



General Certificate of Secondary Education

Science B 4462 / Chemistry 4421

CHY1H Unit Chemistry 1

Report on the Examination

2010 examination – January series

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Science B / Chemistry
Higher Tier CHY1H**General**

There were six questions on this paper. The first two were common to Foundation and Higher Tiers. They were targeted at grades D and C. The final four questions were targeted at grades B, A and A*.

The candidature was very similar to previous years, ranging from very able candidates to those who might have been better doing the Foundation Tier paper.

The mark scheme was designed to allow candidates to gain marks for showing knowledge, understanding and application of chemistry. The extended response questions caused problems for the candidates who could not organise their answers. Too often candidates concentrated or elaborated on one point, or gave an argument and its converse, anticipating two marks, which were rarely awarded. The majority of candidates appeared to have sufficient time to complete the paper.

Basic knowledge and understanding of How Science Works in everyday situations, including in the laboratory, are tested throughout this paper. This means that it is essential that candidates read and analyse the information provided, then read the question before writing their response.

Question 1 (Standard demand)

- (a) (i) A majority of candidates gained the mark for indicating that rapeseed oil had the lowest percentage of saturated fat or only 6.6% of saturated fat. However, a few simply quoted the figures from the table with no real or inferred comparison. This was not enough to gain the mark.
- (a) (ii) A majority of candidates gained the mark for comparing the percentage of poly-unsaturated fat in rapeseed oil with the percentage of poly-unsaturated fat in at least one other oil. Candidates also gained credit for comparing the percentage of poly-unsaturated fat with mono-unsaturated fat and/or saturated fat within rapeseed oil.
- (b) The test for unsaturated fats was well known. Unfortunately, some candidates described the resulting colourless solution as clear and so did not gain the mark for the result of the test.
- (c) (i) The majority of candidates answered the question well with very few stating incorrectly that the melting point decreased or got lower or that it took longer to melt.
- (c) (ii) Many candidates recognised that there would be an increase in saturated fat which is a less healthy fat. Several candidates gave incorrect or inadequate explanations such as the student was wrong because hard fat or hydrogen is harmful to the body or the amount of fat would increase.

Question 2 (Standard demand)

- (a) (i) Most candidates could suggest a valid reason why light bulbs cannot be recycled.
- (a) (ii) There was much confusion over recycling and reuse, although reuse was defined in the stem of the question. Many candidates seemed unaware that glass bottles can be reused because they think that the only bottles that are reused are plastic ones.
- (a) (iii) Most candidates displayed an understanding but sometimes were unable to explain clearly why using recycled glass to make new bottles produces less carbon dioxide. Candidates usually focused on the decomposition of the carbonates rather than the different temperatures used, possibly because the temperature for recycling had been given much earlier in the question. Both were correct.
- (b) (i) The answer was usually correct. The most common incorrect response was 45%.
- (b) (ii) Many candidates appeared to be aware of the large trade in imported wines and beers and the consequent import of green bottles.
- (b) (iii) Most candidates correctly used the information on the bar chart and used this in their answer to gain one mark. Many candidates also used the information given in previous parts of the question and so included, quite correctly, points about necessary raw materials, energy or fuel and the production of carbon dioxide to construct an answer worth two marks.

Question 3 (High demand)

- (a) Concerns about carbon footprints were well understood.
- (b) Most candidates understood that burning wood would have a lower carbon footprint than burning coal. Weaker candidates did not write a full explanation to gain all three marks. A significant minority thought that burning wood emits no carbon dioxide or blamed coals high carbon density for its carbon footprint.

Question 4 (High demand)

- (a) Most candidates did correctly suggest that Wegener did not have enough evidence or proof.
- (b) Plate tectonics still produces too many vague answers. However, nearly all of the candidates knew that tectonic plates move, although some think that they move very quickly or bang together. Two thirds of candidates gained two marks.
- (c) Few candidates could explain the difficulty in predicting when an earthquake is about to happen. Perhaps this is because understanding of earthquakes is limited by our tenuous knowledge of what is happening deep below the crust.

Question 5 (High demand)

- (a) (i) This part was well answered, with most candidates gaining two marks for sulfur dioxide and acid rain. Some candidates are still confused about the causes of acid rain, global dimming and global warming.
- (a) (ii) Most candidates knew that the process was called electrolysis.
- (b) (i) This was another well answered question, with most candidates gaining the mark.
- (b) (ii) This part was also well answered with a large number of candidates gaining both marks. The concept of pure metals having layers of atoms capable of sliding or the atoms in alloys not sliding so well was very well known and was usually the only mark obtained by weaker candidates. Most candidates gained the second mark by recognising that the atoms in alloys were of different sizes, while the more able candidates referred to the disruption of the layers of atoms.

Question 6 (High demand)

- (a) The description of how crude oil is separated into fractions produced a wide range of responses. Although most candidates gained at least one mark, this mark was quite often for a reference to fractional distillation. This fall-back mark was often credited because candidates could not be precise enough to gain marks in any other way. Candidates referred to both the industrial and laboratory versions of this process. The first marking point in the industrial process, the vaporisation of the crude oil, was the mark that was often missed out, while the more difficult idea of separation by differing boiling or condensing points was often included and credited. Many candidates spoil their responses by including references to cracking, some giving an excellent, but non-credit worthy, description of the cracking process. Surprisingly some candidates still managed to include electrolysis, chromatography and the blast furnace in their explanations.
- (b) (i) It was disappointing that more than half of the candidates could not balance the symbol equation for cracking.
- (b) (ii) Many candidates correctly named alumina as the catalyst, although a nickel catalyst at 60°C was often mentioned. Some candidates lost the marks because they explained the meaning of the term cracking rather than describing how cracking is carried out.
- (c) The difference in the structure between alkanes and alkenes was very well known, although it was not always explained very well. Most candidates could explain the relevance of the structure of these hydrocarbons to the formation of polymers. Some candidates had problems explaining the way in which alkene monomers bonded to each other to form a polymer and often lost that mark because of a mixture of weak scientific and poor English.
- (d) Drawing the diagram to represent part of a poly(propene) molecule was difficult for many candidates. Common incorrect answers were to just copy the structure of propene or the structure of poly(ethene).

Question 7 (*High demand*)

- (a) In the final question it was good to see carbon dioxide named as the cause of the loss of mass. Quite a few candidates seemed to think incorrectly that the loss in mass was caused by the heat driving off the impurities or the moisture in the limestone.
- (b) This part proved to be difficult for most candidates. Many thought that the calcium oxide would react with oxygen rather than with water vapour or carbon dioxide in the air.
- (c) Several candidates scored zero because they selected one site but went on to write about a different site. A few good accounts failed to score full marks as they contained all advantages and no disadvantages. Many candidates listed points straight from the map, such as near the road or near the river without explaining why these are advantages or disadvantages. A common misunderstanding was that the heavier the mass of solid remaining after heating, the more limestone you were getting. All sites would be noisy, destroy an area of beauty and cause dust. The question is why some sites would be more acceptable than others. The mark scheme allowed any chosen site to gain all four marks.

Mark Ranges and Award of Grades

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