

NCEA Level 2 Assessment Specifications

General Information

Domain	Chemistry
Level	2
Mode of Assessment	Written examination
For Year	2008

Format of the assessment

The format will be the same for each achievement standard. Questions for all three levels of achievement will be distributed throughout the paper. Some questions will provide the opportunity for candidates to indicate evidence of achievement at all three levels, while others will be set at a specific level.

Equipment to bring

A calculator is permitted.

Resources or information supplied

A copy of the periodic table, giving element symbols, atomic numbers and molar masses, will be provided as a separate resource page.

Symbols, nomenclature, spelling and formatting will follow current IUPAC conventions. These are shown in the reference sheet 'Quantities, Units, Symbols and Nomenclature used in Chemistry'. This is included with the assessment specifications but will not be provided in the examination.

Special notes

In calculations, candidates will be expected to use the molar mass values given with the question or on the periodic table provided.

All working should be shown in calculations. Numerical answers should be rounded to an appropriate number of significant figures (usually three significant figures). Correct units must be included.

Content/Context details

The content is specified in the explanatory notes to each achievement standard.

Questions may be asked within a variety of appropriate contexts, some of which may be unfamiliar to the candidates.

Candidates will be expected to have carried out relevant practical work.

Specific Information for Individual External Achievement Standards

Achievement Standard Number 90308
Title Describe the nature of structure and bonding in different substances

Version 2 **Number of Credits** 4

Explanatory note 4 states three properties of solids that could be included. This list is not limited. Further properties may be malleability, ductility, hardness, etc.

Achievement Standard Number 90309
Title Describe the structural formulae and reactions of compounds containing selected organic functional groups

Version 2 **Number of Credits** 4

Achievement Standard Number 90310
Title Describe thermochemical and equilibrium principles

Version 2 **Number of Credits** 5

Achievement Standard Number 90311
Title Describe oxidation–reduction reactions

Version 2 **Number of Credits** 3

Unfamiliar oxidants and reactants may be used in the contexts of determining and using oxidation numbers and balancing equations.

Quantities, Units, Symbols and Nomenclature used in NCEA Chemistry Level 2 Examination Papers

NCEA Chemistry examinations will use the following information, which has been based on International Union of Pure and Applied Chemistry (IUPAC) recommendations. Candidates should be encouraged to use this IUPAC terminology, but those who use other terminology will not be penalised if their answers indicate a clear understanding of the chemistry involved.

General Chemistry

Symbols for the physical quantities, *M*, *V*, *H*, *K*, are written in italics (sloping letters). Any following subscripts will be in upright type.

Symbols / Expressions	Units in common use
<i>M</i> , molar mass, is the mass of one mole of a defined substance and will be used for elements and compounds.	g mol ⁻¹
<i>V</i> , volume. A looped <i>ℓ</i> is not used in these abbreviations.	L and mL
<i>n</i> , amount of substance, expressed in moles. It is incorrect to use the term 'number of moles'. (See details under 'Amount of Substance' below.)	mol
<i>c</i> , amount concentration, is expressed as moles per litre, also denoted by the format []. Concentrations may also be written as <i>mass concentration</i> , expressed as grams per litre. <i>Composition of a mixture</i> , commonly expressed as % <i>w/V</i> , % <i>w/w</i> and % <i>V/V</i> , will be used only after giving a clear definition of their meaning (eg grams per 100 mL, grams per 100 g, mL per 100 mL respectively).	mol L ⁻¹ g L ⁻¹

Amount of Substance

This is a physical quantity, symbol *n* (*italic n*), measured in a unit called the mole, which has the abbreviation mol.

The term 'number of moles' is to be avoided in favour of the 'amount of substance'. In the same manner, the size of an object can be described in terms of its 'length', rather than its 'number of metres'.

States of Aggregation

These are written in parentheses printed in *italic* type, immediately after the formula or substance and on the same line as chemical formula symbols.

eg *s* solid, *l* liquid, *g* gas or vapour

aq aqueous solution (dissolved in water)

HCl(g) hydrogen chloride in the gaseous state

Temperature

Celsius temperature °C

Pressure

Symbol *P*. Units are pascals (Pa), or more commonly kPa. Standard pressure is 10^5 Pa or 1 bar

IUPAC Approved Spelling

Spelling of the element with atomic number 16 is the original English spelling of **sulfur**. Derived ions have consistent spelling:

eg sulfide sulfate sulfite thiosulfate

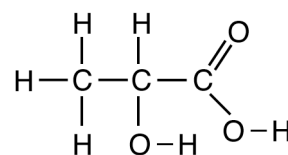
Graph Axes and Table Headings

Labelled as quantity/unit, eg $c / \text{mol L}^{-1}$ and not c (mol L^{-1}). Only values will then be written on the axes or in a table.

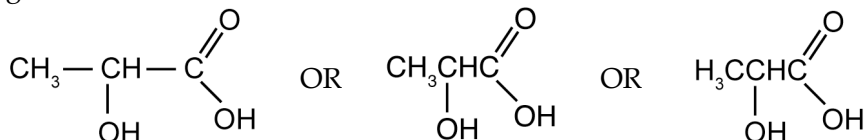
Organic Chemical Formulae

	Information conveyed	Example: lactic acid
empirical formula	Stoichiometric proportions of atoms only. Simplest ratio formula.	CH_2O
molecular formula	Formula of the actual molecule.	$\text{C}_3\text{H}_6\text{O}_3$
structural formula	Shows how atoms are connected. It may be drawn in different ways.	

(a) All atoms and bonds are shown.

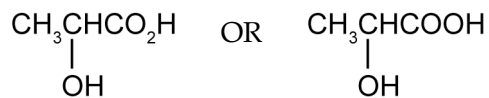


(b) Bonds to hydrogen are not shown



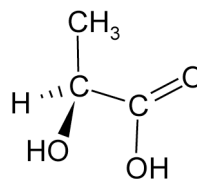
OR

Only bonds to substituents are shown.



(c) Structure is reduced to one line. $\text{CH}_3\text{CH}(\text{OH})\text{CO}_2\text{H}$ OR $\text{CH}_3\text{CH}(\text{OH})\text{COOH}$

(d) Stereochemistry (3-D arrangement of atoms) is shown.



The structural formulae in (b) are referred to as condensed structural formulae.

Organic Chemical Nomenclature

IUPAC conventions will be followed. There is ongoing discussion on some of the following naming. Candidates will be given full credit for alternative naming if an unambiguous structure is implied. Some examples are:

Structure	IUPAC name
$\begin{array}{c} \text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}_2-\text{CH}_3 \\ \\ \text{CH}_3 \end{array}$	2-methylpentane
$\begin{array}{c} \text{OH} \\ \\ \text{CH}_3-\text{CH}-\text{CH}-\text{CH}_3 \\ \\ \text{CH}_3 \end{array}$	3-methylbutan-2-ol
$\begin{array}{c} \text{CH}_3-\text{CH}-\text{CH}_2-\text{C}-\text{OH} \\ \quad \quad \quad \\ \text{CH}_2 \quad \quad \quad \text{O} \\ \\ \text{CH}_3 \end{array}$	3-methylpentanoic acid
$\begin{array}{c} \text{OH} \\ \\ \text{CH}_3-\text{CH}-\text{CH}-\text{CH}-\text{CH}_3 \\ \quad \\ \text{Br} \quad \text{Cl} \end{array}$	4-bromo-3-chloropentan-2-ol
$\begin{array}{c} \text{CH}_3-\text{CH}_2-\text{C}-\text{O}-\text{CH}_2-\text{CH}_3 \\ \\ \text{O} \end{array}$	ethyl propanoate

References

Packer and Scott, 'Let's Talk Chemistry'.

(information available from scottsoft@optushome.com.au)

P Atkins and L Jones, *Chemistry – Molecules, Matter and Change* (3rd edition), WH Freeman, 1997.