AQA

ASSESSMENT and
QUALIFICATIONS
ALLIANCE

General Certificate of Education

Applied Science
8771/8773/8776/8779

SC05   Choosing and Using Materials

Report on the Examination

2007 examination - June series

General Comments

In the majority of cases, candidates had attempted each part of every question. It would therefore appear that there were no difficulties in terms of candidates being short of time on this paper. However, there was evidence that some candidates were not reading the question with sufficient care. This often led them to answering a question which they thought had been asked, rather than the one that was actually asked.

The Principal Examiner's report on the January 2007 paper noted a shortcoming in the mathematical abilities of many candidates. Sadly there seems to have been little improvement in that respect on this paper.

Another point noted in January 2007 referred to the poor standard of recall of straightforward definitions. This was again noticeable in the June 2007 paper.

Question 1

(a)   This question was intended to provide a straightforward introduction to the paper, which indeed it did. The majority of candidates were able to score well on this question. However, a significant number of candidates failed to read the stem carefully and did not notice that the question required a suggested use for each material in a building. This resulted in answers such as 'drinks cans' for aluminium, 'bottles' for glass and 'bicycle frames' for steel.

(b)(i)   Many candidates thought that the purpose of the steel wire mesh was simply to hold the concrete in place while it was setting, rather than to provide reinforcement.

(ii)   Few candidates realised that it would be easier to bend the plywood into a curved shape.

(c)(i)   Most candidates realised that it would be the upper surface of the main floor that would be in compression. Some candidates failed to draw an arrow labelled C, but instead wrote a large capital C on the main floor section, perhaps hoping that they would have covered the required area if they made the letter large enough.

(ii)   Few candidates realised that the reinforcing rod is set in the position where most tension will occur.

(iii)   Most candidates were able to obtain two marks for this part of the question; although some appeared confused between what was an advantage and what was a disadvantage.

(d)(i)   Most candidates could spot that as the length of the joist increased, so did the required cross-sectional area. Some candidates however described a relationship between the spacing between the joists and the cross-sectional area needed.

(ii)   Examiners saw very few correct answers to this part of the question.

Question 2

(a)(i)   None of the three definitions asked for in this part of the question was very well provided. Stiffness was often described as 'how stiff a material is'.

(ii)   Ductile provided the best set of responses out of the three, but was often confused with malleable.

(iii)   Tensile strength was often described as 'how strong a material is'.

(b)   The definitions of stress and strain required in this part of the question elicited rather better responses than the three asked for in part (a), but examiners still saw a lot of incorrect statements.

(c)(i)   Most candidates realised that elastic deformation was indicated by the initial linear section of the graph. Some candidates however indicated a point right at the upper limit of this section.

(ii)   Most candidates could correctly indicate a portion of the graph where the material was undergoing plastic deformation.

(iii)   Very few candidates could correctly identify the yield point.

(d)   The meanings of the three terms required in this section were generally well answered, although a significant number of candidates had elastic and plastic deformation the wrong way round.

(e)   Most candidates knew how to calculate the Young modulus. However, a disappointingly large number failed to conquer the arithmetic to arrive at the correct numerical answer. Few candidates attempted to put any units after the numerical answer, and of those who did, many had the wrong units.

(f)   Most candidates scored one mark here, but very few were able to correctly identify both graphs.

(g)   In spite of the fact that Searle's apparatus is named in the specification, very few candidates appeared to have either seen, or heard, of it. Most were able to pick up one or two marks, but it was clear to examiners that they were doing so by trying to reason out how the equipment could be used, rather than from any basis of familiarity.

Question 3

(a)(i)   Many of the answers seen here lacked conviction, with only a small number of candidates scoring one mark.

(ii)   Most candidates could suggest why it might be better to use wood rather than steel for the hull of the boat. Few candidates however could suggest why it might be better to use a composite material rather than solid wood.

(iii)   Most candidates realised that a thin layer of plastic would help to make the hull waterproof.

(b)(i)   Most candidates knew the meaning of the term alloy.

(ii)   Examiners were disappointed to find that most candidates thought that pure copper would rust.

(c)(i)   Most candidates could correctly identify the structure as being cubic.

(ii)   Most candidates were able to score the mark for this question.

(iii)   Although the majority of candidates correctly identified spectacle frames as a suitable use of a shape memory alloy, a disturbing number thought that bridge girders or hot water tanks would be suitable applications.

Question 4

(a)(i)   Although many candidates were able to score all three marks for drawing the graph, there were many who did not. The most common error involved the scaling on the x-axis. This was because they had failed to spot that there was no data for a 15mm air gap.

(ii)   Most candidates were able to earn one mark here, but few offered sufficient detail to obtain both marks.

(b)(i)   "AQA very much regrets that an error occurred on this question. The question should have stated that the U-value would be reduced if thicker glass were used.
In order to compensate for this, candidates were awarded a mark for any sensible statement relating to thermal conductivity, insulation, U-values or the width of the air gap, regardless of whether they thought that there would be an increase or a decrease in any of these."

(ii)   Most candidates were able to score the mark for this question.

(c)   This was generally a well-answered part to the question.

Question 5

(a)(i)   Most candidates could suggest one property of LDPE.

(ii)   Most candidates could suggest one use of LDPE.

(iii)   The most common error was to write down the formula of the polymer rather than that of the monomer.

(iv)   Surprisingly few candidates could name the monomer used to make natural rubber.

(b)(i)   Most candidates could state either that it was a double bond or that it was a covalent bond. Few candidates were able to state both of the points. Candidates should be reminded to look at the mark allocation for each question, as this can often help them: if two marks are available, then they should know that they have to make two mark-worthy points.

(ii)   Only the more able candidates were able to score a mark.

(c)   Most candidates were able to identify the correct sample, although by no means all of these could state a correct reason for their choice.

(d)   This part of the question was very well answered.

(e)   There was a disappointing response to this part of the question, candidates seeming to be unfamiliar with describing the behaviour of rubber when stretched.

(f)   Very few sensible suggestions were seen in answer to this part of the question.

Question 6

(a)   Most candidates correctly identified invar as being the metal that would expand the least.

(b)   Comparatively few correct answers were seen to this part of the question. Of those who did manage the calculation correctly, units were often missing or incorrect.

(c)   This part of the question, which required candidates to apply their understanding to a new situation, produced very disappointing answers.

Question 7

(a)   Candidates were reasonably good at describing the difference between the two cables, but not very good at explaining why the two cables needed to be different.

(b)   Examiners were extremely disappointed at the poor responses seen to this part of the question. A significant number of candidates failed to score any marks because they answered in terms of thermal conductivity instead of electrical conductivity. Many candidates appeared confused over basic measurements of current and potential difference.

Mark Ranges and Award of Grades

Grade boundaries and cumulative percentage grades are available on the **Results statistics** page of the AQA Website.