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Examiners' Report

Principal Examiner Feedback

Summer 2017

**Pearson Edexcel International GCSE
in Chemistry (4CH0) Paper 2CR**

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Question 1

Most candidates answered this question well although in (a)(iii) a few thought the element was fluorine. In (b) the most common mistake was to give atomic number and mass number instead of answering in terms of subatomic particles as the question asked.

Question 2

In (a) most candidates scored one mark for bubbles/effervescence but fewer gained a second mark by mentioning the decreasing size or an acceptable alternative. There were many instances where it appeared from their answers that candidates muddled this up with either burning magnesium or alkali metals reacting with water. Most gave the correct answer in (b) but a significant minority stated that there would be a decrease in temperature due to heat being given out by the reaction. Part (c) was well answered although a proportion of those who opted to write a symbol equation instead of the requested word equation, were unable to do so correctly, and therefore did not gain the mark.

Question 3

In (a) most candidates could identify the reagents used for preparing carbon dioxide although some had them the wrong way around. However, a range of other reactants for preparing different gases were quite often suggested e.g. hydrogen peroxide and manganese dioxide. A gas syringe was by far the most common correct alternative method of collecting the carbon dioxide in (b), although downward delivery was also quite frequently suggested. In (c)(i) orange or yellow were correctly given as the answer by the majority, but other incorrect colours, particularly red, were often seen. It was disappointing to see that many could not name carbonic acid in (ii) and incorrect formulae were also very common. A wide range of incorrect answers were given, with *hydrogencarbonate* and formula HCO_3 particularly common.

Question 4

Part (b)(i) was poorly answered with only a small minority able to correctly explain what a fraction is. Most incorrect answers described how a fractionating column works, rather than what a fraction is. Part (b)(ii) highlighted a weakness in the approach of many candidates in organising their thoughts and presenting them in a logical sequence. As a consequence, few scored all three marks as most managed to miss out at least one important stage. Weaker candidates often showed a lack of knowledge and understanding of this industrial process with many describing cracking. Most correctly identified carbon monoxide in (d) and understood the effect carbon monoxide has on the capacity of blood to carry oxygen.

Question 5

In (a)(ii) the majority of candidates were able to recognise the relationship between temperature and the solubility of ammonia in water. In (b) as in the past, many candidates, when they are asked for safety precautions, automatically give the general examples of laboratory coats and goggles, and do not think about the specific safety precautions relevant to the situation and information given in the question. In (c) many realised that increasing the temperature of the water would result in evaporation of water and/or dissolved ammonia escaping from the solution. However, some seemed to think that ammonia stopped dissolving as the water got hotter and this would result in a fall in mass. In (d) only a small minority realised that some form of pH measurement was the best method. Many suggested using universal indicator and went into some detail about the colour changes likely to be observed but failed to mention pH. Far too many other candidates seemed to think that simple indicators like litmus would be able to distinguish between different masses of ammonia dissolved in the water. A few candidates also correctly answered the question by suggesting using titration with an acid.

Question 6

In (a) many knew the correct catalysts for the reaction, though a significant number who tried to write the formula for phosphoric acid lost the mark when it was incorrectly written. In (b) many were able to choose the correct production method for each company and link it to the availability of the raw material, either sugar or ethene. However, many failed to also link the

method to the purity of ethanol required. Part (c)(i) was well answered with a large majority gaining both marks for a fully correct repeat unit and in (ii) almost all realised that this was a simple subtraction exercise and gave the correct formula of the hydrocarbon. In (iii) most correct answers focused on the fact that crude oil is a finite resource rather than the alternative acceptable answer, that ethanol manufactured from sugar uses a renewable resource, sugar cane.

Question 7

In (a) many gained a single mark for stating that polystyrene is a good insulator. Fewer candidates went on to explain that there was therefore less heat lost *to the surroundings* and gained the second mark. The most common incorrect suggestions were that the polystyrene cup was less reactive than the glass, it could withstand higher temperatures or it would not react with the liquid.

Part (c)(i) was a straightforward graph to plot and many scored all four marks for correctly plotting the data and drawing best fit straight lines. In (ii) most gained the first mark for correctly reading off their graph the volume of sodium hydroxide. A significant number then failed to realise the second answer required the first answer being subtracted from the total volume of 100. In (ii) only the more able candidates were able to score both marks by using the mole ratio and realising that an equal number of moles were involved in the reaction, and that this required a smaller volume of sodium hydroxide and hence sodium hydroxide had the greater concentration.

Question 8

In (a) it was pleasing to see so many candidates scoring full marks for both parts of the calculation question. If marks were lost it was usually because in part (i) candidates multiplied 0.02 by 23.50, rather than by 0.0235, and in part (ii) where they divided their first answer by 25, rather than 0.025.

Part (b) tended to be either answered very well or very poorly. Of those that did not give very good answers, some candidates managed to obtain the first mark but not the second; some filtered the solution but forgot to wash the crystals with water. There were many who were confused about the order in which the steps in the method should be carried out, whilst many others thought that crystallisation means simply heating the solution to dryness.

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