



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

Biology

BIOL1

(Specification 2410)

Unit 1: Biology and Disease

Report on the Examination

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General Comments

A wide range of marks from 1 to 60 was seen and there were very few blank spaces on the answer papers. At the top end of the range there were some excellent scripts with students having a detailed knowledge of this unit and an ability to apply their knowledge.

Many students would improve their answers if they paid more attention to the instructions given on the examination paper. Where students are asked to refer to a diagram or data, their answers should show evidence of having done so. There are examples in questions throughout this paper where direct reference to material in the question is required for the student to gain full marks.

Some students failed to limit their answers to the question asked and provided a lot of unnecessary information. This can limit time that might usefully be spent elsewhere.

Question 1

- (a)(i) The vast majority of students correctly named organelle Y.
- (a)(ii) Most students were able to identify two structures showing the cell was eukaryotic. Those who did not often failed to use the diagram as instructed or confused prokaryotic and eukaryotic cells.
- (b) Whilst most students correctly linked the mitochondrion with respiration or ATP production, there was still a sizeable minority with incorrect ideas about energy creation in the mitochondria.
- (c) Students generally had a good understanding of why a transmission electron microscope would be needed to see the organelles of the cell. Inevitably there were those who confused transmission with scanning electron microscopy or light microscopy with electron microscopy.

Question 2

- (a) Students had been well prepared for this type of question and many gained both marks for identifying the trends and referring correctly to figures from the graph. Students should be encouraged to limit their answer to the question asked – a significant number attempted to explain the data or to comment on the data from the other investigations.
- (b) Most students correctly stated that age was a risk factor for heart disease. There were, however, many who gave vague generic answers rather than relating what they wrote to the actual question, with answers such as ‘making it a fair test’, without explaining why it would be fair
- (c) The better students had clearly examined the data presented in the graph and provided evidence from specific investigations both in support of, and against, this claim. Weaker answers referred vaguely to few or many drinks and therefore failed to score. Some students correctly suggested that the data were only about heart disease and that other effects of alcohol were not considered. Students should be encouraged to quote data from the graph when asked to use this information.

Question 3

- (a) Many students complicated what should have been a straightforward question by adding a lot of unnecessary information. Many failed to recognise that the question was asking for what happened between times P and Q and described what was happening at P and at Q. Others did not distinguish between the instructions

'describe' and 'explain' and went on to give an unnecessary explanation. There was also some confusion as to whether the diaphragm moved up or down when the muscle contracted.

- (b) Over half the students answered well and gained all three marks. However, as in part (a) there were many who included a lot of unnecessary information, usually about the intercostal muscles. While this did not necessarily result in the student failing to gain credit, it did waste time. Students should be encouraged to use the correct terminology; it was common to see references to space and size rather than volume, and concentration rather than pressure. There was some confusion between cause and effect with students stating that it was the intake of air that caused the movement of the diaphragm and the increase in volume. Students who stated that the air entered by diffusion could not gain the final marking point.
- (c) Most students gained one mark for stating that the oxygen moved by diffusion but only the more able students referred to the epithelial or endothelial cells that made up the walls of the alveoli and capillary.

Question 4

- (a) The majority of the students were able to read the correct figures from the graph and divide concentration by time to gain both marks. Those who made errors in reading from the graph often gained one mark for the correct method. As in previous years, there was a significant number of students who did not attempt a calculation.
- (b) This was answered less well, with many students not describing how cyanide affects the uptake of ions. Instead they described changes in the shape of the graph or wrote about the concentration of ions in the solution. Data to support the answer were often incorrect, resulting from inaccurate reading of the y axis. The better students had read the question carefully and therefore answered in terms of changes to the rate of uptake of sodium ions and supported their answer with correct data from the graph.
- (c) Students were told that cyanide affects respiration and then asked to explain why cyanide reduced the uptake of sodium ions. Many students simply repeated that respiration would be affected without stating that respiration would be inhibited or slowed down. An encouraging number of students were able to make the link between a shortage of ATP from respiration and therefore a shortage of ATP for active uptake of sodium ions. Some students attempted to write about there being no co-transport of sodium and glucose and therefore no glucose for respiration. These students had clearly ignored the information given in the question stem and often failed to score.

Question 5

- (a) It was clear that many students had learned to define key terms and these students gave clear and accurate answers. Others were less specific, most commonly stating that a pathogen was "something" that caused disease. This was insufficient to gain the mark.
- (b) Many students gained all four marks. The main reason for failing to gain marks was for not specifying the idea of fusion of the lysosome with the phagocytic vesicle. Some students, however, failed to read the question properly and wrote in more general terms about B cells and T cells or lymphocytes, ignoring phagocytes.

- (c) Poor terminology let down students who clearly understood the concepts. Too many used active site terminology and were unable to gain the first marking point. The second marking point tended to be gained more often with the majority of students correctly referring to antibody and antigen being complementary, fitting and binding. Those who did not get this mark failed to do so by writing about the antibodies binding to the pathogens rather than to the antigens.

Question 6

- (a) The Benedict's test for reducing sugars was well known with most students gaining all three marks. The main problem here was that many students failed to heat the solution, either by not mentioning heating at all or simply saying 'put it in a water bath' without specifying a temperature – water baths can be at any set temperature. There was a significant number who confused the tests for reducing and non-reducing sugars and a small number who described other biochemical tests.
- (b)(i) It was encouraging to see that the best students were able to apply their knowledge of several different parts of the unit and explain their answers well. These answers were often concise, explaining that more maltose would be produced, lowering the water potential so that water entered by osmosis.

There were many confused answers, however, and it was evident that some students were unsure as to whether pH 2 was acidic or alkaline. Most understood that amylase would hydrolyse the starch into maltose but then went on to write at length about the effect of pH on the rate of enzyme action.

- (b)(ii) Most students gained this mark, realising that you need to look at a range of pH values to be able to conclude what the optimum pH is, but some obviously thought that optimum simply meant the best of those considered. There was a surprising number of students who inexplicably referred to the optimum temperature.

Question 7

- (a) Many students gave the correct answer, hydrolysis. Those who failed to score usually confused hydrolysis with condensation.
- (b) Many students correctly identified that the peptide was too large or insoluble and therefore gained one mark. Only the more able students went on to explain that peptides would therefore not be able to pass through the carrier or channel protein. There was a significant number of students who wrote about active transport despite facilitated diffusion being referred to in the question.
- (c) The more able students used the information in the passage, realising that the destruction of the microvilli on the epithelial cells would lead to a reduced surface area for diffusion or active uptake. In some cases the correct ideas were there but the answer was not fully explained – either by referring only to damage to the epithelium or by failing to complete their answer, simply re-stating the question stem and writing that there would be less absorption. Students who did not use the information, writing about an increased diffusion pathway, failed to score.
- (d) This question was generally answered well with most students recognising that the peptide would be considered "foreign" or "non-self". Those students who failed to score often referred to the peptides as cells.
- (e) Some students failed to use the information in the passage, which stated that the drug had already been tested on patients with coeliac disease, and produced answers referring to trialling on animals or people without the disease. The majority

correctly wrote about side effects, though some gave this answer twice with slightly different wording. Large numbers of answers gave generic responses here such as age or gender, without giving any thought to the context of the question.

Question 8

- (a) Many students showed a good understanding of this part of the specification and went on to gain 4 or 5 marks. There were some who confused the SAN and the AVN and only the best answers showed an understanding that the delay at the AVN was linked with the ventricles filling or the atria emptying before the ventricular systole. Many students also included a description of the route taken by the blood as it passes through the heart and how pressure changes caused the valves to open and close. The weakest answers only described this and, therefore, gained little credit.
- (b) Students have obviously learned the material and have grasped the main ideas about diet and heart disease. The main problem with accessing full marks here was the tendency of students not to be precise in their answers. There were lots of comments about a high fat diet – without mentioning saturated fats, or of atheroma in arteries without mentioning where in the artery. Many wrote about reducing blood flow to the heart, without mentioning that it was the heart muscle that was deprived of oxygen and glucose. There was also some confusion about the difference between an atheroma and an aneurysm. A substantial minority failed to read the question adequately, and wrote about other factors affecting heart disease such as smoking and lack of exercise.

Mark Ranges and Award of Grades

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