



General Certificate of Education

Applied Science

8771/8773/8776/8777/8779

SC14 The Human Body

Report on the Examination

2010 examination - January series

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General Comments

This was the first series in which questions incorporated marks for quality of written communication and stretch and challenge. Some candidates were clearly aware of the need for clear and accurate expression and made 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

The names of the structures on the diagram were known well and the application of knowledge of swallowing to the particular case of the naso-gastric tube was also good, although some candidates failed to gain marks through using slang expressions such as "gag" which did not convey the point clearly enough.

In part (b) most candidates did not take their response far enough and limited themselves to failure to break down the food mechanically, without considering the implications of this for the efficiency of enzymic digestion later. Candidates should remember that credit is not given for re-writing the stem of the question.

Question 2

The majority of candidates knew that the greatest of the three groups should be grains and starches, but a very significant number linked the fats/sugars to 20%.

In part (b) most candidates were aware of the need for slow-release energy foods, but only the better linked protein to muscle growth and repair. Answers suggesting extra fats and sugar were regarded as neutral.

In part (c) it was clear that many candidates had put a great deal of effort into learning the biochemistry of respiration and were able to write answers that were highly detailed (and in many cases were far more detailed than was required) and gained full marks. Some misread the question and wrote about the conversion of glucose to glycogen under the influence of insulin.

Part (d) was also well done, particularly by those who had already demonstrated a good understanding of respiration. Where candidates failed to gain marks, it was again because they had not developed their answer fully; the significance of the increased availability of oxygen as a result of greater pulmonary and cardiac output in reducing the proportion of anaerobic respiration was rarely mentioned.

Question 3

Relatively few candidates knew the name of the haematocrit test. In part (a)(ii) a key point was an understanding that the body would produce more red cells in conditions where atmospheric oxygen was low. Most candidates appreciated that this was the case but relatively few gained the second mark, where they needed to explain the significance of this in enabling the body to take up and transport adequate oxygen for the body's needs.

The ethical aspects of the athlete's self-inflicted injury and the way in which finite medical resources would be used in her treatment were not well addressed by the majority of candidates. Ideas such as this are found in earlier AS modules, and their testing in an A2 paper is part of the synoptic element that is included as "stretch and challenge".

Parts (c) and (d) were poorly done, considering that they were AO1 questions that clearly came directly from the wording of the specification. The role of the right ventricle in pumping deoxygenated blood was poorly understood and, in particular, the functions of valves was very badly described, with even the higher-achieving candidates giving answers suggesting that valves push blood along and similar serious misconceptions.

In contrast the calculation in part (e) was usually done correctly.

Question 4

Some candidates fell foul of the list rule in part (a) where, if they named more than one hormone, and the second answer was incorrect, they failed to gain the mark for the correct response. Success in this question seemed to depend on the centre: many centres had covered this material carefully and even the less able candidates were able to score good marks. Many other centres however had a very muddled understanding, and did not write about either aldosterone or ADH correctly. Although some credit was given for knowing that the hormone involved in maintaining a constant blood water potential was ADH, full marks could only be gained if the candidate realised that too much water in the blood would cause ADH production to stop. Weaker candidates gave a memorised, routine description of how ADH would cause water reabsorption in the kidney to increase rather than decrease.

Part (d) was usually well done, although it was clear that a number of candidates were attempting the calculation without a calculator and their overly rounded up or down answers did not gain full marks. Most candidates were able to recognise that information from the calculation should then be used to answer the last part of the question, though some did not realise that all of the sections of part (d) were linked. This is usually the case in structured questions of this sort.

Question 5

Possibly the least successful question on the paper, this question was difficult to answer and many candidates seemed to have done little practical work and found it hard to visualise the experiment.

In parts (a) and (b) many marks were not gained because candidates were repeating information from the stem rather than answering the question. Relatively few knew that maltose was the product of starch digestion and a significant number of candidates wrote maltase where they seemed to mean maltose.

In part (c) the trend of less time taken to stop turning black as temperature rose was identified by most, but only the best candidates looked more closely at the data and saw that the pattern changed at the higher temperatures.

Part (c)(iii) was another QWC question and in this part, even more than in Question 1, candidates deprived themselves of marks by writing unstructured short notes rather than continuous prose. It may help candidates to read the published mark scheme in order to get a better idea of the requirements for these questions. Another significant reason for failing to gain marks was a lack of understanding about what constituted as source of error, as opposed to issues with accuracy and reliability.

Question 6

The biology in this question was well understood by most candidates and many gained high marks. A common mistake was to imply, or directly state, that a more acid pH was “higher”. This would cancel any mark given for the correct response of acidosis. Knowledge of the role of buffers and, in many cases, the mechanism by which they worked was very good as was the understanding of the link between blood pH and breathing rate.

Part (b) was less well done, with candidates offering very brief, sometimes only one or two words, in response to the aspects of dietary control that a diabetic would need. To gain these marks a full description of the strategy was needed. Fizzy drinks, without qualification, do not gain the marks here, as they can be simply carbonated water with no sugar content. “Avoid fizzy drinks” therefore gained no marks, as it did not convey the concept of the avoidance of sugar/sucrose.

Question 7

Superficially this probably appeared an easy question but the majority of candidates did not score highly on it because they mis-read the stem and wrote low-level, unspecific responses. Part (a) required an understanding that chewing stimulated the flow of saliva, which would have bactericidal properties, prevent sugars in the mouth being converted to acids and thus reduce acid erosion of the enamel.

Part (b) then went on to suggest advantages of the Supasweet gum, which was to reduce dietary calorie intake, so reducing the likelihood of weight gain. Very few candidates indeed recognised that bacteria would be unable to respire the Supasweet, so they would not produce the acid that erodes enamel. The majority of candidates only rewrote the information from the stem, instead of explaining its significance.

In part (c)(i) the majority of candidates (who had calculators with them) were able to calculate the percentages, although quite a number did not then subtract them to gain the second mark. They were then able to go on and use the result of 2% when discussing the reliability of the conclusion to the study. When marks were lost in this section it was often due to generic answers about reliability of data, rather than points being made about this particular scenario.

Mark Ranges and Award of Grades

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