



General Certificate of Education

Human Biology 2405

HBIO1 The body and its diseases

Report on the Examination

2009 examination - January series

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Mark Ranges and Award of Grades

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General comments

The standard of the responses produced by many candidates was encouraging. Some truly excellent papers were seen. There was a minority of candidates who appeared ill-prepared for the exam in terms of their factual knowledge.

It was pleasing to see that many candidates were prepared and able to cope with the questions relating to *How Science Works*. In particular, it was pleasing to see these candidates looking at both sides of the story when asked to evaluate information. Many candidates still did not read questions carefully enough, or did not understand the command words used in questions; for example, *describing* when asked to *explain*, or vice versa. Some candidates ignored information given in questions which would have given them answers to questions.

Question 1

Many candidates obtained two or three marks in (a). The commonest error involved getting the sides of the heart confused. Part (b) discriminated strongly, though it was intended as straightforward recall. Many candidates confused the SAN and AVN with each other.

Question 2

Part (a) was correctly answered by most candidates. The commonest error was to identify B as the cell wall. Similarly, part (b) allowed almost all candidates to obtain at least one mark and half got two marks. In part (b), many candidates ignored the instruction to give the *function* of C and D and just said they were DNA.

Question 3

It was very encouraging to see many candidates scoring highly on this question. In (a), a third of candidates obtained one mark and nearly half obtained two marks. Almost half of all candidates obtained all three marks in (c). Some measured distances from the bottom of the paper, so failing to gain the third mark. Only about a fifth of candidates had no idea how to do the calculation.

Question 4

This was intended to be a relatively easy question on a topic included in the practicals they have to have performed. In practice, many students scored poorly on both parts of the question. In (a), weaker students often described the *lock and key model*. Other students appeared unable to clearly express the concept of the interaction between enzyme and substrate causing the enzyme to change shape. About a third of students obtained one mark and a similar proportion got two marks.

In (b), many *described* the curve and gave no *explanation*. Other described the curve and then explained what happened above the optimum temperature, in terms of denaturation. Students should be aware of the need to answer the question as set.

Question 5

This question discriminated well across the ability range.

In part (a), there were good answers but about half of candidates *described* the results or displayed no apparent knowledge of lactose intolerance. Two-thirds of candidates gave a correct response in (b) relating to avoiding some form of bias on the part of the mother. Vague answers just mentioning bias, but not referring to the mother, were not given credit.

In (c), over half of the candidates were able to suggest a suitable variable but only half went on to give a suitable *explanation*. For example, a candidate might identify lactase concentration as a variable but would then just say that this would *affect* the experiment, with no idea of *how*.

Part (d) discriminated in that only the better candidates obtained all four marks. Many candidates noted that the lactase treatment did appear to reduce crying. Better candidates then went on to look at the investigation critically. About a quarter obtained a second mark for identifying an unknown in the study, such as the number of babies involved or other reasons for crying. The best candidates looked at more than one of these unknowns.

Question 6

This question discriminated well across the ability range.

Many students knew the required level of factual detail and about forty percent obtained all three marks in (a). On the other hand, about a quarter of candidates appeared to have little knowledge of *why* the thick mucus is produced. These candidates often wrote about the *symptoms* of cystic fibrosis.

In part (b), weaker answers only gave *descriptions* of the results, with no *explanation*. The detail given in descriptions varied a lot. Some candidates just noted that the LCI is higher in children with CF. Better descriptions went on to note that some children with CF have LCIs in the same range as healthy children, or that LCI does not seem to show any correlation with age of a child. Better answers gave explanations linked to blockage of airways by mucus and the effect of this on breathing. There were some pleasing examples of students considering factors that might affect the LCI obtained, such as treatment for CF, or lung infections at the time the LCI was measured. The examiners were looking for blockage of airways, not alveoli. Only five percent of candidates failed to score in (b), about a quarter obtained one mark, forty percent two marks, a quarter three marks and ten percent four marks.

Question 7

About half of candidates obtained one or two marks in (a). Those who did not often strayed into *descriptions* of how a person gets infected with *Salmonella*, rather than *how Salmonella* causes food poisoning.

In (b), many candidates found it difficult to extract and use information from the diagram. Those candidates who knew about antigens and antibodies had no problem with (b)(i) and about sixty percent obtained this mark. Part (b)(ii) proved accessible only to the better candidates, with about thirty percent of candidates getting one mark. Very few indeed were able to deduce that each colony would come from one bacterium.

There were many vague and impractical answers to (b)(iii), such as using an airtight room, flaming all of the equipment, or 'sterilising everything'. Candidates are required to have carried out investigations involving sterile technique and it was disappointing to find so many who could not describe two techniques using appropriate language.

Question 8

Part (a) proved to be beyond three-quarters of candidates. Most wrote about the glucose or carbohydrate content of foods. Only a minority wrote about the effect of a food in terms of a rise in blood glucose. Even fewer went on to write about this rise compared to (50g) pure glucose or a starch source such as white bread.

Most candidates were able to identify evidence for more plant material in the fibre content of the diet and obtained one mark. Better candidates also noted that fat, protein or both were about the same in the LGI diet and that meat would be the main source of these.

In (c)(i), nearly seventy percent of candidates obtained one mark for noting the greater fluctuation in the blood glucose concentration with the LGI diet. About a quarter went on to make another suitable observation, such as the blood glucose concentration being generally lower with the LGI diet.

Part (c)(ii) did not work, in that almost no candidates were able to suggest a reason for the effect of the LGI diet.

Question 9

This question discriminated well across the ability range.

In part (a), about twenty-five percent of candidates obtained each of the 0, 1, 2 or 3 marks available. Candidates who obtained no marks usually wrote vaguely about damage to blood vessels, high blood pressure, blockages and blood clots. For those who did score, it was a question of how much of the story they knew.

In (b)(i), just over half of the candidates got one mark for linking obesity to atheroma formation. Nearly thirty percent got a second mark for noting an increase in the atheroma-causing protein with increases in *both* BMI and WHR. Weaker candidates often thought BMI would be better to use in (b)(ii). This often seemed to be because they had heard of BMI and so discounted WHR. Some thought BMI would be better because of the greater range of the data. Better candidates, about a third, spotted the closer clustering of the data points for WHR. Only the very best linked this to a better, or more reliable, correlation.

In (b)(iii), about sixty percent of candidates correctly noted that BMI uses mass and doesn't take account of factors such as the amount of muscle someone has.

Question 10

Parts (a) and (b) proved very discriminating, though they had been intended as fairly easy questions.

In (a), nearly half of candidates failed to obtain marks. Many wrote about measles, mumps and rubella as bacterial infections, even though the first line of the stem states that they are caused by viruses. About a third of candidates obtained one mark, usually for stating either that antibiotics work against cells of bacteria, or they work against metabolism that viruses don't have. The better answers noted that viruses aren't cells and antibiotics work against some named part of cells.

In (b), nearly half of candidates failed to obtain marks. Many candidates appeared to be very confused between blood plasma, tissue fluid and lymphatic fluid. They were often confused between blood and lymph capillaries. A third of candidates did explain the swelling and obtained both marks.

Part (c) discriminated across the range, with almost equal percentages obtaining each mark from 0 to 7. Weaker candidates were often confused between antigens and antibodies and often thought that antibodies persist in the body. Those candidates who scored one or two marks usually knew about memory cells and how they allow a rapid response to subsequent infection. There were some brilliant answers with detail beyond that required by the specification. The examiners did wonder if some weaker candidates had been confused by being taught too much detail about the primary immune response.

A third of candidates obtained one mark in (d) for suggesting there would have been a fall in the vaccination rate. Over forty percent got a second mark for stating that this would lead to fewer protected or immune children. Only the very best answers included references to loss of herd immunity, or described the consequences.

About a quarter of candidates ignored the data from Finland when answering (e). They focused on the negative reports and ideas coming from the limited study in the UK. The impression was that some brought pre-conceived notions into the exam. Over forty percent did obtain one mark, usually for noting that the children who did get ill got better. About twenty percent obtained a second mark for noting the large numbers and time scale of the study from Finland. Few candidates made reference to the reliability or otherwise of the evidence presented.

Part (f) was aimed at the higher end of the ability range. Some very good answers were seen.