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SC05 Choosing and Using Materials

Report on the Examination

2010 examination - January series

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General Comments

The paper appeared to differentiate well and produced a good spread of marks. The vast majority of candidates attempted every part of every question, with the exception of Question 4.

As in the past the standard of mathematical calculations was disappointing. Candidates should be encouraged to attempt all calculations: in many cases marks are awarded for selecting the correct formula to use or for providing the correct units, even if the arithmetic is incorrect. Candidates' handling of negative indices was particularly weak (Question 7(h)(ii)).

Many candidates appear to be either careless with units or do not understand how to use units. This was particularly noticeable in Questions 5(h) and 7(h).

There are some occasions where candidates are 'hedging their bets' by writing down several answers in the hope that one of them may be correct. A good example of this was in Question 3(b). Candidates should be aware that examiners mark lists on a +1 -1 basis.

The concept of chemical bonding is still poorly understood (Question 4) and polymer science is also a weakness (Question 3(d)(e)).

It was disappointing to find, yet again, that those questions involving straightforward recall of standard definitions were poorly answered by many candidates. A total of 12 marks out of 80 (i.e. 15%) fell into this category.

Many candidates were careless in their wording and failed to gain marks as a result. For example, describing a composite as a mixture of *one* or more materials or an alloy as a mixture of *one* or more metals.

Question 1

Most candidates scored around half marks on this question.

In (a)(i) a surprisingly large number of candidates did not realise that the 'malleable' nature of metals made them suitable for making car bodies.

In (c)(ii) a lot of candidates failed to gain marks by not comparing GRP with plastic. For example, by saying that GRP is strong rather than GRP is stronger than plastic.

Question 2

Apart from the less able candidates most did well on this question.

In (b)(ii) a lot of candidates did not describe the trend shown in the graph as 'the rate of heat loss decreases as the size of the air gap increases'. Instead they stated that the graph showed a 'negative correlation'.

Question 3

Only a small number of candidates scored highly on this question.

In (a) the definitions of 'polymer' and 'tensile strength' were largely unknown. A lot of candidates were able to state that density = mass ÷ volume.

Part (e) was very poorly answered showing a weakness in the knowledge of polymer science.

Question 4

The answers to (a) & (b) were very much centre dependent.

The candidates from a few centres answered these questions well. However, the majority of candidates showed little or no knowledge of chemical bonding. Surprisingly some candidates referred to positive and negative electrons.

Some candidates who correctly identified ionic bonding in (a)(i) could not explain in (a)(ii) that an ionic bond is formed by the transfer of electrons from metal atoms to non-metal atoms. Instead they talked about the force of attraction between ions which is what an ionic bond is, not how an ionic bond is formed.

Question 5

In (a) the definition of 'thermal conductivity' was largely unknown.

In (b) judging by the large number of incorrect answers to this part of the question it would be safe to assume that the definition of 'electrical conductivity' was also largely unknown.

Parts (c) & (d) were well answered by the majority of candidates.

In (e) the definition of 'thermal expansivity' was largely unknown.

In (f) this was well answered by most candidates.

In (g) in defining an alloy a large number of candidates stated that it is a combination of metals.

In (h) a lot of candidates knew that density = mass ÷ volume but could not rearrange this to give mass = density × volume.

Question 6

The majority of candidates scored around half marks on this question. A pleasing number scored full marks. Despite being told that each of the samples being tested had the same dimensions a lot of answers started with a detailed description of measuring the length, width and breadth of the three samples to ensure they were the same size. A significant number of candidates thought that the idea of the experiment was to break the samples rather than dent or scratch their surfaces.

Question 7

This question was reasonably well answered by most candidates.

The definition of 'synthetic' was largely unknown.

The Young Modulus calculation in (h)(ii), although better answered than in past examinations, still presents a problem to many candidates despite it being a well established question.

Mark Ranges and Award of Grades

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