

Cambridge Nationals

Science

Level 1/2 Cambridge National Certificate in Science in the Workplace **J816**

OCR Report to Centres January 2016

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This report on the examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the examination.

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R075/01 How scientific data is used (Level 1)

General Comments:

This examination provides candidates with opportunities to demonstrate their knowledge and understanding of the ways scientists obtain, analyse and communicate information using the context of the analytical techniques they have experienced in unit R704.

It was clear that Centres had entered candidates who were suited to the structured approach of this Level 1 paper. For example in question 2 they were able to demonstrate their knowledge and understanding better on the structured parts (2ai, 2aiii, 2aiv and 2av) than the extended writing aspect (2bii).

The language used in questions was appropriate and there was no evidence that candidates did not have sufficient time to complete the examination as all questions were attempted on the majority of papers. Candidates need to develop their examination technique so that they appreciate that the mark allocation of a question gives an indication of the number of responses needed to achieve those marks. Where two marks were allocated to a question many only gave a single response so only achieved one mark (e.g. 5a, 5b and 6ai). Answers could also be improved as while there is no need for candidates to repeat the question they need to be specific regarding what they are referring to as there were many references to 'it' where this was not clear (e.g. 2aiii and 6bi).

A common feature was that candidates misused the term 'accurate' in answering questions relating to experimental data (e.g. 1b, and 2bi) and did not take account of outliers before interpreting it (4).

Comments on Individual Questions:

Question no.1

In (a) candidates were required to put the steps required to carry out a titration in the correct order, a significant number of candidates were unable to do this. Candidates were given where the starting volume (B) featured in the steps but put the second burette reading (C) before this. A number of better answers would put indicator in the sample flask before the sample was added; although it would not affect the results it is not considered best practice.

The better answers in (b) referred to improving the reliability of the results. The idea that there could have been an error in his first analysis was hardly referred to; common incorrect answers referred to improving accuracy or fair testing. Several answers relating to changing his method indicated that the question was often misread as 'how does **he** improve his results?'

The idea in (c) that a different person might see the end point differently was lost on candidates, and their answers usually referred to possible errors in the way the second person carried out the titration. The use of an 'alternative technique' was not understood as answers in (d) usually made suggestions as to how he could improve his method for example by adding more indicator.

Question no. 2

This question tested candidates' ability to combine the use of charts and data tables relating to chromatography and absorbance spectrometry. Part (a)(i) indicated that many candidates seemed unaware that a chromatogram is run to give maximum separation of the spots.

In (a)(ii) candidates were required to explain whether the results were qualitative or quantitative, many simply stated one or the other without any explanation. This concept does not seem well understood as several referred to results being qualitative due to their quality.

Candidates were able to use data in identifying pigments and this was clearly stated in the best answers in parts (a)(iii), (a)(iv) and (a)(v).

Only the better answers to (b)(i) offered the idea that there is more confidence in a conclusion if two different techniques yield similar results.

In the extended writing task (b)(ii), which referred to a technique not readily accessible in centres (but in the specification), only half the candidates gained credit. This involved interpreting a results chart using a data table and some candidates used the wavelength data in isolation, interpreting it as showing the abundance of the pigments. The best answers clearly identified the absorbance peaks in the chart and referenced them to wavelengths. The third pigment was also often recognised but few gave a reason why it could not be identified.

Question no. 3

Many candidates were able to interpret results from the pH chart (a) but very few gave the idea that Universal Indicator covers a range of values in part (b). Some recognised that a pH meter gives a quantitative measurement in (b)(ii).

Candidates demonstrated their knowledge and understanding of flame tests in part (c).

Part (d) was answered well although some candidates listed all of the colours from the table rather than using the table to identify a specific one.

Question no. 4

This question first of all involved using a data table to work out the mean and range of a series of values, it discriminated well. Most candidates did not identify the outlier and a few did include it in working out the range. Most answers stopped at this point as candidates did not address the second part regarding the safety of a swimming pool. Some attempted to give a concentration value but did this by simply putting a decimal point in front of the transmission values rather than using the calibration graph. Candidates giving the best answers were able to use the calibration graph but some who did use the graph did not make sure that they provided evidence of this by drawing lines on the graph or stating what they have done. The best answers stated that the pool was not safe but all failed to give a reason relating to the lower limit of the range being outside the safe concentration level.

Question no. 5

This structured question was answered well but it highlighted the need for candidates to realise that the mark allocation gives an indication of the number of responses needed. Several candidates only gave a single response where each part had 2 marks allocated. The number of responses needed was not specified in (a) and (b) but (c) specified two responses but only resulted in one in some cases.

Question no. 6

This question proved to be topical as it was about the drug testing of athletes which was in the national news at the time. Most candidates were unaware of the meaning of a 'representative sample' in (a)(i). Those who gave creditworthy answers usually referred to the testing of male and female athletes but few included the need to test athletes from all countries in this 2 mark question. Candidates showed that they are familiar with the procedure after taking samples in keeping them separate in clean, sealed, labelled containers. A number misread the question and described how the blood samples should be taken from the athletes.

Part (b) involved comparing HPLC graphs and the better answers in (b)(i) usually gained 1 of the 2 marks because candidates only made one comparison, usually for specimen A and did not do the same for B. A number of candidates referred to 'it' so it was not clear if they were referring to specimen A or B.

Few candidates gained credit in (b)(ii), giving a way the drug could be identified, the main way was by a suggestion of further drug experiments. Ideas of looking at drug reference graphs or using the internet or books to find out further information were rare.

The final part (b)(iii) showed candidates had little idea of using a different technique to confirm a conclusion, many suggested repeating the test even though the question stated that the tests had been repeated.

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