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Examiners' Report
October 2025

Pearson Edexcel International Advanced Level In Chemistry
WCH16/01

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Introduction

The paper had an emphasis on experimental techniques and there were good opportunities for all candidates to demonstrate their chemical and practical work understanding. Candidates were most assured in dealing with the calculations and they also dealt competently identifying organic compounds using qualitative tests. However, drawing and understanding how some organic apparatus worked proved challenging for many learners. In addition, sometimes answers were too generalised and did not address the specific points raised. This was particularly apparent in the NMR spectrum question and when explaining how to calculate an activation energy. There was no evidence of learners running out of time and there were very few pages left blank.

Question 1

1(a)(i) The majority of learners manged to correctly identify the three liquids and give the positive result of the test. Where errors were made the most common were to include propanoic acid as one of the liquids and forgetting to state that a precipitate was formed.

1(a)(ii) The Tollen's and Fehling's tests were well known to many learners, and they were able to successfully identify propanal. However, a number who used the Fehling's test omitted the starting colour so lost a mark. Giving a positive test for propanone proved more challenging, with many giving a second test for propanal. Of those who knew the correct test for propanone, some did not give the reagents and instead just wrote 'the iodoform test', which was not sufficient to score.

1(b) The majority of learners focussed on identifying propanoic acid, usually with a metal carbonate. Occasionally, some used the ester route, but with mixed success as the sulfuric acid catalyst was often omitted. However, a large number of learners incorrectly chose PCl_5, presumably as they did not realise it would react with the OH group in both propanoic acid and propan-1-ol.

1(c) This question appeared to be quite challenging for many learners. Of those who correctly identified pentan-3-one, some got carbon and proton environments confused and a number gave a detailed explanation of the n+1 rule but did not link the groups to their corresponding peaks. A small minority did not read the question carefully and assigned the triplet and quartet to different compounds.

Question 2

2(a)(i) The majority of learners knew that the sodium hydroxide had to be added dropwise but significantly fewer selected the correct apparatus. A pipette instead of a dropping pipette was often seen but it did allow access to the second scoring point. The use of a burette, an allow answer was also quite a common response.

2(a)(ii) This reaction of aqueous zinc ions was known by the majority of learners. Where errors were made, most involved not giving the colour of the precipitate or saying the precipitate was formed on addition of excess sodium hydroxide.

2(b)(i) The correct observation for the sulfate test was known by almost all learners.

2(b)(ii) Whilst most learners correctly suggested sulfuric acid should not be used in this test many did not explain why. A number described how hydrochloric acid should be used to remove carbonate ions but then made no reference the presence of the sulfate ions in the sulfuric acid and so did not score.

Q2(c)(i) This type of electrochemical cell experiment was very well known, with many learners correctly completing the four missing labels. The most common errors were failing to mention the aqueous conditions for C and D and the use of a platinum electrode for B. Very rarely, A was identified as an ammeter instead of a voltmeter.

Q2(c)(ii) There were many word-perfect explanations of how to make a salt bridge. However, a significant number of learners just mentioned the use of potassium nitrate and did not explain that it had to be used in conjunction with a filter paper.

Q2(c)(iii) The majority of learners gave the correct reactants and products for this redox reaction equation, but many used the equilibrium sign instead of an arrow and so did not score. Other errors were very rare but included the equation being revered or incorrect or missing state symbols.

Q2(d)(i) While the toxic symbol was well known by the majority of learners, the oxidising agent symbol was not and flammable was the most common wrong answer given.

Q2(d)(ii) Most learners understood the need to carry out this experiment in a fume cupboard. However, many gave multiple answers that involved a range of personal protective equipment such as gloves and masks. As these were ignored the mark was usually scored.

Q2(d)(iii) Most learners knew the indicator for this reaction, but the colour change proved to be slightly more challenging. The most common error was reversing the colours at the end point.

Q2(d)(iv) This calculation was well understood with large numbers of totally correct, well-presented answers seen. The most likely reason for losing marks were for an incorrect ratio or not multiplying by 10 to take into account the dilution.

Question 3

3(a)(i) The majority of learners were able to calculate the moles of calcium carbonate and hydrochloric acid correctly. However, a significant number then ignored the reacting ratio in the final calculation to find the number of moles in excess.

3(a)(iii) Although the reaction of calcium carbonate with hydrochloric acid was very well known, a number of learners did not state that the bubbles would stop being produced when the reaction had finished. Some learners suggested the reaction would be finished when the mass remained constant, although there was no mention of a balance in the procedure.

3(b) This was the most challenging question on the paper and fully correct responses were very rare. The majority of leaners stated that rate was proportional to $1/T$ but did not explain why, as asked for in the question. Those who were successful tended to explain in words what directly proportional meant.

3(c) Despite the slightly novel way this frequently asked question was phrased, there were some excellent fully correct descriptions of how to find the activation energy. However, some

learners assumed that the graph had been drawn so they did not access the first two marks. Likewise, a number did not explain that the gradient had to be calculated, but almost all understood how calculate the activation energy from the gradient.

Question 4

4(a) The majority of learners knew the name of the of apparatus to crush the lavender flowers.

4(b) Very few learners knew what steam distillation was or were able to draw a reasonable two-dimensional diagram. Weaker responses often had no labels and included a conical flask, instead of a round bottomed or pear-shaped flask and there was also no indication of steam. Learners who appreciated steam was required, sometimes attempted to draw a steam generator but often the water was not heated so it would not work. Of those who successfully labelled steam entering the flask, many did not score the first mark as the steam did not bubble through the liquid.

4(c)(i) The vast majority of learners understood how to complete the diagram of the separating funnel. The most common errors were not having a line drawn at top of the lavender oil layer or reversing the layers.

4(c)(ii) This question was found to be quite challenging to many as the cause of the cloudiness was not well known. A number suggested it was due to impurities in the oil or carbon dioxide. But learners who appreciated the cloudiness was due to water were usually able to select a suitable drying agent.

Paper Summary

Based on their performance on this paper, candidates are offered the following advice:

- read all the question carefully and use the information provided to help direct your answer
- show working when carrying out calculations and think carefully about units, significant figures and rounding
- learn the hazard symbols and precautions associated with them
- learn the practical techniques used to purify organic compounds and practise drawing them
- make sure that you are familiar with the core practicals given in the Advanced level Specification