



Examiners' Report Principal Examiner Feedback

June 2025

Pearson Edexcel International GCSE
in Human Biology (4HB1)
Paper 02

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The effort by both the centres and candidates in preparation for must be commended. Many candidates had acquired good breadth and depth of knowledge and understanding of the specification content and they were able to apply these in different contexts. Mathematical skills were generally very good with many candidates demonstrating that they could process data and complete calculations requiring a number of steps. There would appear to be a range of familiarisation or practical experience with the experiments that are embedded in the course content. In the absence of equipment or these can be done as demonstrations other online resources, including simulations. Before attempting questions, It is important that all information is read very carefully and candidates are clear about what questions are asking, for example , using all data in order to successfully complete calculations. They must also distinguish between different command words such as describe and explain. Furthermore ,it is also important that responses have sufficient detail, particularly for question with three marks or more, so that all marking points can be accessed.

Q 1(a)asked candidates to match parts of the reproductive system descriptions of their functions. Many scored full marks for this question. A few incorrectly associated epididymis with the production of seminal fluid and the vulva as the location where sperm is deposited during intercourse.

In Q 1(b)(i) candidates were asked to describe the function of oxytocin. Many scored 2 or 3 marks by correctly identifying its role in the contraction of the uterus muscles, birth and milk production. Some responses only gained the mark for milk production but there was no mention of its involvement of oxytocin in birth. Candidates rarely mentioned the role of oxytocin in emotional bonding.

In Q1(b)(ii) candidates were asked to describe the function of LH.Many responses were credited for the role of LH in ovulation Fewer successfully extended their answers to include the maintenance of the corpus luteum or its role in the production of progesterone.

In Q 2(a)(i)candidates were provided with a diagram of part of the digestive system and they had to label identify four parts. Many candidates scored full marks for this question. Some incorrectly identified the structure labelled A(gall bladder) as the bile duct and C(oesophagus) as the large intestine.

In Q2(a)(ii) candidates had to name the chemical associated with the gall bladder which was identified in the previous question. Most candidates identified bile and gained 1 mark for this question. Very occasionally responses named an enzyme or a hormone and were not credited.

In Q 2(a)(iii) candidates had to explain the function of the chemical identified in 2(a)(ii). This question was generally well answered. Most candidates correctly identified that bile emulsified fats to increase the surface area for lipase activity, hence scoring MP1, MP2 and MP3. Many also described its role in neutralising stomach acid, which was MP4. A few incorrectly described the breaking down of large molecules to small molecules.

In Q 2(b)(i), candidates had to describe the function of the organ identified from the diagram in 2(b)(i). A large number of candidates scored full marks for this question. They were able to name the chemical as pancreatic juice and the area where it is released. They accurately named individual enzymes, the substrate they acted on and the products produced. Some candidates wrote about the role of hormones in glucose regulation. Other responses scored poorly because they did not name individual enzymes and the food they digested.

Q 2(b)(ii) asked candidates to name other substances produced by the pancreas. Many candidates gained both marks for naming insulin and glucagon. A few responses had enzymes, named enzymes or bile which were not credited.

In Q 3(a) candidates were asked to describe what is meant by a reflex action. Many gained three marks for describing it as rapid and involuntary and the protective role. Very few mentioned that it did not involve conscious thought, with some instead using terms like subconscious or unconscious, which were not credited. A minority of candidates incorrectly described the reflex arc, and the pathway of impulses through the three neurones.

In Q 3(b)(i) candidates were given a diagram of the reflex arc and asked to identify names of the neurones. While many candidates scored full marks, a small but significant proportion named the wrong structures, for example, they occasionally mixed up the relay and motor neurones. Some did not add labels to the diagram.

Q 3(b)(ii) asked candidates to indicate the direction of impulses in a reflex arc, using an arrow. Most candidates identified the correct direction of the impulse from sensory to motor neurone. There were a few blank responses, and a small number of candidates drew the arrow in the wrong direction.

Q 3(b)(iii) asked candidates to name the structure that prevented the impulses travelling in the wrong direction. Many scored a mark for naming the synapse. Some went into a lot more detail and described the receptors in the post synaptic membrane. Some named axon or dendrites which were not credited.

In Q 4(a)(i) candidates were given data from an experiment of the percentage increase in mass of potato at different concentrations of sugar solution and were asked to present the data in a table. Most scored full marks for this question. A few did not put the values for the concentration of sugar solutions in the correct order and scored 3 marks. Some candidates did not include the units in the heading of the table and therefore did not score those marking points.

Q 4(a)(ii) asked candidates to determine the median value for the sugar concentrations that were used in the experiment. Many candidates answered this question correctly, but a significant number calculated the mean instead and incorrectly determined the answer to be 0.65au

In Q 4(a)(iii) candidates were given the initial mass of the potato as 7.0g at 0.25 au sugar concentration and were asked to calculate the final mass to 2 significant places. They were given the percentage change at this concentration. Many candidates scored either 2 marks for an answer of 7.28 or 3 marks for 7.3. Some correctly calculated the increase in mass as being 0.28 g but did not add it to the initial mass. Some added 7 to 4(%) to give an answer of 7.4.

In Q 4(b) candidates were asked to use the experimental data to calculate the concentration of the sugar solution when there was no change in mass of the potato cylinder. Many calculated it as 0.45au and scored full marks. Some gained credit for identifying the mass loss at -1% and 4%, and for selecting values between 0.25% and 0.5%. Very few identified the use of the 5% range in mass to do the correct calculation.

In Q 4(c) (i) candidates had to explain the reason for using filter paper around the potato disc at the beginning and end of the experiment. Many candidates answered this well, correctly stating that excess water needed to be removed to avoid an incorrect mass being recorded. Some candidates wrongly suggested that the role of the filter paper around the potato was to prevent water from being lost or to prevent pathogens entering or the potato being contaminated.

Q 4(c) (ii) asked candidates to state two factors that had to be controlled at the beginning and end of the experiment. Candidates stated MP1 and 2 most often, however, there are still many candidates losing marks for saying 'amount' rather than 'volume'. Some candidate stated that one of the factors to be controlled was the starting mass which was not credited.

In Q 5(a) candidates had to use information in the passage their own and their knowledge to describe the difference in actions of Losartan and ACE inhibitor. Those scoring full marks, clearly described the mode of action of the two drugs. They understood that ACE inhibitors inhibited enzymes that prevented the formation of angiotensin ii and therefore there was less to bind to receptors, while Losartan bind to the receptors preventing angiotensin ii from binding. Some were not specific enough and did not mention receptors. Some were very vague and failed to link ACE inhibitors to enzymes and therefore minimizing the production of angiotensin ii.

In Q 5(b) candidates were asked had to describe the action of angiotensin ii on a named blood vessel A high number of candidates identified structural features of arteries, such as the presence of muscle in the walls and their ability to contract to narrow the lumen and therefore scoring full marks. Some named the incorrect blood vessel and did not score MP1 while others alluded to elastic tissue, which was not credited for MP2. Many responses had details on blood pressure without really describing the significance of blood vessels.

Q 5(c) asked candidates to explain why proteinuria was a sign of kidney problems. Very few candidates scored the first mark for stating that protein should not be found in normal urine. However, most correctly recognised that protein molecules are too large and many were able to out of the glomerulus. Some missed the idea of size of protein molecules and instead their explanation was incorrectly centred around the lack of absorption of proteins after filtration.

In Q 5(d) candidates had to explain the thickening of the left ventricle wall as result of high blood pressure. Very few secured full marks. Many referred to more frequent contractions rather than the intensity of contractions, that resulted in the increase of muscles in the left ventricle. Candidates were not credited for saying that the left ventricle have more muscles because they have to pump blood further around the body,

Q 5(e) candidates were asked to explain why people with liver function should not take Losartan. Students scoring both marks often mentioned the liver for the process for detoxification and therefore they were unable to breakdown Losartan. Others were credited for the realising that the liver can be further damaged. Some responses explained roles , other than detoxification , for example, in bile production and were not credited.

Q 6(a)(i) asked candidates were asked to examine the cross section of the eye and describe the function of two parts. Most candidates correctly identified the retina and stated its function in detecting light. Many also successfully identified the optic nerve and stated that it transmits impulses to the brain. Some students used the term signals which was not credited. Others were not credited for blind spot instead of the optic nerve.

In Q 6(a)(ii) candidates were asked to complete a diagram to show how an image is formed at the back of the eye. This question produced a wide range of responses and corresponding scores. There was a full range of marks , with some candidates obtaining full marks. Mark. Some students failed to show that light bent at either the lens or cornea. Others were unable to show that the image was inverted at the retina or the inverted image was not at the retina.

In Q6(b) candidates were asked to describe an experiment to demonstrate that stereoscopic vision would help to catch a ball. Candidates generally performed well on this item, with many scoring 3 or 4 marks from a variety of acceptable points. A few candidates stated that the experiment was carried out with students with and without stereoscopic vision without demonstrating their understanding of using one and both eyes for the experiment. A few did not explain that the experiment had to be repeated in order to make the results reliable.

In Q 6(c) candidates were asked to describe what is meant by astigmatism. Candidates obtained full marks for mentioning a change in the shape of the lens or cornea which resulted in a blurred image. Fewer explained the impact on refraction. A significant number of candidates were too vague and mentioned that there was a change to the shape of the eyeball which was not credited. It was clear that many candidates had little knowledge of astigmatism and response included explanation of other eye defects.

In Q 7(a)(i) candidates were given the blood groups of two sets of parents, There were also give the blood group of two children. They had to explain which child belonged to which parent. Many obtained a mark for matching a child to the correct parent, but they did not provide an explanation. Candidates scored full marks for using ascertain the correct genotype, given the blood group of the parents and they were able to demonstrate how genotype obtained in the offspring can be matched to the blood group of the child.

In Q 7(a)(ii) candidates were asked to calculate the probability that a child produced by the second set of parents will have blood group B. A significant responses had the correct genotype $I^B I^O \times I^B I^O$, the correct genotypes of the offspring and 0.75 probability. Some candidates lost a mark because they had the genotype of the parents as BO and BO.

In Q7(b) candidates had to describe how to prepare a sample of blood for observation using a light microscope. Many candidates described obtaining blood with a sterile pin or needle and transferring blood to a slide, earning up to three marks. Fewer mentioned the need for the smear to be thin and to stain and dry before observation with a microscope. Some mentioned obtaining blood with syringe which did not gain MP1. Some described placing blood an glass, plastic, or petri dish instead of a slide. Though the question asked about the preparation of a blood smear, some responses had detail about the observation using a microscope.

