



*Let the mind manage the body
Que l'esprit gère le corps*

**MAURITIUS
EXAMINATIONS
SYNDICATE**

**NCE 2023 GRADE 9
SCIENCE
CHEMISTRY COMPONENT**

Subject code: N530

EXAMINER'S REPORT

April 2025

INTRODUCTION

The NCE assessment in Science is in line with the philosophy adopted in the National Curriculum Framework (NCF) and detailed in the Teaching and Learning Syllabus (TLS). Science is assessed in three separate papers namely Biology, Chemistry and Physics. Each paper is based on the three assessment objectives as given in **Table 1**.

Table 1

Assessment Objectives		Weighting
AO1	Knowledge with understanding	45 – 50
AO2	Application	25 - 35
AO3	Scientific Inquiry	20 - 25

GENERAL COMMENTS:

The 2024 Chemistry component of the Science paper consisted of five questions which were based on the whole syllabus. The performance in the Chemistry component was generally satisfactory. The first three questions were graded in difficulty level but **were** considered to be within the reach of most candidates. The items were mainly objective-type ones and therefore were accessible to learners of all abilities. Candidates found Question 4 and Question 5 more challenging **where they** were required to show a good grasp of concepts to be able to apply them. Some candidates did not attempt Question 4 and Question 5 altogether. Although these questions assessed some higher order skills and concepts, there were parts and subparts that related to basic concepts and required short answers. Open-ended questions in Chemistry at NCE level required candidates to write a maximum of two sentences wherein the essence of the concept being assessed is present.

KEY NOTES

- Candidates should be reminded that they are required to provide only one answer for the MCQ items. Those candidates, who provided two answers in an MCQ item, were not awarded the mark as the decision is left on the examiner. Although marking is done positively, the answer of the candidate should demonstrate clearly his/her

understanding. The same rule applies to matching exercises, where candidates provided a correct and an incorrect matching for the same item.

- In case candidates want to revise the answer provide for an MCQ item, they are advised to cross out the wrong letter encircled and encircle their new option chosen. They should clearly indicate their new answer (e.g by using an arrow).
- Candidates should take time to read questions carefully. For example, in Question 2, they were asked to identify the separation technique used to obtain **water** from seawater. Many gave crystallisation, which is the separation technique used to obtain salt, not water.
- It was also observed that some candidates do not copy the words correctly where these were given.
- Emphasis must be placed on the use of the Periodic Table to recall the valency of elements.
- Candidates should pay attention to the use of capital and small letters when writing symbol of elements and formula of compounds. Writing the formula of sulfate radical as So_4 was a common mistake.
- Candidates are encouraged to develop mathematical skills related to the plotting and interpretation of graphs.
- Language was often a barrier to answering open-ended questions. For example, a few candidates did not understand the question and repeated the answer to part 4(d) in 4(e) or gave health-related impacts when environmental impacts were expected.

Comments on specific questions

Question 1

Question 1 comprise 10 multiple choice items which ensured a broad coverage of the syllabus of Grade 9. Whilst the majority of the items were knowledge-based items, some items focused on application of knowledge and required candidates to reflect on their learning.

Candidates found items 1, 2, 3, 4 and 5 accessible. Items 6, 7, 8, 9 and 10 were found to be more challenging.

Table 1 provides the key for the items of this question.

Table 1

Item Number	Key
1	B
2	C
3	C
4	D
5	A
6	B
7	C
8	A
9	A
10	D

Item 1 was identified as the most scoring item. Candidates could easily recognise the thermometer as the apparatus used to measure temperature.

Item 2 was generally well answered. The diagrammatic representation allowed students to identify ammonia as consisting of three hydrogen atoms.

Item 3 was satisfactorily answered by many students although there was some evidence of guessing by pupils who did not use the Periodic Table to find the valency of Aluminium.

Item 4 was scoring as there was a diagrammatic representation of methane molecule. However, distractor B – C_4H was the most common incorrect answer for candidates who considered the number of atoms of each element as the valency. They used the swap valency method to work out formula.

Item 5 was satisfactorily attempted. Candidates correctly recognised that the ozone layer is depleted by chlorofluorocarbons. Carbon monoxide or oxides of nitrogen were the most common distractors chosen by candidates.

Item 6 was found to be challenging. Oil from ships was the most common distractor. Some also opted for answer A – smoke from factories, which was incorrect, as a cause for eutrophication.

Item 7 was poorly attempted by a significant number of candidates. Candidates understood that the reaction between a metal and an acid produces a salt and a gas. However, the confusion was mainly about the gas produced. Distractor A – Oxygen was the most common incorrect answer.

Item 8 was among the most challenging MCQ questions. Few candidates could identify copper as the metal which does not burn or glow when heated. Zinc was the most common distractor chosen.

Item 9 was the most challenging item among the MCQs. Reading and understanding the question itself was a challenge. Many opted for the nitric acid, ammonium sulfate and potassium nitrate which were incorrect answers. Those who opted for nitric acid were possibly misled by the word 'acidity' while those who opted for ammonium sulfate or potassium nitrate could have focussed on the word 'soil' as these substances are used as fertilisers.

Item 10 required candidates to recall the rules for solubility of salts. Distractor A – ammonium hydroxide was the most common incorrect answer. Students learn about hydroxides being insoluble, but ignored the exceptions. A few candidates could correctly recognise magnesium carbonate as an insoluble salt.

QUESTION 2

Question 2 carried a total of 7 marks and assessed candidates' knowledge and understanding of separation techniques. This question was generally well answered. The first part consisted of a list of separation techniques and candidates were required to identify the separation techniques used from the given list. The second part was a labelling exercise on the experimental set-up used for sublimation.

Item 2(a)

Many candidates could correctly identify distillation for item 2(a)(i) and sublimation for item 2(a)(ii). However, some candidates opted for crystallisation as the separation technique to obtain **water** from seawater. A few candidates also interchanged the answers of 2(a)(i) and 2(a)(ii).

Item 2(b)(i)

Candidates could easily label the set-up for sublimation. A common mistake was to refer to the 'evaporating dish' as the 'beaker'. The word conical flask was not given in the list of words, yet some candidates mistook the inverted funnel with the neck of the conical flask.

Item 2(b)(ii)

Candidates understood that cotton wool has been inserted at the narrow end of the (inverted) funnel to prevent the escape of vapours. Unfortunately, many could not fully elaborate their answers. Many candidates did not score marks due to lack of clarity in their answers. Some incorrect answers included 'placing the cotton wool at the top or at the entrance of the beaker/evaporating dish or conical flask'. No mark was awarded for suggesting general laboratory safety precautions such as wear gloves, masks, goggles or lab coats.

QUESTION 3

Question 3 carried a total of 10 marks and was on the unit 'Language of Chemistry'. Candidates showed mastery in writing symbols and word equations. However, writing formula of compounds remains an area of improvement.

Item 3(a)(i)

This item required candidates to write the symbol and valency of potassium and oxygen. The common incorrect answer was to give the symbol of potassium as 'P' or that of oxygen as 'O2' or 'O₂'.

Item 3(a)(ii)

A majority of candidates were able to use the swap valency method to obtain the answer, K₂O. Many could not score as attention was not paid to details regarding capitalisation and subscribing the number. Answers such as K2o and k2O were incorrect answers.

Item 3(b)

Candidates were required to write the formulae of calcium chloride and iron (III) sulfate. Formula of calcium chloride was fairly well written as compared to that of iron (III) sulfate. CaCl₂ and Fe₂(SO₄)₃ were the correct answers. Some candidates were not able to distinguish between sulfate for sulfide.

Item 3(c)

This item was one of the most scoring of the paper. Hydroxide was the most common incorrect answer. A few candidates did not differentiate between word and chemical equation and gave formula of compounds.

QUESTION 4

This question consisted of data manipulation and interpretation, graph-plotting and open-ended questions. Open-ended questions 4(d) and 4(e) proved challenging to the majority of candidates.

Item 4(a)

The majority of candidates obtained 220 ppm, which was the correct answer.

Item 4(b)(i)

For those who attempted this part of the question, the plotting was well done. Candidates could not score full marks as they wrongly plotted the points or missed plotting all the points. Bar charts, histograms or construction lines with no visible plotted points were not awarded marks.

Item 4(b)(ii)

Candidates were expected to mention a gradual increase from 1800 to 1950 and the sharp increase from 1950 to 2000. Most candidates could identify the general increasing trend in the amount of carbon dioxide, yet they could not differentiate between the increasing nature over the years.

Item 4(c)(i)

A good number of candidates mentioned that a greenhouse gas is a heat-trapping gas. Some candidates confused between the terms 'global warming' and 'ozone depletion'.

Item 4(c)(ii)

Methane was the most common correct answer, though some pupils could not correctly write the name. A few also correctly stated CFCs or water vapour. Misreading of question lead some candidates to give carbon dioxide, which was an incorrect answer.

Item 4(d)

A wide range of answers was given, with deforestation/cutting down of trees/ burning of fossil fuels as the most common correct answers. Other accepted answers included pollution from exhaust pipes of vehicles, forest fires and volcanic eruptions. Marks were also not awarded for activities leading to major increase of methane such as cattle breeding, landfills, decay of vegetation and animals. Vague answers such as air pollution, using fuels, from factories/cars need to be avoided as they do not provide sufficient details.

Item 4(e)

Common correct answers included mostly the consequences of global warming such as melting of glaciers leading to rise in sea level, severe droughts, more frequent rainfall/flash floods or more violent cyclones, heat waves and coral bleaching. However, many candidates did not score full marks due to telescoping of answers such as:

- climate change/weather disbalances and flash floods,
- an increase in temperature and global warming/heat waves

Candidates were expected to give two distinct ways how an increase in the level of carbon dioxide impacts the environment negatively. Some candidates had misconceptions that rise in sea level will cause tsunamis and that melting of glaciers leads to flash floods. Vague statements such as ‘affect/harm crops’, ‘cause natural hazards’ should be avoided.

QUESTION 5

This question was based on the chapter ‘Metals and the reactivity series and salts. It mainly assessed the knowledge and application of the reactivity series and uses and solubility of salts. Many candidates found this question challenging and as a result, it was left unattempted by low performers.

Item 5(a)(i)

Candidates could easily identify hydrogen gas being produced when sodium reacts with water. Oxygen was the most common incorrect answer. Misreading of questions lead to answers such

as sodium oxide or sodium hydroxide showing that candidates did not pay attention to the word gas.

Item 5(a)(ii)

The majority of candidates scored at least one mark. The following observations were awarded marks:

- Sodium floats on water/darts on the surface of water.
- It melts into a silvery ball/It becomes smaller in size.
- It fizzes/Effervescence occurs/Bubbles of gas are seen.
- The solution becomes hot or heat is produced.
- Sodium reacts explosively/violently/vigorously.
- An alkaline solution is formed which turns red litmus paper blue/turns phenolphthalein pink/ changes colour of methyl orange from red to yellow.
- Fizzing/hissing/whizzing sound is produced.

Item 5(a)(iii)

Writing balanced chemical equation proved challenging for the majority of candidates. Only high ability students could write the balanced chemical reaction between sodium and water correctly. The common mistake was to write H instead of H₂ for hydrogen. Some candidates had difficulty in writing the formula of sodium hydroxide, NaOH.

Item 5(a)(iv)

Neutralisation was the correct answer. The majority of candidates understood that neutralisation occurs between an acid and sodium hydroxide. Misspelling of the word was often seen. Displacement reaction was the most common incorrect answer. Some candidates gave chemical reaction, which was an incorrect answer. Candidates are required to be precise about the type of chemical reaction.

Item 5(b)

This item made reference to the reactivity series. Candidates had to identify metal X and Y based on their reactions with water and steam. Zinc, Iron, Aluminium were acceptable answers for metal X and Lead, Copper, Mercury, Silver, Gold, Platinum were acceptable metals for

metal Y. Magnesium was the most common incorrect answer. This showed lack of understanding regarding reactivity of magnesium with water.

Item 5(c)

Candidates could identify baking soda as the salt used for baking. Some named it correctly as sodium bicarbonate or sodium hydrogen carbonate while others simply named it as bicarbonate. Sodium carbonate or baking powder or sodium chloride were common incorrect answers.

Candidates showed good understanding of calcium sulfate being used in the making of Plaster of Paris, though there was a general tendency to use the French or Creole words for Plaster of Paris. Some incorrect answers included its use as laxatives (in medicines), in the making of glass, as bandages or to enhance taste.

As regards to solubility of salts, only a few candidates could recall the solubility rules. Sodium bicarbonate is a soluble salt while calcium sulfate was identified as being insoluble or partially soluble.