Pearson Edexcel

Examiners' Report

Principal Examiner Feedback

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Pearson Edexcel International GCSE

In Chemistry (4CH1) Paper 2C

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Question 1

In (b)(i) as expected most correctly identified the pieces of apparatus with the main difficulty being seen in correctly naming the condenser.

Question 2

(b) Most were able to correctly identify the blue and red dyes in substance V, but the explanations were not always sufficient often because candidates did not refer to the *spots* or an equivalent word.

In (c)(i) the measurements and the subsequent calculation of the R_f value were generally well done. The most common errors were in measuring the distance moved by the solvent and the inversion of the R_f calculation to obtain values greater than 1, which candidates should appreciate are impossible.

In(c)(ii) a variety of ways of correctly explaining that food dye Y was less soluble than food dye R were seen.

Question 3

In (a)(i) most correctly selected magnesium but in (ii) although many correctly stated silver, often with a suitable explanation, it was surprising to see a selection of other metals commonly being offered as the most likely to be found as an uncombined element.

From the specification candidates are expected to explain how the method of extraction of a metal is related to its position in the reactivity series, illustrated by carbon extraction for iron and electrolysis for aluminium.

In (b) the question gave the relative positions of aluminium, iron and lead in the reactivity series and asked to explain which method should be used to extract lead from lead(II) oxide. Many candidates were able to use their knowledge to place carbon in the series and give very good answers, often including correct equations. However, others were a little loose in their explanations, comparing the reactivity of carbon to lead(II) oxide instead of lead.

In (c) some very good answers were seen, but many did not gain full credit as they failed to use the given diagram to explain that in pure metals *layers* of particles can easily slide over each other making the pure metal less hard than an alloy. Some, despite being asked to draw a diagram in their answer failed to do so, and some gave ones of poor quality, obviously not using the given diagram as a guide. Candidates should be aware that answers should refer to *layers* of particles being harder to slide in alloys. A sizeable minority incorrectly tried to give explanations in terms of bonding and the energy needed to break bonds.

Question 4

In (a) some obviously did not appreciate the meaning of a structural formula and gave displayed formulae instead. Most candidates, having stated fermentation in (b)(i) were then able to make a good attempt to answer (b)(ii), with many gaining 3 or 4 marks. A common inaccuracy was referring to yeast, not enzymes, being denatured at high temperatures.

In (c) part (i) often produced at least 2 marks with errors in drawing the displayed formula of ethanoic acid and in naming butanoic acid the most common. Significant numbers could not give carboxylic acids as the required homologous series.

In (d)(i) although some correctly identified the role of the acid as being a catalyst, many suggested answers concerning changing the pH or neutralisation, with a few references to getting rid of impurities.

In (d)(ii) only the best candidates correctly gave the displayed formula of the ester, with many seemingly unaware of a correct ester linkage. However, in (d)(iii) many candidates gave both a correct property and use of esters but there were also many other answers with a wide variety of incorrect properties and uses.

Question 5

In (a) many explained the meaning of *unsaturated* but unfortunately candidates often then failed to explain the meaning of *hydrocarbon*. Those that did usually gave very good answers.

In (b)(i) it should be appreciated that bromine *water* is an orange solution. It was pleasing to see fewer instances of candidates using *clear* instead of *colourless*.

In (b)(ii) many candidates made a good attempt at the enthalpy change calculation, with fully correct answers not uncommon. Most others seemed to know how to go about calculating ΔH and were able to score marks through consequential marking even when errors were made earlier in their calculation. Some carelessly did not provide a sign in their answer, despite being asked to in the question.

In (c)(i) many were able to correctly balance the equation with the most common error being in the number of H_2O molecules. Part (c)(ii) was well answered with the majority of candidates choosing carbon monoxide and explaining how it reduces the capacity of blood to carry oxygen around the body. Fewer correctly referred to carbon dioxide being a greenhouse gas or a cause of global warming.

In (c)(iii) it was evident that many candidates do not know the difference between an energy level diagram and an energy profile diagram. Those that correctly drew an energy profile diagram lost marks where the arrows or lines showing the magnitude of activation energy and enthalpy change were poorly drawn and where the length of the lines were shorter than could be allowed with reasonable tolerance. A few endothermic

reaction profiles were seen and, if correct, were able to score up to a maximum of 3 marks.

Question 6

In (a)(i) candidates often just stated that zinc would react or is reactive, without referring to the context and what the zinc would react with. It was surprising how many stated that zinc does not conduct electricity.

In (ii) many gave a correct observation of bubbles or an equivalent, but others did not gain the mark as they just stated a *gas is given off. In* (b) it was pleasing to see good numbers giving a correct test for sulfate ions.

In (c)(i) the most common suitable piece of apparatus to measure 25.0 cm^3 of solution was a pipette (with burette being allowed), although some incorrectly suggested a measuring cylinder.

In (c) there were good numbers of fully correct answers to both parts of the calculations. However, a common error was a failure to divide by 1000 in part (ii). Part (iii) proved to be more difficult, with a failure to correctly use the mole ratio often evident. However, the use of consequential marking often enabled some marks to be awarded, including when the answer to part (ii) was incorrect.

Question 7

The gas volume calculation in (a) was well attempted by many candidates. Others did often manage to calculate the number of moles but were then unable to convert this into the volume of carbon dioxide gas produced. A common error was failing to convert dm^3 to cm^3.

In (b) which concerned the effect of changing the conditions on the yield of a product in an equilibrium situation, the answers seemed a little better than in the past, with more candidates seemingly heeding the regular reminders in Mark Schemes that arguments involving the use of Le Chatelier's Principle are ignored. Consequently, it was not unusual to see fully correct answers to both parts (i) and (ii). However, weaker candidates incorrectly tried to explain the increased yield in (i) by referring to collisions between reacting particles and involved discussions of the endothermic nature of the forward reaction in trying to answer part (ii).

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