2015 NZ Scholarship Assessment Report

Chemistry

Part A: Commentary

Candidates who were able to analyse, think critically, integrate and synthesise ideas and present their discussions logically, concisely and clearly, were able to succeed in this paper.

The Scholarship Chemistry Performance Standard expects candidates to show, among other things, a "highly developed knowledge, skills, and understanding (of chemistry that they can apply) to complex situations".

Outstanding students are required to show aspects of perception and insight, sophisticated integration and abstraction, independent reflection and extrapolation, and convincing communication.

Candidates who were mathematically strong were advantaged in this examination.

The overall results showed that more candidates were able to start, and complete some parts of the examination paper than in the past, showing that candidates had a stronger understanding of the chemical principles and concepts of Level 3 NCEA.

Candidates need to take more care when using specific terminology, and define or explain the terminology they were using. Candidates must also take care with the use of chemistry symbols, equations and diagrams to support answers if they wish to achieve success.

The examination, once again, highlighted the poor understanding that some candidates have regarding intermolecular forces.

Part B: Report on performance standard

Scholarship with Outstanding Performance	Candidates who were awarded Scholarship with Outstanding Performance commonly: • could predict unfamiliar shapes and bond angles using valence shell electron pair repulsion theory • predicted the geometry of a molecule with more than one central atom • used equations and data given to support their answers • linked comprehensively pH and conductivity to a titration curve and all species present • solved simultaneous equations in calculation problems • could clearly describe the principles of solubility • supported answers with diagrams • understood clearly the interactions between solute-solute, solvent-solvent and solute-solvent • could link both entropy and enthalpy to favourability.
Scholarship	Candidates who were awarded Scholarship commonly: • drew correct Lewis diagrams • recognised angles in molecular shapes • calculated the amount (*n*) of or the concentration (*c*) of iodate • balanced redox equations • recognised that more than one reaction occurred • interpreted a titration curve • calculated the pH at different points on a titration curve • linked pH to the species involved • described changes in conductivity linked to the species involved • were able to complete calculations to determine the mass of two aldehydes within a given mixture • followed a reaction scheme to identify several organic substances • linked properties of different functional groups to solubility, in terms of their

	interactions with water • recognised where hydrogen bonding would occur in three common pain reliever medications • explained how the mass or hydrocarbon tail affects the intermolecular forces and consequently the solubility • understood the importance of states in thermochemical calculations • understood favourability and spontaneity • recognised changes in particle order or disorder.
Other candidates	Candidates who were not awarded Scholarship commonly: • failed to count valence electrons or to draw Lewis diagrams to predict the shapes of different ions • did not recognise reduced bond angles due to lone pairs • could not write balanced redox equations • could not calculate the concentration of a standard solution • did not recognise the combined titration curve of a strong acid-strong base, weak acid-strong base mixture • could not calculate the total volume or account for dilution • did not understand the species present at different points of a titration • did not recognise that a redox reaction was needed to determine the mass of two aldehydes in a given mixture • could not use the information given to determine the structures of four different organic compounds • did not recognise the acidic properties of common pain reliever medication • did not recognise that hydrogen bonding occurs between a molecule and water • did not give a definition for solubility • could not carry out thermochemical calculations to determine total enthalpy change • could not link enthalpy to favourability.