Pearson Edexcel

Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel International GCSE Level

In Human Biology (4HB1)

Paper 01

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Common areas for improvement remain the need for candidates to ensure that in questions where comparisons are required in answering a question, they put both sides of the case. For example, blood in vessel A is oxygenated whilst blood in vessel B is deoxygenated, rather than just say blood in vessel A is oxygenated. Too many candidates, if they are unable to conclude their answers within the allocated space, insist on writing down the side of the answer booklet or at the bottom, often with several crossings out which makes interpretation of their answers very difficult. In questions that require numerical manipulation, many candidates do not include the working out which can often lead to marks being lost.

Question 1

Most candidates were able to correctly answer the multiple choice questions and the majority knew which nutrient was required for growth. Despite the fact that the Benedict's test has been examined many times candidates still do not describe the process fully. In this question yoghourt should have been tested, not a reducing sugar or glucose. Heat should be applied via a water bath after the Benedict's solution has been added and the colour change when a positive result is obtained should be described.

Question 2

A significant number of candidates thought that the sperm is deposited at point B rather than point A, though the majority knew that part D represented the muscular wall which contracts during childbirth. The blank spaces were usually filled in correctly though common errors were FSH instead of oestrogen and wall instead of lining. The need for extra calcium in the diet was not always expressed in terms that it was required for bone formation in the foetus instead, there were vague references to development.

The advantages of breastfeeding in a human biology paper should always be in the context of biological benefits i.e. 'provides antibodies' rather than in terms of cost or convenience.

Most candidates recognised that there were more breastfed babies in 2010 than 1940, with many quoting figures though unfortunately, on occasions, quoting incorrectly.

Interpretation of the graph caused problems. Whilst many candidates were able to articulate in one way or another the fact that the number of mothers breastfeeding does vary, far fewer made reference to the fact that life expectancy showed a continued increase during the two dates.

Question 3

Most candidates could relate the various structures within a bacterium to their function. Whilst many candidates could state two differences between the two types of cell, a significant number made reference to only one of the cells by stating, for example, a bacterium has a cell wall'. Candidates should be encouraged to complete such an answer with an appropriate comment about the sperm, i.e. a sperm cell does not have a cell wall. A number of candidates thought that bacteria possessed mitochondria.

Virtually every candidate could correctly complete the word equation, though there were a few who insisted in on putting chemical formulae in the spaces.

The importance of respiration was well understood, though there was a common error made by candidates who talked about energy being 'produced'. Whilst it is acceptable to state that 'ATP is produced', it is not acceptable to discuss energy production.

Question 4

The majority of candidates were able to correctly identify the heart chambers though some did state incorrectly that they were the 'right' atrium/ventricle.

Part (b) caused problems for candidates, many of whom couched their answers in terms of the different shading of the vessels and also discussed at length, oxygenated versus deoxygenated blood. Only a minority correctly identified any of the vessels and fewer still stated which were arteries and which were veins, or made a comment about the direction of blood flow in the two types of vessel.

There were some interesting answers to part (c) with many stating that the liver had no chambers or did not consist of muscular tissue.

The role of capillaries is not as well known as might have been expected. Many stated that they brought blood from arteries to veins and others mentioned blood pressure. There were few simple references to the role of capillaries in exchanging oxygen, carbon dioxide, glucose etc. by diffusion.

Question 5

Calculation of the diameter was usually well done though a number of candidates got the order of magnitude of the magnification incorrect. It would help candidates if they showed their working out so that if the final answer is incorrect they may at least score a mark for a correct formula.

The function of the myelin sheath was well known with correct references to insulation and speed of impulse.

Candidates were unable to explain the difference in speed of transmission of a hormone and a nerve impulse. Those who acknowledged that hormones are transmitted in the blood usually failed to make the point that the hormone was therefore restricted to the speed of the blood.

Although a significant number of candidates secured full marks for calculating the time taken for the impulse to travel, many found the calculation too demanding. Some candidates who fell into this category were able to salvage a mark by stating the formula that they used even if they were then unable to substitute the correct values to calculate. Those who simply put a final incorrect answer without showing any working out scored zero.

Question 6

The diagram is indicating the bronchus rather than the bronchioles and candidates should have noted that in answering the question. Use of the spirometer was known and understood by many candidates. However, many described the counterweight moving up and down rather than the air chamber even though they described accurately movement of air in and out of the chamber. Descriptions of how the pen records a trace on the rotating graph paper often lacked clarity.

Many candidates thought that it was a good idea to change the mouthpiece in between each use of the spirometer as a way to reduce health risk. Whilst this is true, it is not a particularly practical way when a simple sterilisation of one mouthpiece between each use is the usual way this is done. A sizeable number suggested not breathing too hard so as not to ingest the soda lime. These candidates were presumably thinking of another investigation involving breathing in and out of lime water.

Many candidates understood the term 'non-communicable disease', though some thought that it meant that they could not communicate.

As with all percentage calculations many candidates were unable to manipulate the data correctly. As there is a requirement for ten per cent of the marks on each paper to be based on data manipulation future candidates will almost certainly encounter questions based on the calculation of percentage and should be prepared accordingly.

Candidates were familiar with the causes of the increase in deaths from heart disease which meant the last part of this question was easily accessible.

Question 7

Calculation of the ratio was generally well done by candidates. The same was not true for the identification of trends. Whilst many recognised that a greater percentage of males than females were overweight, many candidates then went onto

describe figures for specific countries rather than looking for trends across all of the data.

Candidates found great difficulty in suggesting why the data might be unreliable with very few suggesting that the sample may not be representative.

Control of blood glucose levels was well understood with many candidates securing all three marks. There was one area where candidates failed to express themselves with clarity and accuracy. There was an expectation that candidates would describe the role of insulin in causing the conversion of glucose to glycogen. Unfortunately, many said that insulin caused the 'breakdown' of glucose into glycogen, which was not acceptable.

Very few candidates scored any marks with their explanations for increased urination as a consequence of diabetes. There was a failure to appreciate that increased levels of glucose in the blood decreases its water potential or increases its osmotic concentration. Without that starting point candidates were unable to construct a robust answer instead, simply describing the need to excrete more glucose.

Question 8

Candidates could readily identify the parts of the urinary system. The role of the aorta was generally well understood though a common omission was to specify that the blood carried by the aorta from the heart was oxygenated. Many candidates stated that the blood was carried to the kidneys which was clearly the context of the question but, in reality, candidates should have described the distribution of the blood to all organs except the lungs.

Differences in the composition of blood between the two vessels was generally well known. Regrettably many candidates described one difference as the blood in A being 'oxygenated' and gave as a second reason the blood in vessel B as being 'deoxygenated'. Often there was simply a statement such as the blood in vessel A contains urea without any reference to vessel B. Candidates often answered in absolute terms i.e. no urea present rather than more/less.

The functioning of the dialysis machine brought varied answers, many having no real substance. The question is about the removal of waste substances from the blood but many candidates insisted upon describing glucose and salt concentrations in the dialysis fluid which in the context of the question is irrelevant. There were often references to a concentration gradient but they were often lacking clarity. Few candidates made reference to the membrane being partially permeable or that the urea passed across the membrane from the blood.

Whilst many candidates understood that it was necessary to add anticoagulant prior to the blood entering the machine to prevent it clotting and blocking the machine, there were very few who could give a relevant reason as to why it was not added

prior to the blood returning to the body. In reality virtually every candidate ignored that part of the question.

Question 9

Surprisingly few candidates could identify the fact that the reason the use of beta blockers in sport is illegal is the fact that it is unfair.

The effects of adrenaline on the body were generally well known with increased heart rate and blood pressure being well articulated. Fewer candidates made any reference to the diversion of blood from the gut to the skeletal muscles.

Many candidates recognised that beta blockers bind to the receptor sites and prevent the binding of adrenaline, though a significant number thought that it prevented the adrenaline diffusing across the gap. Further, there were a number who failed to mention receptor sites and instead, discussed heart tissue.

Candidates understood why the use of beta blockers in active sports was not a good idea though many referred to a reduction in respiration rather than a reduction in aerobic respiration.

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