



**General Certificate of Education (A-level) Applied
June 2011**

Applied Science

SC14

**(Specification
8771/8773/8776/8777/8779)**

Unit 14: The Healthy Body

Report on the Examination

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General Comments

Some candidates' responses were pleasing to see this series, especially in the demonstration of depth of knowledge of insulin and glucagon. QWC questions are still poorly answered by a significant number of candidates; some did make clear and accurate statements, making good use of scientific terminology, but many others failed to gain marks by giving unstructured, unpunctuated and mis-spelt answers that did not reach the higher marking level.

The pleasing trend of candidates' increasing confidence with calculations continued. Many candidates demonstrated that they were able to process data effectively and make use of the numbers they had calculated in subsequent parts of the question.

Question 1

In 1ai candidates demonstrated a level of confusion in their knowledge of the terms 'tidal volume' and 'vital capacity', with the majority of candidates referring to deep breaths in and out, which is incorrect. It was pleasing to see candidates' responses to 1aii, where candidates identified the correct areas of the graph as being the tidal volume and multiplied by the number of breaths per minute. Some candidates clearly did not have access to calculators, however, and failed to calculate anything meaningful for this section.

For 1b, some candidates were still using information from the stem to answer the question. Candidates do not gain credit for rewording the stem of the question. Lots of candidates scored highly on this question, however, and the level of understanding of pressure changes demonstrated by some illustrated a very sound grasp of the mechanism of breathing.

In 1c, some students used the information gained from part 1a to correctly redraw the graph but this was poorly done by most candidates sitting the paper. Generally if they drew fewer peaks but larger, two marks could be secured. Most managed to gain one but not both of the available marks.

In 1d, most candidates answered correctly and identified continuing with the same diet and not doing any extra exercise.

Question 2

2a was answered very well by the majority of candidates, whereas 2b caused problems for a significant number of candidates who clearly did not know the correct volume of sodium ions in mmol per litre in the blood of a healthy adult, despite the fact they were given a choice of only four answers.

In 2c, many candidates demonstrated their knowledge of symptoms associated with high sodium levels in the body but there were some who referred to becoming dehydrated and having headaches. These comments were ignored and not penalised.

Part 2d was a QWC question and was not answered very well by a considerable number of candidates. The main problem was in the confusion between aldosterone and ADH hormones, and this, coupled with poor structure and spelling, meant that many did not access the higher mark levels for this question.

Candidates failing to identify the correct hormone could still access two or three marks by correctly referring to kidneys and collecting ducts as well as re-absorption of salt. Generally, though, it was clear that for some centres, this area of the specification was poorly understood.

Nonetheless, some candidates had clearly learnt about the correct hormone and its effect with rigour and were rewarded with full marks, which was very pleasing to see.

Question 3

3ai was answered correctly by most and 3aii was also correctly calculated by the majority.

3bi was well understood but 3bii less so. Many candidates were credited with two marks for identifying anaerobic respiration and less ATP, but few scored all three marking points as a depth of knowledge of the stages of respiration was not demonstrated.

For 3c a similar pattern emerged, with candidates stating that surface area is reduced by emphysema or that diffusion would be slower. Very few wrote about both and consequently did not access all the available marks.

Question 4

In general, question 4 was answered very well. Many candidates have a good working knowledge of teeth and dental hygiene and most scored a significant amount on this question. Some candidates showed confusion as to what plaque is, while others miscalculated the percentage increase of children being admitted into hospital with tooth decay. There were many intelligent and plausible comments and suggestions in response to evaluating whether the data provided was unreliable for 4cii. This was very encouraging.

Question 5

The biology in this question was well understood by most candidates and many gained high marks. Most correctly identified villi for 5ai, although one or two got confused with the term cilia and failed to score marks. Some candidates mixed up their answers to 5aii and 5aiii, indicating a lack of understanding of the words “describe” and “explain” in the stem of a question.

5b was answered to a much higher standard than has been seen in the past which was pleasing to see. Candidates clearly have a good grasp of the need for control groups in any investigation, the need to control variables such as the number and age of volunteers, and the need to have a large number within each experimental group.

Question 6

Despite the fact that the stem of question 6ai asks how blood cholesterol could be measured, a significant number of candidates referred to testing urine in their answer. Any references by candidates to chromatography were ignored. It was good to see the majority of candidates had learnt the range for normal blood cholesterol levels in 6aii, and in part b the health risks of high cholesterol were well understood.

In part c, some candidates did not achieve the marks due to incorrect interpretation of pounds and pence. There was significant evidence that some candidates did not have calculators and had rounded up or down too much by attempting tricky calculations by hand. In ciii, few candidates were able to suggest reasonable arguments to support introduction of cholesterol lowering spread, the main problem being that candidates made unqualified references to cost.

Question 7

All but a handful of candidates were able to answer question 7a regarding current guidelines on the amount of fruit and vegetables needed for good health.

7b required critical evaluation, however, and a number of candidates did not even attempt this question. Of those that did, a large number described what the figures were showing instead of evaluating the validity of the conclusion. This meant that no marks were gained. Some candidates failed to notice that the data was only about fruit and discussed the problems of having less than the guideline amount of fruits and vegetables per day and again failed to score. Some answers demonstrated a sound understanding, however, and such candidates secured 3 or 4 marks for their answers.

7c was the second of the QWC questions. Of the two, this was answered to a much higher standard with many candidates having detailed knowledge of suitable nutrition for children and structuring their knowledge such that they gained full marks. Some candidates supplied very superficial answers, with general nutritional comments that did not access marks; others wrote facts with bullet points which meant that the answer lacked structure and flow. Some candidates stuck to their discussion of fruit and vegetables from previous stems and so their answers lacked breadth of knowledge and gained only one or two marks.

Question 8

Generally, this question was the most successfully answered and the level of biological understanding demonstrated by the majority of candidates was pleasing. In 8a, most candidates were able to gain at least one mark by stating that serious or fatal illness can ensue if blood sugar levels drift outside of the normal values, and some even went onto mention hyperglycaemia and hypoglycaemia. Weaker candidates made references to taking insulin if blood sugar was too high, which also gained a mark.

In 8a_{ii}, candidates were able to refer either to a urine test with a dipstick or a blood test with a digital meter. Lots of candidates managed to gain a mark for this question but many missed out by either only mentioning blood test or urine test without reference to the test method.

Candidates' answers were thorough for both 8b and c. A significant number were able to suggest increasing fruit and vegetables to improve diet while some made reference to named carbohydrates such as potatoes and pasta rather than sugary foods. Some lost out by making a sweeping statement to carbohydrates and not differentiating between complex carbohydrates and simple sugars. Few made reference to avoiding alcohol while others gained little by referring to cutting down on fats.

The level of biological knowledge demonstrated by most candidates for 8c was very encouraging. It was clear that many candidates had put a great deal of effort into learning the homeostatic mechanism for controlling blood sugar levels. Lots of candidates knew the hormones involved and the mechanism involved in their function. Some candidates were confused between glucagon and glycogen and consequently failed to score the maximum of four marks.

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