there will be more urea to be removed by the body. Unfortunately, some thought that the kidney will have to work more to filter and then reabsorb the protein.

Q6(a)(i) candidates were given data on the percentage of people with colour blindness in different locations. They had to calculate the number of males with colour blindness in one of the three locations. Very few candidates scored full marks for this question because they did not take into consideration that half of the 5000 people were males and the other half females. This meant that majority of learners used 5000 as the starting point for their calculation rather than 2500 thus gaining a final answer of 40, the correct answer behind 20.

In **Q6(a)(ii)** candidates had to state why the results from 1 region was not considered to be reliable. Most commented on the small sample size and therefore secured the mark. They were not credited for saying that the sample was small compared to the other two regions.

In **Q6(a)(iii)** candidates were asked to justify the statement that colour blindness was a recessive sex-linked condition. Those candidates scoring full marks were able to use the information provided to support the fact that it was recessive and also why it was sex-linked. MP1, 3, 4 and 5 were the most common MP's. Many missed out on MP2 and MP7 by repeating the question stem. Very few linked the idea that there were very few colour blind people overall and this was evidence to support the disorder being recessive so very few gained MP6 and 7.

In **Q6(b)** candidates were asked to use a genetic diagram to determine the possible genotypes and phenotypes of a child resulting from a woman heterozygous for colour blindness and a man without the condition. This was well answered by the majority of candidates. Some candidates did not use the correct sex-linked symbols for the genotypes and so lost marks. Where this was seen, learners usually gained 1 mark for correct offspring. Some candidates did not secure MP4 because they omitted the gender in the phenotype.

In **Q7(a)** candidates were shown a diagram of cheek cells. They had to name three parts of the cell and describe their function. This was very well answered with most candidates securing full marks. A few incorrectly stated cell wall for MP1. A small number of responses commented on the protective function of the cell membrane. Most candidates correctly described that chemical reactions took place in the cytoplasm, a few were a bit more vague and were not credited.

In **Q7(b)** candidates had to describe how to prepare cheek cell slide to be viewed using a microscope. Well answered question with many gaining most of the available marks. Some candidates used the term glass plate for slides and cover slides for cover slips. The last MP relating to disinfecting the swab was rarely seen.

In **Q7(c)** candidates had to name two other structures that can be seen with an electron microscope, Most gained two marks for mitochondrion and ribosomes while fewer named endoplasmic reticulum, which was also credited. Some responses included chromosomes which did not secure a mark.

