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General Certificate of Secondary Education

Science B 4462 / Chemistry 4421

CHY1F Unit Chemistry 1

Report on the Examination

2010 examination – January series

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Science B / Chemistry
Foundation Tier CHY1F

General

There were seven questions on this paper. The first five were targeted at grades G, F and E. The last two were common to Foundation and Higher Tiers. They were targeted at grades D and C.

The mark scheme was designed to allow candidates to gain marks for showing knowledge, understanding and application of chemistry. The majority of candidates appeared to have sufficient time to complete the paper and very few questions were left unattempted.

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. Many candidates would have gained better marks had they been able to express clearly what they appeared to understand. Two examples that many candidates used were the word burn instead of heat or the statement that carbon dioxide was used instead of carbon dioxide was produced.

Question 1 *(Low Demand)*

(a) (i) The majority of candidates could use the bar chart to indicate that copper was the metal in all of the coins.

(a) (ii) The majority of candidates were able to identify that the 50 p coin did not contain zinc.

(a) (iii) The answer was usually correct. The most common incorrect response was 75 %.

(a) (iv) Most candidates correctly identified tin as the other metal in 1p and 2 p coins. Several questions on this paper required candidates to draw a ring around the correct answer; the vast majority complied with this instruction. There were a few candidates who did not receive any credit because they had circled more than one answer.

(b) (i) Most of the marks gained were by reference to the high cost of copper or to the high percentage of copper in the 2 p coin. Many candidates thought that the 2 p coins were worth 3.3 p because they were collectable or antique.

(b) (ii) Most candidates correctly gained the mark for the answer cheaper or for harder or stronger. A few candidates thought, incorrectly, that steel was replacing tin and zinc because both of these metals are now rare. The suggestion that the copper-plating prevented the steel from rusting did not gain any credit.

Question 2 *(Low Demand)*

(a) (i) Most suggestions given were correct. The majority of candidates stated that the additives would be in the ice cream.

(a) (ii) The majority of reasons given were correct. The most common correct responses were related to cost and being able to keep the milkshake for a long time.

(b) (i) Many candidates found it difficult to interpret the simple chromatogram. The most common incorrect answer was five.

(b) (ii) Most candidates just wrote the chromatography test for their answer because they were unable to interpret the simple chromatogram. A few candidates did correctly indicate that the dots or colours were either at the same height or matched in some way.

(b) (iii) Several candidates gave the inadequate response that the student did not do the test correctly or accurately. However, many candidates did suggest correctly that the test was done only once or that the test needed to be repeated or that the E129 dot or colour was larger than the matching one from the milkshake.
A small number of candidates were also correct in suggesting that the dot or colour in the milkshake alongside the E129 dot could have been caused by something other than allura red.

Question 3 *(Low Demand)*

(a) (i) Most candidates were able to identify that the core was the correct word.

(a) (ii) Many candidates correctly chose radioactive. The most common incorrect choice was combustion.

(b) Most candidates followed the instruction and used a straight line from each substance to its correct environmental effect.

(c) The majority of candidates correctly stated or indicated that volcanic eruptions happened because the tectonic plates were moving. A few candidates knew that it was something to do with convection currents in the mantle but did not go on to state that this causes the plates to move. There were some candidates who thought that it was to do with the atmosphere and global warming.

Question 4 *(Low Demand)*

(a) The correct word elements were usually chosen.

(b) (i) The majority of candidates knew that the centre of an atom is called the nucleus.

(b) (ii) Most candidates understood that a carbon atom has six electrons.

(c) (i) The majority of candidates understood that the formula of methane was CH_4.

(c) (ii) The majority of candidates knew that the line between the atoms of carbon and hydrogen on the diagram of methane represented a bond.

(d) (i) Most candidates knew that when methane burns it reacts with oxygen.

(d) (ii) There were some very confused answers. For example, some thought that hydrogen is a gas abundant in the atmosphere and that it does not react with oxygen, unlike methane. Others thought hydrogen released noble gases when burned. Most candidates were awarded marks because they realised that hydrogen burns in air to form water and/ or that water is non-polluting. However, there were several candidates who only gave limited responses such as, methane contains carbon or methane produces carbon dioxide, without mentioning why burning hydrogen would be less harmful to the environment than burning methane.

Question 5 *(Low Demand)*

(a) (i) This was not answered well. Candidates gained the mark for the idea that alkene molecules join or bond to form a molecule of a plastic. Many wrote that the molecule of plastic is formed because of the heat or by polymerisation, both of which do not explain how alkene molecules form a molecule of a plastic.

(a) (ii) There were many good answers usually related to heating. However, a large number of candidates who quoted that there are lots of processes or that crude oil will run out did not gain any credit.

(a) (iii) Most candidates gained marks by stating that plastic is non-biodegradable or that landfill sites are filling up. References to habitats were not credited because the problems had to be related to the plastics that are put into landfill sites.

(b) The candidates who scored marks here did so by stating that bio-plastic was renewable or that plants or corn could be replanted. However, there were many candidates who just repeated parts of the stem, such as it is environmentally friendly or less fuel used and so gained no credit for these responses.

Question 6 *(Standard demand)*

(a) (i) Most candidates gained the mark for indicating that rapeseed oil had the lowest percentage of saturated fat or only 6.6% of saturated fat. However, there were several candidates who just stated that it was 6.6, it is low or just gave the answer yes it is.

(a) (ii) Most 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) Several candidates did not attempt this question. There were very few correct answers. Most candidates had little idea what the test was and produced answers such as, emulsion test, melting point, chromatography test or cook things in it and see what colour they go. Even when the bromine or iodine test was given, many

candidates were unable to describe the result of the test with unsaturated fats or described the colour change the wrong way round. Unfortunately, some candidates described a colourless solution as clear and did not gain the mark for the result of the test.

(c) (i) The majority of candidates answered the question well with only a few stating incorrectly that the melting point decreased or got lower or that it took longer to melt.

(c) (ii) A small number of candidates recognised that there would be an increase in saturated fat which is a less healthy fat. Many candidates gave incorrect or inadequate statements such as the student was wrong because hard fat or hydrogen is harmful to the body or the state of the fat changes or the amount of fat would increase.

Question 7 *(Standard demand)*

(a) (i) Most candidates gained a mark here for mentioning metal, filament, wires or glass is a different type. Some candidates appeared to think that bottle banks are only for plastic bottles. A few candidates thought that light bulbs would explode or just stated that they cannot be recycled because it is not a bottle.

(a) (ii) There was much confusion over recycling and reuse, although reuse was defined in the stem of the question. Where candidates did gain a mark on this part it was usually related to the bottles being unhygienic or too damaged to reuse.

(a) (iii) Candidates were asked to explain why using recycled glass to make new bottles produces less carbon dioxide. Many candidates displayed an understanding but often were unable to explain clearly. Most candidates made comments that the bottles had already been made so the carbon dioxide had already been released or that <u>all</u> of the raw materials released carbon dioxide when heated without being specific. There were many references to calcium and sodium carbonates containing carbon or carbon dioxide. Only a few seemed to get the mark for lower heat or energy. Candidates interchanged heating and burning without seeming to realise they are different. Several stated that fossil fuels were running out.

(b) (i) The answer was usually correct. The most common incorrect response was 45%.

(b) (ii) Several candidates appeared to be aware of the large trade in imported wines and beers and the consequent import of green bottles. There were some strange ideas here, green is the colour for recycle so we do, there are more bottle banks for green bottles and green bottles are easier to recycle.

(b) (iii) Many candidates correctly used the information on the bar chart and used this in their answer to gain one mark. They sometimes 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.

Mark Ranges and Award of Grades

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