Examiners' Report

Principal Examiner Feedback

Summer 2018

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

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Examiner Report International GCSE Human Biology 4HB0 01

There continues to be many high performing candidates whose knowledge and understanding of human biology is outstanding. Some candidates continue to provide issues over the clarity of their writing and others have an insufficient command of English to express themselves with the clear and concise expositions required in this paper. Candidates should always be reminded that the number of lines provided for an answer is an indicator of the maximum that should be written and not treated as a target for the number of words to be used. Candidates should also be reminded that this paper is marked on-line and, that if they cannot constrain themselves to contain their answers within the space provided, then they should clearly indicate on the last printed line that their answer continues elsewhere. In addition, they should be reminded that they should not write below the last printed line for each answer.

Question 1

Only two of the multiple choice questions caused any difficulties for candidates. Firstly, (d). Candidates, in some cases struggled to work out the ratio. It is not clear as to whether it was unfamiliar material to which a principle had to be applied or because of the higher than usual number of offspring for a genetics question on this paper. Part (j) was the other question where many candidates simply did not know the role of Oxytocin in causing uterine contraction during birth.

Question 2

The muscles were usually correctly identified but there were some interesting spellings on occasions. The movement of the forearm was generally well known. There were some common errors however, such as candidates describing the 'raising of the arm' which the biceps does not do on contraction because it raises the forearm and conversely, the contraction of the triceps lowers the forearm and not the arm. Some candidates only described the contraction of the biceps and failed to mention the role of the triceps in lowering the forearm despite the context of the question, some simply described the raising of the forearm and then said that the converse happens to lower the forearm, which was not acceptable and a sizeable number made no reference to antagonistic action. The parts of the musculoskeletal system were usually assigned to their correct level.

Question 3

A common mistake in both parts (a)(i) and (ii) was not to give a comparator i.e. more or higher amounts of protein and calcium. Only a limited number of candidates referenced the importance of protein to the growth of muscles and even fewer made reference to calcium ions being incorporated into hard or compact bone which gave the strength. Again, in (a)(iii) a number of candidates did not say that there was a higher level of fats and cholesterol in food B instead, simply quoted figures. Too many candidates talked about the deposition of fats/cholesterol in veins, vessels or even capillaries rather than the coronary arteries. Where candidates extended their answers with reference to a reduction in the supply of blood or oxygen it was often 'to the heart' rather than 'heart muscle'. Most candidates new the elements present in the various nutrients listed.

Question 4

This was usually well answered with most candidates scoring well. Commonest errors were to give the wrong vessels and not to know the role of the plasma.

Question 5

Most candidates found part (a)(i) and (ii) very accessible a common error was to suggest that typhoid is caused by houseflies. The answers to part (b)(i) often referred to a flagellum as being a difference, these candidates clearly forgetting that a sperm cell has a flagellum. It was pleasing to note that some candidates had extended their knowledge outside of the specification to include differences in the types of ribosomes between an animal cell and a bacterium. The functions of the components of the cell were well known but some candidates were unclear in the role of the cell membrane in controlling the movement of substances in and out of the cell. The answers to part (c) were largely quite poor. Many candidates had paid insufficient attention to the wording of the question which clearly asks for the pattern between 2 and 14 days and not 0 to 14 days. Poor expression made it difficult to understand the descriptions in many cases, few candidates progressed to an explanation, which should have included a reference to depletion of nutrients. Although many candidates could state that zero degrees was the best temperature for storing meat and a sizeable number related this to a reduction in cell division, there were many that described the effect of low temperature on the rate of enzyme activity, which was not relevant. Few candidates made a specific reference to the appearance of a bad smell at 18 days and even fewer made any reference to the food becoming slimy. Part (d) proved to be very accessible to the majority of candidates with detailed reference to the role of lymphocytes and phagocytes.

Question 6

The descriptions of the practical investigation were often confusing and not sequential. Few candidates made reference to the need to measure the volume of the peroxide or the need to heat the water bath to the required temperature. Many recognised that the volume of oxygen evolved would need to be measured but did not always mention the gas syringe as a means of so doing. A common error was a failure to mention the need to repeat the investigation at different temperatures. Most candidates could identify the independent variable but far fewer accurately identified the volume of oxygen evolved as the dependent variable. Far too many candidates referred to the 'amount of gas/oxygen' rather than volume which was a common occurrence throughout the paper. Candidates largely understood why it is necessary to keep the pH at 7 throughout the investigation. The minds of some candidates however, were insufficiently focussed because they referred to pH7 as being the optimum temperature of the enzyme. The control variables were well known though far too many referred to the 'amount' of liver rather than mass and references to 'surface area' were not allowed as this is not practicable in a school laboratory. A far better answer would have been to homogenise the liver and keep the volume of the homogenate constant. The calculation of the average and the identification of the anomalous result was not an issue for most candidates. The reasons for the result being anomalous proved to be far more challenging with many candidates simply quoting figures from the table. Few mentioned that the result did not fit the pattern but very few candidates made any reference to the result being too low. The reasons for the result being anomalous often lacked detail or clarity and candidates should be reminded that 'human error' is not an acceptable answer.

Question 7

The treatment of sewage was poorly understood with many candidates simply rewriting what was given in the diagram without any amplification. Where accounts were given the sequence of events was often not correct and the language used was casual such as the 'screening process is for large particles' and 'aerobic respiration occurs'. It was most unusual to see a detailed correctly sequenced account. On the other hand the process of eutrophication was well known though many candidates failed to mention the increase in number of bacteria as a result of the increase in nutrients or that sewage contains nitrates.

Question 8

Testing of the hypothesis was well answered by most candidates though there were some odd accounts as to how and where the pulse could be taken and a number of vague names for pieces of apparatus that could be used. The graph was well plotted by most candidates though a common error was to draw a dot to dot line rather than the line of best fit as demanded by the question. Straight lines should always be drawn using a ruler and a sharp pencil. The relationship between the exercise period and the number of breaths allowed candidates to

score one mark quite easily however, the majority failed to mention that it was a linear or directly proportional relationship. In answer to part (iv) too many candidates referred to the 'production' of energy. This is incorrect and was not given any credit here or anywhere else on the paper. This is a common and repeated error which needs to be drawn to the attention of candidates. Many candidates referred to the oxygen debt for which there was no mark. The Examiners wanted a clear reference to the metabolism/breaking down of lactic acid being oxygen dependent hence the increase in the number of breaths.

Question 9

The majority of candidates correctly identified the diaphragm but few could correctly identify the rings of cartilage, with many describing them as 'bronchi' or 'trachea'. The role of the diaphragm was largely well known. Unfortunately, a sizeable minority of candidates still refer to the lungs increasing/decreasing in volume and pressure whereas the reference should be to the changes occurring in the thorax. The terms relating to breathing were usually correctly identified.

Although many candidates knew that gases moved by diffusion it was only a minority who went onto expand their answers with references to movement down a diffusion gradient or from a high to low concentration. Candidates well understood the harmful effects that smoking has on the respiratory system often giving more than one effect.

Question 10

As ever, a simple percentage calculation caused problems for a large number of candidates. The fact that glucose is completely reabsorbed from the filtrate was well known. However, a significant number of candidates talked about 'absorption' of glucose which is not the correct term. There was widespread reference to the role of the proximal convoluted tubule but on the downside too many candidates hedged their bets by referring to the proximal convoluted tubule, the loop of Henlé and the collecting duct as areas where reabsorption takes place. Candidates should be advised that pct is not an acceptable abbreviation when describing the proximal convoluted tubule. Candidates were largely appreciative of the fact that proteins are generally large molecules and can't therefore, pass into the filtrate. Whilst candidates were able to correctly identify the kidneys as organs involved in water balance, far fewer could correctly identify a second organ. A large number referred to the skin which is incorrect. The skin is one means that the body employs to control its temperature. The production of urea was not a subject matter that was known by a large number of candidates. Too many discussed the breakdown of proteins rather than excess amino acids. Use of the term 'deamination' was not widespread and many candidates were not aware that this activity occurs in the liver.

Question 11

Part (a)(i) defeated virtually every candidate. They were unable to determine that the amount of DNA doubles prior to mitosis and then decreases immediately at the end of the process therefore leaving the higher amount only during the process itself. Candidates were aware that cells produced by mitosis are diploid and that they are genetically identical to the parent cell. Nearly all candidates, however, failed to mention that the daughter cells have the same characteristics as the parent cell and so, failed to secure a third mark. Differences between the two types of reproduction were generally well known. An area where the use of correct terminology would have improved answers is in the use of the word 'gametes', too many simply used the term 'sex cells', which is somewhat ubiquitous. It makes candidates' answers much more lucid and easier to mark if the correct terms are used in responses.

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