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Examiners' Report

Principal Examiner Feedback

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In Human Biology (4HB0) Paper 01

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There was the usual wide range of quality in the answers provided by candidates. One encouraging development is that questions that ask candidates to compare are being answered in an appropriate manner. Although one of these questions did give them a table to assist, candidates made good use of the table and where no table was provided they often gave both sides of the comparison. This point is expanded upon in the rest of the report. An area for candidate development is making sure that they read the question carefully and answer in the context of the question asked rather than write down everything they know about a topic or answer the question they wish had been set. Again, this will be expanded upon later in the report.

### Question 1

All of the multiple choice questions were well answered with none causing undue problems for the majority of candidates.

### Question 2

Common errors found in the answers to part (a) included:  
candidates identifying the cornea as the structure which protects the eye from dust,  
candidates who think the lens is where most refraction occurs  
candidates who stated that the pupil controls the amount of light entering the eye and candidates who sometimes failed to make their letters clear especially F/E, G/C, D/B.

In answer to part (b)(i) the term stereoscopic was well known but the spelling of it was frequently poor. Most candidates were able to use this term or one of the two alternatives and to go on to explain how this helps with speed and distance judgment and depth perception (many candidates giving all three advantages). A number of answers however were vague and just referred to clearer or better vision with two eyes.

There were many references to having two eyes giving a wider field of view and referring to the cancelling of the blind spot effect.

In answer to part 2(b)(ii) some missed the point and described an investigation with pencils. Most responses gained a reasonable proportion of the marks, but often neglected to mention specific details such as counting the number of times the ball was caught.

One response had a student covering one eye with his hand and then catching the ball. Some said that the candidates could 'catch a ball with one eye' or 'keep both eyes closed as a control.'

### Question 3

Most candidates were aware that the process carried out by plants is photosynthesis.

Part (a)(ii) was answered well by the majority. Very few failed to follow the instruction to use words.

In part (b)(i) candidates often tried to explain rather than describe.

Many candidates failed to comment on the daily rise and fall, they frequently described glucose levels on day 1-3 as constant .

Part (b)(ii) was generally well answered, although a number of responses missed the lower production of glucose in days 4-5.

In answer to (c)(i) there were many descriptions of starch tests. A water bath was often absent and on occasions, when mentioned, the candidate failed to say that the water bath was heated. The biggest failure was to discuss the grinding of the leaf as a prelude to performing the Benedict's test or to simply describe testing for glucose powder.

The answers to part (c)(ii) were variable. Many candidates recognised the difficulty of determining colour changes in a green leaf whilst others suggested that the cuticle may cause problems in preventing the penetration of the reagent.

### Question 4

A number labeled B as the prostate gland, perhaps they didn't read the question properly and automatically thought that A would be the first structure required to be labeled.

The ureter was frequently confused with the urethra. The correct spelling of ureter was essential for a mark to be awarded.

Most gave the answer for D as the plural form, which though not strictly correct was allowed.

Many candidates were able to correctly answer part (a)(ii) some giving very detailed accounts.

Part (a)(iii) was not well answered. Many candidates failed to mention that the urethra would become obstructed leading to problems in urination and the passage of sperms. A number thought that the effect would be on the bladder which would be insignificant or on the production of sperms.

The answers to (b)(i) generally scored full marks as considerable latitude was granted in the award of the mark for the quality of the diagram. There were however, some excellent detailed diagrams that were also fully labeled.

The answers to part (b)(ii) usually yielded one or two marks. Particularly disappointing was the almost universal failure to recognise that the testis acted as an endocrine gland. Many quoted the fact that it produces testosterone and this is responsible for the secondary sexual characteristics.

The answers to part (c)(i) were an encouraging improvement upon the answers to similar questions in previous series. Although the table gave some help in providing a structure, candidates took full advantage of this by constructing their answers in an appropriate manner giving both sides of the comparison on each occasion. However, a significant number of responses alleged that the ovum does not have a nucleus.

In answer to part (c)(ii) most candidates stated that the sperm and ovum were haploid or had 23 chromosomes (many stated both). Few referred to the X chromosome. A number of candidates just said they had the same number of chromosomes without specifying how many.

Instead of giving an example of how they were genetically similar some candidates gave the function of these cells or stated that they were both produced by meiosis.

### Question 5

Most candidates could correctly identify 'cilia' as the structures though some described them as 'villi' and yet others termed them 'ciliated epithelium.

In answer to part (a)(ii) most candidates knew that the cilia beat/waft but sometimes didn't refer to the mucus - instead it was beat or waft dust/dirt.

Some thought that the cilia produce the mucus. Many said that the cilia increase surface area for diffusion.

In answer to part (b) most candidates understood that mucus traps dust/dirt/bacteria but often didn't go on to link this to lung infections.

A number stated that the function of mucus was to keep alveoli moist to speed up diffusion.

The answers to part (c) were often vague. Descriptions of the effects on the alveoli were sometimes confusing and repeatedly referred to 'damage'. At this level a more precise description is required with some detail of the rupturing of the alveolar walls with references to a consequent reduction in surface area was expected. Similarly details beyond 'damage' were required to describe the changes observed to the cilia.

#### Question 6

The vast majority understood that the x4 was to do with magnification, although a handful thought it referred to the artery consisting of 4 layers.

The term "zoomed in" made an appearance a few times.

In answering part (a)(ii) most candidates knew that they had to divide their measurement by four, but a number lost a mark as they didn't measure correctly or measured in cm and then made mathematical errors when converting the answer to mm or just forgot to convert the answer to mm.

A number didn't attempt to answer this question.

Part (a)(iii) was answered correctly by the vast majority of candidates.

For part (a)(iv) some candidates did make comparisons. Overall this question was well answered with all marking points seen regularly. Very occasionally the characteristics were quoted the wrong way round but this was very rare. Oxygenated versus deoxygenated blood was the most common inaccurate response.

Part (b)(i) caused issues since the direction of transfer given in the question seemed to be ignored by many, who gave glucose and oxygen as their answer. Salts, nutrients and amino acids also featured frequently in answers.

A common misconception that blood flow was fast/high pressure was seen in answer to part (b)(ii). Further, marks were often lost due to vague statements such as 'one cell thick'. Candidates must be more precise at this level. They should be referring at all times to the wall.

### Question 7

The definition of 'homeostasis was well know by many candidates except that a common omission was to not refer 'despite external changes' which is an integral part of the definition.

Part (b)(i) was well answered. The vast majority of candidates gave thermometer (with a wide variety of spellings) as their answer and most specified a suitable place to put it, most frequently in mouth/under tongue with some going into detail about how long to leave it for and how to sterilise it between use by different people.

Some suggested measuring the temperature of a urine sample.

Very rarely did any student fail to pick up a mark here in answering (b)(ii)and when they did it was usually just one of the three calculations that was incorrect.

Responses often compared skin temperature with core temperature in each of the persons undertaking the experiment, rather than comparing the temperatures of the persons in the answers to (b)(iii) and further to think the bigger the gap the better the clothing/worse the clothing split about 50:50.

Part (b)(iv) this was generally well answered with most candidates gaining at least two marks. Many however, mentioned points that weren't relevant and had clearly been used as generic answers.

The answers to part (b)(v) were overall, very good. However, Marks tended to be missed because of vague responses and a surprising number of inaccuracies regarding body hair, a significant number stated that the hairs would lie down rather than stand up. There were still too many references to blood on the skin surface and the misconception continues to be peddled that it is the capillaries that undergo constriction rather than the arterioles that supply them.

### Question 8

In answer to part (a)(i) a surprising number of candidates didn't realise that this was a calculation question and just tried to use their knowledge to answer this; these answers were invariably incorrect. Those that did the calculation normally gained all three marks.

The answers to part (a)(ii) were very mixed. If candidates failed to put 3360 as their answer the Examiners had to look at the candidate's working, this was often very difficult to follow. Frequently, they had recognised that bacon and cauliflower were twice normal portions but then they had made an error in the list of numbers which they were adding together for example missing one number out or copying incorrectly.

A number of candidates calculated the answer as 3360 but then rounded it to 3500.

The answers to part (a)(iii) were invariably poor. Many inaccurate responses who said that the meal was sufficient for the office worker –they often missed the idea that the main meal would be larger than the other meals. There seemed to have been some confusion about the units, as the responses indicated that this was a massive meal and would make them both X and Y overweight, so it is assumed candidates thought that the energy content referred to calories.

In their answers to part (b) a number proportion of candidates went down the route of saying what a balanced diet contained rather than what this was lacking. This is not an uncommon occurrence. Candidates need to read the question and answer the one that is set. It is no good giving an answer listing all of the components of a balanced diet when the question clearly asks why this meal is not balanced.

### Question 9

In answer to part (a) there were a good range of responses, although a surprising number had both females and males as XX. Although many candidates were able to give the genotypes of the parents and of offspring A, B and C, only the most capable of candidates appreciated that Susan could be one of two genotypes and that consequently her son would be one of two genotypes.



The definition of a carrier still causes problems to candidates. The X chromosome was rarely mentioned as the location for the allele though many candidates were able to comment that the allele would not be expressed in the heterozygote, though not necessarily describing this fact in a succinct way.

Many candidates gave just one answer only, in answer to part (b)(ii), often just writing a percentage without linking it to one of Susan's potential genotypes.

Some candidates interpreted the question 'determine the possible chances of their daughter being a carrier' as 'determine the possible chances of having a carrier daughter' giving the answer as 25% rather than 50%.

The vast majority of candidates answered part (c) correctly. However some, wrote mitosis, meiosis or linked it to inheritance from Susan's mother.

