



**General Certificate of Education (A-level)  
January 2012**

**Human Biology**

**HBIO1**

**(Specification 2405)**

**Unit 1: The Body and its Diseases**

**Report on the Examination**

---

Further copies of this Report on the Examination are available from: [aqa.org.uk](http://aqa.org.uk)

Copyright © 2012 AQA and its licensors. All rights reserved.

**Copyright**

AQA retains the copyright on all its publications. However, registered schools/colleges for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to schools/colleges to photocopy any material that is acknowledged to a third party even for internal use within the centre.

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334).  
Registered address: AQA, Devas Street, Manchester M15 6EX.

## General Comments

Few answers were left blank, so there was no evidence that students were short of time. Once again, examiners were disappointed by students' poor mathematical skills, as evidenced mainly in question 6(b). Many students failed to gain marks through vagueness, as mentioned in a number of specific questions below. There is also evidence that students sometimes mis-read the question: this was especially evident in 8(b).

### Question 1

- (a) This part was known by the majority of students.
- (b) Part (b)(i) was also well known by most candidates. However, many students failed to gain marks in (b)(ii) by not giving two different functions. It was not uncommon to have responses such as 'to transport ions out of the cell' and 'to transport ions into the cell', or 'to transport molecules into the cell' and 'to transport molecules into the cell by active transport'. Despite this, many students scored two marks, and even weaker students frequently scored one mark.
- (c) About 73% of students correctly identified mitochondria in part (c), with the majority of the rest suggesting incorrect organelles such as ribosomes or nuclei.

### Question 2

- (a) Coronary by-pass surgery was well known by many students, although a few confused this with angioplasty. The idea of using a vein or artery from elsewhere was the commonest mark awarded. Where students failed to gain marks, it was often for not realising that the blockage was in an artery. Some students even specified vein or capillary.
- (b) Betablockers were well known, although some students' answers were too vague, for example, stating that betablockers regulate heart rate rather than slowing it or preventing an increase.
- (c) Angioplasty was well known, but many students gave details of inserting a catheter and a stent, rather than explaining how the procedure was helpful in the treatment of coronary heart disease.

### Question 3

- (a) Most students were able to score both marks, usually for knowing that fruit and vegetables contain vitamins and minerals. A few chose to describe the absence of some components in fruit and vegetables, e.g. the fact that they are low in fat, for which marks were not awarded.
- (b) Only better students scored full marks. Many were concerned that the pyramid did not include water, and wrote at length about the benefits of water. The commonest correct points made were that the pyramid does not give details of portion size, nor does it take account of the varying needs of different people with varying activity levels. Only better students made such valid points as distinguishing between wholemeal and white bread, or full-fat and skimmed milk. Many students were concerned that bread was included as a cereal, which they felt was an error, as they assumed the term to refer only to proprietary breakfast cereals.

#### Question 4

- (a) Only about 30% of students gained a mark in (a)(i), the commonest wrong answer being **B**. However, the majority of students correctly identified **A** as the answer to (a)(ii).
- (b) This part proved very demanding for all but the best students. Weaker students assumed that the sodium ions remained in the blood plasma and somehow caused more tissue fluid to build up. There seems to be poor understanding of the fact that hydrostatic pressure causes tissue fluid to be formed. Many students think that this results from a water potential gradient.

#### Question 5

- (a) Most students scored one mark here but only the better students scored both marks. The commonest problems were failing to mention the membrane, or referring to water concentration instead of water potential, even though they were asked to use the term water potential in the question.
- (b) This part was poorly answered by most students. Some thought that water moving in or out of the red blood cells caused the external solution to change colour. Many others invented some biology, in which the sodium chloride reacted with the red blood cells or the haemoglobin. Only the very strongest students correctly understood that water had entered the cells in tube 2 by osmosis, bursting the cells, resulting in a very small pellet.

#### Question 6

- (a) The cause and symptoms of lactose intolerance were well known, although a few students thought that the bacteria produced a toxin, or added a number of incorrect symptoms among the correct ones.
- (b) In this section, it was once again evident that A level Human Biology students find simple mathematics, such as calculating percentages, problematic. Fewer than 12% of students gained both marks. A single mark was awarded if students recognised that they needed to find the change in glucose concentration of person **A** between 0 and 30 minutes, but fewer than 17% of students gained this mark.
- (c) This part was well known and almost all students gained at least one mark here.

#### Question 7

- (a) Part (a)(i) was poorly answered. Many students confined their answers to a statement that the phone would be swabbed all over, or else in one particular place. Others stated that the swab should be sterile despite being told that in the question. Only the best students referred to swabbing  $1\text{ cm}^2$ , or a specific area, and the need to take several different swabs from each phone. Part (a)(ii) was better answered, although many students gave vague responses, such as 'to avoid contamination' or 'to make it a fair test'.
- (b) Most students could answer (b)(i) correctly, although a small number made an error in at least one of the answers. In (b)(ii), the full range of answers was seen. A significant number of students mis-read the information, claiming that the mobile phone contained more bacteria than faeces.

### Question 8

- (a) In this part, many students scored both marks. Those who did not commonly referred to the antibody's 'active site', or repeated what they were told in the question, simply writing that the antibody was specific so the antigen would bind.
- (b) This was well answered by many. Weaker students referred to 'the antibody' without saying to which antibody they were referring. Some gave accounts of an ELISA test they had memorised, referring to the dye changing colour in a positive test. However, good students were able to gain full marks for this question.

### Question 9

- (a) In (a)(i), the full range of marks was scored. Many students were able to suggest a range of advantages for the enzyme, especially referring to heat stability and the fact that enzymes can be used over and over again. Weaker students ascribed significance to the fact that vitamin E makes the chemicals produced in the skin harmless, while enzymes break them down. In (a)(ii), almost half of students scored both marks, and most scored at least one. The fact that disulfide bridges are strong was clearly well known.
- (b) Here, many students chose just one factor and wrote at length about it, limiting the marks they could achieve. For example, some realised that skin pigmentation would be a relevant factor, but then explained in great detail why this was relevant, instead of identifying another factor, such as how to expose the people to UV, or how much lotion to apply. A very few felt that the investigation presented ethical issues, as enzymes would be killed.

### Question 10

- (a) This was well known, with many students scoring full marks. Where marks were not awarded it was usually for lack of detail in answers, for example, not referring to cells of the small intestine being infected. A few weaker students clearly confuse lactose intolerance and Salmonella food poisoning.
- (b) Better students scored all four marks here and gave detailed answers. Weaker students confined their answers to vague statements about people with HIV having weak immune systems. A few students described HIV as infecting both T cells and B cells.
- (c) In part (c)(i), many students scored the mark, usually for saying that this would show that morphine is causing the effect and nothing else. A few were concerned about the psychological effects on the mice of giving them a drug and therefore the placebo was needed to counteract this. In (c)(ii), many students realised that this would make the results more reliable, or would reduce the effect of outliers, but only the best students mentioned both.
- (d) Many students scored both marks, but a few did not through vaguely referring to 'mixing of body fluids' if needles that were not sterile were used.
- (e) The full range of marks was scored here, with many students scoring full marks. Some students insisted on giving rehearsed answers, which included low sample size, even though the passage referred to a large number of mice being used. Some students feel that investigations are not valid unless they are repeated many times, even if a large sample is used.

## **Mark Ranges and Award of Grades**

Grade boundaries and cumulative percentage grades are available on the [Results statistics](#) page of the AQA Website.