



General Certificate of Education

Human Biology 1406

HBIO1 The body and its diseases

Report on the Examination

2010 examination - January series

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Set and published by the Assessment and Qualifications Alliance.

General Comments

The paper seemed accessible to most candidates. Most were able to attempt all the questions, and answers left blank were not frequently seen. As usual, candidates had most difficulty with questions involving mathematical calculations, so the question that was most often left blank was question 4(b). There was evidence that many had forgotten to bring calculators to the exam, adding to their difficulties. Another difficulty was in understanding command words, so 'explain' in question 6(a) was generally interpreted as 'describe'. Poor expression also caused loss of marks in several questions.

Question 1

- (a) Very few candidates left this part blank, and many candidates scored both marks. Some candidates simply named the cells, or got them the wrong way round. A few thought these were parts of a cell, e.g. a phospholipid membrane, and a few thought the cilia were 'tiny hairs' or even microvilli.
- (b) The best candidates scored all three marks here, but many scored only one or two. The question that proved most difficult was the function of the vesicles, with many giving vague answers such as 'transporting mucus around' or even 'transporting mucus from one cell to another'.

Question 2

- (a) Most candidates scored at least one or two marks here. The commonest problems were failing to refer to an artery, and not mentioning that angina affects the coronary artery. Candidates were also vague about the effects of angina, referring to a lack of oxygen getting to the heart but not the heart muscle. While many mentioned pain, this was rarely linked to anaerobic respiration or build-up of lactic acid. Significant numbers of candidates confused angina with myocardial infarction, coronary thrombosis and aneurysm, so described these instead.
- (b) Many candidates had the idea of a balloon being inflated, though use of a stent was less well known. Many had the idea that angioplasty involves scraping out the atheroma. Only the best candidates were aware of how the device got into the body.

Question 3

- (a) In part (i), all combinations of letters were seen, though about half of all candidates were able to give the correct sequence. In part (ii) it seemed that many candidates had misread the question, and were answering a question about the thickness of the wall of the left ventricle compared to the thickness of the right ventricle instead.
- (b) There was a lot of confusion as to the whereabouts of the atrioventricular valve, with many thinking it was between the ventricle and the aorta. Some candidates thought if they wrote vaguely about the volume of blood entering the aorta being 'different' or 'variable' they might gain marks, but this was not the case. On the other hand, the best candidates gave very clear answers and scored full marks.
- (c) Many candidates were able to score two marks here, although marks were often lost due to poor expression. Candidates usually knew that the pacemaker supplied electrical

impulses, but were less often aware that this was required because some part of the heart's conducting system was faulty.

Question 4

- (a) Most candidates scored a mark for the advantage, although a few gave very vague answers such as 'so you are healthy' or 'so you can keep an eye on what you are eating'.

The mark for a disadvantage was less frequently scored. Many candidates focused on the pizza makers losing money if people realised it was unhealthy, or people being incapable of understanding the information. Where the mark was awarded, it was usually for recognising that men, women and children have different nutritional requirements based on age, size or activity levels.

- (b) Many candidates left this answer blank and did not attempt any calculation. There was substantial evidence that many had forgotten a calculator and had little idea about how to attempt the calculation.
- (c) This proved to be a difficult question for most candidates. Many explained that a savoury product such as a pizza would not need sugars as an ingredient, or thought that the dough was a carbohydrate. Few even realised that sugars were carbohydrates. Only the best candidates realised that there are other forms of carbohydrate besides sugars.

Question 5

- (a) In part (i) many candidates scored both marks, although A was frequently confused with the cell wall or cell membrane. Misspellings were common, although these were allowed if they were phonetically correct. In part (ii) about half of candidates scored a mark. Marks were often lost through vague answers such as 'protection'.
- (b) Most candidates scored both marks here, usually for explaining that it is a droplet infection and describing transmission from an infected person to a non-infected person. A few lost the mark because they described the effect of the bacterium on the body, or described transmission via dirt, contaminated food or even sexual transmission.
- (c) Most candidates managed to score at least two of the three marks available. The commonest correct answers were about bacteria becoming resistant to one antibiotic, and the need to eliminate all bacteria. Many candidates, however, referred to bacteria becoming 'immune' to antibiotics, and went into descriptions of the immune system, showing that they thought antibiotics and antibodies are synonymous. Some vaguely referred to drugs taking a long time to work.

Question 6

- (a) Most candidates failed to score here as they only described the results. Where a mark was awarded, it was usually for reference to denaturation. Candidates need to look carefully at command words like 'describe' or 'explain' and make sure they address the question being asked.

- (b) This was better done than part (a), but even so, many candidates scored no marks here as well. The commonest correct answers were for recognising the need to carry out repeats, or to test the capsules *in vivo*. Many incorrectly thought that the enzymes in capsule C were too active for a person with cystic fibrosis and that a less effective enzyme might be better.

Question 7

- (a) Many candidates scored nothing here, offering answers like 'helps with digestion/ lubrication of food/ immune system/ fights bad bacteria'. Many quotations from TV advertisements were seen. Better candidates were able to give a relevant useful role of gut bacteria, usually vitamin production.
- (b) Many candidates described how diarrhoea is produced and/or suggested it was needed to get rid of all the dead bacteria. Only a minority of candidates realised that antibiotics can kill healthy gut bacteria as well as infections, and of these, even fewer recognised that this might make it possible for bacteria causing diarrhoeal infections to colonise the gut.
- (c) In part (i), most candidates recognised that group B was needed for comparison with group A, but fewer could explain why it was needed beyond this.

In part (ii) there were interesting spellings of 'biased' and 'psychological'. Many were able to give a satisfactory answer, but the weakest candidates simply gave vague answers such as 'in case it affected the results'.

Part (iii) was badly answered, with few candidates scoring more than one mark. Many got a mark for suggesting 'random' but it was rare for the candidate to follow this up with a method of achieving two random groups. Many candidates gave a valid method, such as random, but then went on to describe a different way of allocating people to groups, usually by matching. Quite a few candidates wanted to put all men in one group and women in the other, or all with diarrhoea in one group. This question showed that candidates have poor understanding of this aspect of scientific investigations.

In part (iv) many gave good answers, usually for 'allows comparison' and the fact that numbers in each group might be different. Poor expression let many candidates down, and a few thought that it gives a more accurate result.

Question 8

- (a) In part (i) many candidates gained a mark, although a common error was to include vomiting as a symptom. A few described the lack of lactase enzymes and missed the point. A small number gave entirely wrong symptoms such as lack of energy/ brittle bones/ low blood sugar/ sugar in urine.

In part (ii) a whole range of answers was seen. The best candidates scored full marks, describing the lack of lactase and bacteria feeding on undigested lactose, producing gas. Weaker candidates simply described symptoms but were unclear about how they were caused.

- (b) In part (i) most candidates talked about food altering blood sugar level, without referring to types of food. Few candidates realised that time is needed for blood glucose level to return to its normal level.

In part (ii) most candidates gained a mark for the comparison idea but a few gave the baseline idea. Some of those candidates who failed to score said such things as 'lactose and glucose are both sugars', or 'enzymes might be different', showing a lack of understanding. In part (ii) the full range of marks was awarded. It was not always clear where the glucose was being absorbed and some thought that the lactose is absorbed then digested in the blood. Quite a number thought there would be no change or a fall. Many felt the need to explain the result if a person was lactose intolerant as well as the result expected for a person who is not lactose intolerant.

Question 9

- (a) Many candidates believe that an isotonic drink is full of energy/sugar for people who have been active. Only about half of candidates understood that it has the same water potential/concentration as body fluids.
- (b) Many candidates lost marks here by describing the situation after labour. Only the best candidates realised that there is natural variation, or that some women may have eaten food more recently than others.
- (c) This was badly answered by many. Most candidates understood that the isotonic drink maintained blood glucose levels, but only the strongest candidates went beyond this. Few candidates commented on the fall in blood glucose concentration being quite small in the group who drank water (many described this as a large fall) and only occasionally were factors such as length of labour, age, or medical conditions mentioned. The need for repeats and the sample size were also mentioned by the best candidates. Many candidates focused on labour being tiring, without linking this to respiration.

Question 10

- (a) In part (i) many vague answers were seen, usually about fighting cells and recognising self and foreign. Many described it as a 'structure' rather than a 'molecule' or a named molecule, and thought that it causes a disease. However, some good answers were also seen, which included the idea that an antigen produces an immune response.

Part (ii) was well understood by many, although there was some confusion with enzymes and active sites. A few candidates confused antibodies with antibiotics, explaining that antibiotics are not effective against viruses.

Part (iii) was left blank by many candidates, while many others did not understand and discussed induced fit. Where marks were awarded, it was usually for the idea that the adaptor molecule binds to both HIV and the anti-gal antibodies.

- (b) A surprising number of candidates scored no marks at all here, mainly because they wrote about memory cells and cloned antibodies. On the other hand, the better candidates scored 5 or 6 marks and gave comprehensive accounts. A few left the question blank, and some lost marks by confusing T and B cells.
- (c) Very few candidates scored marks in part (i) here at all. Common misconceptions were that the receptor was on the HIV or that antibodies were involved. In part (ii) some good answers were seen, usually for realising that antibiotics target metabolism, cell walls or protein synthesis, and explaining that viruses do not have these. A few said antibiotics only attack membrane bound organelles which was unfortunate. Many stuck with

‘because they only work on bacteria’, ‘they would become resistant/immune’, ‘because viruses have RNA/ no antigens’. This was often a case of bad expression losing marks.

- (d) This question was very hard to mark. Many said the adaptor and anti-gal would bind to HIV so this was allowed but I looked for receptor for point 2, which was very rare. The idea of not many HIV available (point 3) was not clearly expressed. Many concentrated on the antigens of the HIV or thought the receptor was on the HIV. A lot had the virus being demolished by anti-gal and antibodies. Overall perhaps 15% of candidates gained 2, 40% gained 1 and the remainder 0 marks. Quite a few left the question blank.

In part (i) most candidates failed to score, usually because of poor expression. Very few referred to antigens. Hardly any candidates used the term ‘complementary’ though every other word e.g. active site/substrate was employed. Many talked about resistance, infection, attack or had the wrong name for parts.

Similarly in part (ii) poor expression lost marks. When the candidate used terms like ‘antigen’ and had the idea of shape and fit, both marks could be awarded.