



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

Applied Science

SC08

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

Unit 8: Medical Physics

Report on the Examination

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General Comments

Many candidates were well prepared for this examination. However, as in previous examinations, some candidates showed little knowledge and understanding of basic concepts and were clearly unready to sit this examination. This was particularly evident in questions where candidates had to apply knowledge they had recalled. Candidates also still need to read the questions carefully and make sure they understand what the question is about before attempting to answer it. It is good to see that some centres have clearly made good use of previous reports and mark schemes to prepare their candidates very effectively. Some very high quality answers were seen.

Question 1

This question was generally done well.

- (a) Most candidates gained 2 marks.
- (b) Most candidates gained 1 or 2 marks. Some candidates, however, still suggest that 'wearing goggles' is a suitable precaution to take when using a laser, which is insufficient to gain a mark.
- (c) (i) Most candidates gained one mark but very inaccurately drawn reflections meant that many failed to gain the second mark.
 - (ii) This was generally answered correctly.
- (d) Most candidates gained at least 2 marks for using the correct equation and substituting correctly. Many candidates, however, had great difficulty in dealing with powers of 10 and/or re-arranging the equation to calculate f .

Question 2

- (a) (i) Few candidates knew that hypothermia would be diagnosed when core temperature was below 32°C .
 - (ii) Many candidates lost marks because they failed to read the question properly. This question was about how the thermometer would be used, not about the physical principles behind how it works.
 - (iii) This was generally answered well.
- (b) Some candidates produced very thorough answers but a substantial number did not appreciate that this question was concerned with heat radiation. Some candidates displayed very limited understanding of thermal transfer in their answers, for example, through saying that the blanket was a good conductor so would keep the heat in.
- (c) This was generally answered correctly and most candidates gained both marks.

Question 3

- (a) (i) Most candidates gained both marks.
- (ii) There was a full range of responses to this question. Some candidates clearly knew this well and others did not.
- (b) (i) Almost all candidates were aware that M stood for ‘magnetic’ and most knew that R stood for ‘resonance’. However, ‘imaging’ was less well known, and some candidates thought the I stood for ‘isotope’.
- (ii) This was generally answered quite well with a significant number of candidates gaining 2 or 3 marks.
- (iii) Some candidates answered this very well, but others showed a lack of understanding of different imaging techniques which meant that they were not able to make meaningful comparisons.
- (iv) This was generally answered well.

Question 4

- (a) This was generally answered very well with many candidates gaining the full three marks.
- (b) This was generally answered well with most candidates gaining 2 or 3 marks. The most common reason for not being awarded marks was when candidates failed to read the question properly and stated ‘emit gamma radiation’ as an additional reason for the isotope’s suitability.

Question 5

- (a) (i) There was a huge variation of marks awarded for this question. Many candidates were obviously very familiar with measuring refractive index and answered this question very thoroughly. Others appeared to have no idea of what was being asked. Some candidates knew what refractive index was but did not know how to carry out the experiment. Some candidates wanted to carve the block into a semicircular shape and measure the critical angle. There was also a wide variation in the quality of written communication. To gain high marks for a QWC question it is important that candidates not only apply the mechanics of English (spelling, punctuation and grammar) but also that they present their answer in a logical, structured way. It was disappointing to see that a large number of candidates made very basic English errors with a significant number even misspelling words that appeared in the stem of the question.
- (ii) Most candidates gained at least one mark. Statements like ‘use accurate equipment’ were far too vague to gain any credit.
- (iii) This was generally answered correctly.

- (a) Many candidates gained full marks. Marks were lost due to substituting 1.4 for the critical angle and inability to use sines correctly.
- (b) Many candidates gained at least 3 of the 4 available marks. A significant number failed to score any marks as they did not seem to understand what 'refractive index' meant, some suggesting that it was a measure of how strong or how hard the glass was.

Question 6

- (a) Most candidates had a reasonable attempt at 'sphygmomanometer' and were given credit if their response was phonetically acceptable.
- (b) Most candidates gained the full 2 marks in this section.
- (c) Many candidates scored well on this question. Others lost marks through answering this question in relation to temperature rather than pressure, failing to explain their advantage or disadvantage or assuming that only invasive methods of measurement can be used to monitor continuously or be recorded electronically.

Question 7

- (a) This question was generally answered quite well. Some candidates gave excellent, thoughtful answers which showed a good level of understanding. Marks were lost through poor written communication and also simply repeating information given in the stem without considering its implications. Again a significant number of candidates did not appear to have read the passage carefully or think about the meaning of what they had read.
- (b) This was generally answered well. Some candidates, however, thought that the thermal camera had to be inserted into the body and others thought that heat radiation had to be sent into the body in order to produce a thermograph.

Question 8

- (a) Most candidates answered this question correctly.
- (b) (i) Most candidates knew which equation to use and substituted correctly. Many then had difficulty in manipulating the equation to gain a meaningful answer.
 - (ii) This was generally answered well.

Mark Ranges and Award of Grades

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

