



New Zealand Qualifications Authority
Mana Tohu Matauranga O Aotearoa

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Assessment Report

New Zealand Scholarship Chemistry 2016

Standard 93102

Part A: Commentary

High-achieving candidates showed a comprehensive knowledge of all the level 3 chemistry principles, expanding these to solve problems in unfamiliar contexts. They were also able to correctly use the language and symbols of chemistry in discussions and explanations of chemistry related phenomena.

It was disappointing, however, that some candidates were coming to this examination with only limited knowledge, and sometimes with large gaps in their background. The stepping off point for scholarship must be an in-depth knowledge of all the content within the level 3 chemistry achievement standards. Once this is mastered, candidates will have more confidence to apply the scholarship skills to the types of problems / questions that appear in these examinations.

Spectroscopy was introduced to the scholarship examination for the first time this year and many candidates showed that they could access information about molecular structure from the appropriate spectra.

It is important to recognise that many chemistry theories and principles are based on mathematical calculations. Whenever it is appropriate, candidates at this level should be able to provide both quantitative and qualitative evidence for their answers. For example, questions related to pH and buffer solutions may require a relatively sophisticated calculation which can be linked to the relative concentrations and the nature of the species present in solution

Part B: Report on Performance

Candidates who were awarded **Scholarship with Outstanding Performance** commonly:

- presented fully integrated discussions linking equations to the data provided and to the observations given
- showed excellent calculation skills with all working clearly set out and easy to follow

- provided coherent, relevant explanations for various phenomena correctly using the ideas of chemistry, with supporting calculations when appropriate
- analysed information provided to solve a given problem, justifying their answers by linking the data to the final outcomes
- extrapolated their level 3 understanding of chemistry to provide answers to higher level problems
- recognised and accounted for trends in periodic properties, using appropriate chemistry language, symbols and calculations
- compared and contrasted two sets of data to determine the better predictor of periodic trends
- demonstrated excellent understanding of the content of all the level 3 chemistry.

Candidates who were awarded **Scholarship** commonly:

- linked the data / observations provided to relevant equations
- linked observations to appropriate calculations
- correctly carried out calculations based on concentration, K values and pH
- gave reasoned discussions linking pH and weak acids and bases
- recognised titration data and carried out appropriate calculations to determine the percentage composition
- linked spectroscopic data to the structures of organic molecules and provided some justification for their answers
- showed understanding of the relationship between enthalpy and entropy and the spontaneity of chemical reactions
- demonstrated understanding of chemical principles in well-reasoned explanations for observations
- recognised trends in periodic properties and explained some of these, correctly using the language and symbols of chemistry
- accessed the data needed from the question to solve the given problems.

Other candidates commonly:

- failed to recognise the chemical processes related to the observations / data provided
- did not write balanced equations for the given reactions and so could not carry out related calculations
- were unable to use their level 3 chemistry knowledge to solve more sophisticated chemistry problems
- provided answers without justifying their reasons
- failed to link periodic trends for the physical properties of molecules to their knowledge of the periodic table
- showed only limited understanding of the chemical principles needed to explain and discuss the observations or data given
- did not use chemical terms correctly and provided answers that were not well thought out or logical
- were unable to extract the important information from the context of the questions
- did not recognise the relationship between the information provided in the questions and their level 3 knowledge
- did not incorporate equations into their discussions

- missed important pieces of information given in the question, e.g. whether the reaction conditions are acidic or basic.

Further comments

Students who have strong mathematics skills were more successful in this paper.

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