



General Certificate of Education

Applied Science

8771/8773/8776/8779

SC14 The Human Body

Report on the Examination

2009 examination – January series

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Question 1

- (a)(i) The majority of candidates knew this well, and it was clear that many candidates had carried out the test in a practical session and were able to refer to specific tests such as Clinistix. Some candidates lost marks by writing “use Clinistix” instead of describing how the test should be carried out; others wrote a detailed description of the glucose tolerance test, suggesting that they had not read the stem of the question carefully.
- (ii) The response to this question should have shown that the candidate had an appreciation of the need for accuracy/reliability of the test, so answers such as “to find the normal level” did not gain this mark.
- (iii) This was generally known well. Some centres quoted a number that was not the value in mmol litre^{-1} . Where the correct unit was given the mark was awarded, but not otherwise.
- (b)(i) Most candidates were aware of the need to control sugar intake, but many were not aware of glucose itself being a carbohydrate, so the mark relating to slow-release, complex carbohydrates being a preferable source of energy was often lost. Weaker candidates tended to give generalised advice on healthy eating rather than concentrate on the specific needs of diabetics.
- (ii) This was generally done well and in many cases candidates gained full marks. Some confusion between glycogen and glucagon was evident, and there were a number of references to insulin being produced by the liver.

Question 2

- (a)&
- (b)(i) These were simple calculations but required candidates to realise that the squash had been diluted; the candidates who did well on this question had often underlined the key values and were then able to use them in the calculations. Where working had been shown it was often possible to credit some of the marks, but an incorrect answer with no supporting calculation could not gain any marks.
- (ii) Most candidates were aware of the health risks to the child of this diet, and explained them adequately.
- (c)(i) Most candidates knew the symptoms of anaemia, though some confused the condition with rickets.
- (ii) That the addition of foods containing vitamin C would improve iron uptake was generally known but a significant number of candidates lost marks through the list rule when their answers contained a long list of “healthy foods” most of which would not directly aid iron uptake. Fresh or raw vegetables needed to be specified.

Question 3

- (a)(i) Indirect measurement through urine analysis was often given. The best candidates were aware of the high pressure chromatography used to analyse samples.
- (ii) The correct answer to this question was very rare, (134-145mmol litre⁻¹). Quite a large number of candidates quoted the RDI for sodium instead.
- (b) A very large number of candidates wrote wrongly about the need to digest sodium ions, and wrote unspecific answers that applied to any food being ingested, digested and absorbed. Many candidates thought that the entry into the body was at ingestion, rather than absorption and did not realise that the lumen of the gut was still outside the body. The regulation of blood sodium levels through aldosterone was also given here, suggesting that candidates were not reading the question carefully before starting to write.
- (c) There was an interesting range of answers to this question and some candidates gave clear and carefully considered arguments. The units mg and g were often muddled, which then gave the candidate misleading information about the relative proportions of sodium ions in the water and the soup. The better candidates realised also that elderly people were more likely to suffer from high blood pressure and kidney problems and so it was even more important for them to control their sodium intake.

Question 4

- (a)(i) Relatively few candidates used the term homeostasis for this answer. Some candidates wrote "blood" but did not specify or describe the regulatory nature of the blood flow to the cells.
- (ii) These were generally known, although water potential/ osmotic potential were not often considered. The simple answer "water" did not gain credit.
- (b) Marks could be gained in this question either by demonstrating the understanding of the exponential relationship or by working it out long-hand. Many candidates got to the right answer eventually but would have got there more easily if they had used the exponential relationship.
- (c)(i) Many candidates wrote long lists of all the heart conditions they could remember, which again lost them marks due to the list rule. Some centres had given their candidates very detailed information about specific, named heart defects. An awareness of valve defects, their consequences and the effects of a hole in the heart is all that is needed in this part of the specification, which will not require specific named conditions in order to gain marks.
- (ii) Improvements to the patient's health would include less chest pain, less fatigue and the ability for prolonged activity. Responses explaining that the heart would now work better did not gain these marks.

Question 5

- (a) A number of candidates did not read the question and described the most fit person, rather than the least fit, or tried to assess the fitness of the group.
- (b)(i) A significant number of candidates did not describe how to use the spirometer, but only what it measured.
- (ii) This calculation was usually done well, but a number of candidates did not seem familiar with this way of presenting results of spirometer measurements.
- (c) The majority of candidates knew this well and many gained full marks.

Question 6

- (a) The selection of subjects needed to ensure that the only variable was the time spent jogging, so they had to be as similar as possible. Many candidates wanted to gain data from a wide range of different types of people, suggesting that they had not read the stem of the question in order to find the object of the investigation.

The second part of this question required the candidates to consider other factors. It was clear that some centres had given their candidates the opportunity to practise these skills but others had not and the candidates were at a loss as to how to tackle this question.

- (b) The graph was generally plotted very poorly. Very few candidates appreciated that the dependent variable should fill as much of the y-axis as possible and a significant number of candidates did not put the independent variable on the x-axis. Messy and inaccurate plotting led to many candidates denying themselves marks through lack of care. The anomaly at 160s was identified by most and a suitable explanation offered.

Quite a number of candidates lost marks when describing the trend of the graph by writing too generally: “the longer the time, the more the pulse goes up” was a common answer that failed to gain the marks because they had not explained that it was the time spent jogging that caused the pulse rate to rise.

Question 7

- (a)(i) Most candidates responded, wrongly, to this question with the word “enzymes”. Only the better candidates referred to hormones. Named hormones also gained the mark, although gastrin did not.
- (ii) A large number of candidates lost this mark because having stated, correctly, that gastrin increased the release of acid in the stomach, they then went on to negate the mark by saying that this would increase the pH. Only a few candidates named hydrochloric acid as the substance released when gastrin was secreted.
- (b)(i) Most candidates answered this well, and were able to extract enough useful information from the table to gain both marks.

- (ii) The water was the control for the experiment. Only a minority of candidates seemed to understand the role of control as most neither used the term, not described the role correctly.
- (c) As with (a)(ii), this was generally done well.
- (d) The role of the ethics committee in preventing harm to human subjects and giving an impartial evaluation was not appreciated by most candidates. Many seemed to think that the subjects of the investigation would be forced to take part and that it could upset people from a religious perspective.

Question 8

- (a) Most candidates knew that chewing begins the breakdown of food, but did not understand that the increase of surface area makes enzyme action more efficient. A significant number of candidates lost this mark because they referred to chewing breaking down molecules.
- (b) A number of candidates lost marks here because they did not give any information. For example, "She should tell her what foods to avoid" did not gain credit. An answer explaining that sugary or highly acidic foods should be avoided would have got this mark.

Mark Ranges and Award of Grades

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