



## **General Certificate of Education**

### **Applied Science**

**8771/8773/8776/8777/8779**

**SC14      The Healthy Body**

## **Report on the Examination**

*2010 examination - June series*

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## General Points

The number of sections left unattempted has reduced, with a greater proportion of candidates prepared to try the AO2 calculations. Remarks added by a few candidates in these questions suggested that they resented being expected to carry out calculations and were surprised to find them on the paper. Centres should ensure that their candidates are aware that data processing includes basic mathematical procedures.

Candidates lost marks unnecessarily when they did not observe the rubric of the question or when they re-wrote the stem of the question as their response. Where questions involved the use of data to draw conclusions, marks were only awarded if it was clear that the candidate had used the data specifically.

Candidates need to remember that there are synoptic elements in this paper which will include knowledge of work covered in SC02.

## Question 1

- (a)(i) Most candidates drew an arrow pointing to the large intestine rather than specifically to the rectum and only a minority gave the rectum as the name of the part of the gut where faeces were stored. Due to the variability of events in the rectum/colon/large intestine, the first mark was allowed if the arrow indicated any portion of the gut beyond the transverse region, but the name of the rectum had to be correctly given for the second mark.
- (a)(ii) The majority of candidates understood that water was re-absorbed in the large intestine, but many lost marks through responses such as “prevents diarrhoea” indicating they understood the concept but had not read the question carefully enough.
- (b)(i) The concept of peristalsis as a wave of antagonistic muscle contraction was not well understood, even when the word peristalsis had been used in the correct context.
- (c) “Eat more fibre” was a very common response, but it gained no marks as earlier parts of the question had given this information already. Despite the question asking for changes to the diet to prevent constipation, many responses included exercise and other lifestyle choices unrelated to diet showing the question had not been read carefully enough.
- (d) This part was generally done well, with a good range of responses showing that the components of a vegan diet were well understood.

## Question 2

- (a)(i) This was not well known. Many responses gave a selection of tests (all the candidate could remember?) and so fell foul of the list rule, where additional, incorrect answers can cancel out the correct one.
- (a)(ii) This value (5 $\mu$  or 200iu) was rarely known, and the numerical value alone without the units was not given the mark.

- (b)(i) The production of vitamin D by the skin in the presence of sunlight was not well understood. A number of candidates wrote their responses as though they imagined vitamin D itself raining down in the sunlight, and the clothes blocking its entry into the skin. This idea has been tested in a similar way in previous examinations and it is disappointing that candidates are still experiencing difficulty with it.
- (b)(ii) The role of vitamin D in preventing the bone abnormality seen in children as rickets was known by many candidates, but they then lost the mark by contradicting themselves and referring to brittle rather than softened bones. Many responses included ideas such as pale skin, and listed a variety of symptoms such as headache, nausea and tiredness which, again, lost candidates marks through the list rule as these symptoms are too general and widespread to be accepted as specific to vitamin D deficiency.
- (b)(iii) Relatively few candidates were able confidently to describe the link between vitamin D and calcium uptake.

### Question 3

- (a) This part was done well with the majority of candidates able to identify the nutritional advantages of the second menu. Where marks were lost it was because candidates wrote about “more fibre” or “more omega-3 fatty acids” and did not name the replacement food item that would supply these nutrients. The QWC in this question was considerably higher than in similar questions in the previous examination.
- (b) Again the majority of the responses correctly identified the reasons that elderly people should remain physically active, although some again produced a long list that sometimes cancelled the mark. Maintaining vital capacity, a synoptic mark from S&C was very rare.
- (c) This was generally done well, although some candidates muddled the effects of a diet with too much sugar with a diet containing too much fat.

### Question 4

- (a)(i) The majority of candidates knew the correct name for these muscles, although a number did not read the question carefully and answered both parts (i) and (ii) as though they were being asked about the diaphragm rather than the intercostals muscles.
- (a)(ii) This was done well, and many candidates wrote enough to gain more than the maximum marks. A relatively small number showed a good understanding of the pressure gradient causing movement of air into the lungs. A significant number of candidates lost marks as they wrote about the lungs expanding to draw in air.
- (b)(i) This was only done well by relatively few candidates, who realised that it was the downward movement of the diaphragm that was being prevented by the position of the rower’s legs, rather than the upward movement of the ribs.
- (b)(iii) Many candidates found this difficult and wrote answers that were more complicated than were needed: greater strength in the muscles of the chest wall would increase vital capacity which in turn would increase oxygen intake, therefore reducing the proportion of anaerobic respiration.

### Question 5

- (a)(i) This was known by most candidates
- (a)(ii)  
&(iii) Relatively few candidates showed a good understanding of the functions of the coronary arteries, so were unable to apply their knowledge to the function of the bypass in providing the cardiac muscle with a better supply of oxygenated blood. This meant that they found it difficult to identify the position of the blockage and lost marks in the extended prose by writing about oxygenated blood being delivered to the body tissues rather than the heart muscle itself.
- (b)(i) The advantages of a digital display which removed the subjective element of taking a reading was well understood, although generalised phrases such as “more accurate” did not gain marks unless they explained what it was about the digital display that improved the level of accuracy.
- (b)(ii) This question was well done, with the majority of candidates knowing the correct value for normal blood cholesterol and applying this to identify the level given as too high.

### Question 6

- (a)(i) Most candidates knew the various aspects of the volunteers’ characteristics that should be controlled in this type of experiment, but as in previous years did not specify that they should be in the same age range, similar body mass and so on.
- (a)(ii) The answer that people differ in size and therefore the amount of caffeine needed to be adjusted in order for results to be comparable was explained clearly by relatively few candidates; many had the right idea but did not express themselves clearly enough to gain the marks.
- (b) Many candidates recognised the placebo experiment as a control, but only a few were able to explain that the role of the control was to show that only the caffeine could be responsible for the change in urine output, as all other factors had been accounted for.
- (c)(i) This was done well, with most candidates gaining both marks, although some did not gain credit because they did not show in their answer that they had used the data to form their conclusion.
- (c)(ii) This question tested the understanding that absorption of substances through the gut wall took time and was variable. Few candidates showed that they understood this, although most were able to appreciate that an injection would deliver the caffeine directly into the blood system.
- (d) Answers to this type of question are improving, with a good understanding of informed consent, independent scrutiny and confidentiality.

### Question 7

- (a) Knowledge of the cooling effect of evaporation as it removed heat energy from the body was generally poor, with weaker candidates believing that a layer of water on the baby kept it warm.
- (b) The use of a pulse oximeter and its advantage in being non-invasive was well known and clearly explained in most cases.
  - (b)(ii) Some candidates missed the % from the answer and so missed this mark.
  - (b)(iii) The question clearly asked for atoms of oxygen but a significant number of candidates wrote 4, suggesting they had not read the question carefully enough.
- (c) This calculation was generally done well, with many candidates gaining full marks.

### Question 8

- (a)(i) There was some confusion about the role of bile, with many candidates referring to the molecules of fat being broken down, rather than the droplets being emulsified. Mention of lipase was rare.
- (a)(ii) The majority of candidates appreciated that the enzymes required a narrow pH range and better candidates were able to explain about denaturation and the effect this would have on the rate of reaction.
- (b) Most candidates were able to recognise the high-fat foods, but relatively few selected their foods so that there was a comparable low-fat replacement. The replacement did not have to be selected from the list offered although fish could be used to replace the protein of the full fat cheese, and chicken could replace the fattier bacon.

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

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