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

MAURITIUS EXAMINATIONS SYNDICATE

EXAMINERS' REPORT

NCE 2025

CHEMISTRY COMPONENT

Subject code: N530

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NCE 2025 – CHEMISTRY COMPONENT

EXAMINER'S REPORT

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 NCE 2025 Chemistry paper consisted of 5 questions, carrying a total of 50 marks. The paper covered the breath of the syllabus and yet proved to be quite challenging for students. As in the previous years, the question types included objective type items, short answered items and structured items. The open-ended, application-based questions demanded specific responses leaving little room for general answers to be awarded marks. As a result, students' overall performance in NCE 2025 was not as good as it was in NCE 2024 for the Chemistry component. The syllabus comprise of 5 units and questions were given on the five units. Each question was graded to cater for all ability of students. The units that proved most challenging were 'Language of Chemistry' and 'Metals and Reactivity Series'.

KEY MESSAGES

- Candidates must read questions carefully.
- Candidates should provide only one answer for the MCQs. They should clearly indicate their answer and cross out the one they intend to. In cases where the intention for the candidate is not clear to the examiner and the decision is left to the examiner, no mark is awarded.
- For matching exercises, candidates are required to provide only one matching answer.
- Emphasis must be placed on the recall and the understanding of basic chemistry terms such as radicals, diatomic molecules. A lack of proper understanding impinges on the candidates' responses, particularly in MCQs, where there have only one choice. The first item among the MCQs required candidates to identify a diatomic molecule. Whilst, the cognitive demand of this question for this level is rather low, many candidates could not identify the correct answer.
- Writing of symbol of elements and formula of compounds is a primordial for the learning of Chemistry. Candidates must write symbol of elements and formula of compounds by properly illustrating capital and small letters. Writing the formula of sulfate correctly remains challenging, particularly when it involves putting it into brackets. Candidates also ignore capitalise the O in sulfate radical.
- Language continues to be a barrier for candidates. In open-ended questions, candidates had difficulties in expressing their answers in a clear and concise manner. A few candidates even answered in French or in Creole, which is to be discouraged at the level.
- Candidates had difficulty to recall appropriate terminologies and names of instruments.
- In Chemistry, the ability to observe visually as well as auditorily is an important skill that needs to be developed in students.

Comments on specific questions

Question 1

Question 1 comprised 10 multiple choice items where there was a good blend of knowledge-based items as well as items focussing on application/scientific inquiry. Very few candidates could score all ten marks in MCQ. Candidates found items (d), (e), (g) more accessible and the mean mark for this question was 5.9.

Table 2 provides the key for the items in this question.

Table 2

Item	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
Key	**B**	**D**	**A**	**C**	**A**	**A**	**D**	**B**	**C**	**C**

Item (a)

This item proved slightly challenging for those candidates who did not know the meaning of diatomic molecule. Whilst a good majority of candidates understood that sulfur and zinc are incorrect answers. Distractor A – Carbon was the most common incorrect answer.

Item (b)

This item revaled that candidates could not recognise that a radical is a group of atoms chemically combined together. The most incorrect common answer $NaHCO_3$ and the majority of candidates opted for this incorrect answer. This reveals that students have the misconception of considering a radical as an element.

Item (c)

This item proved to be challenging as it was an application question. From the given formula of the chloride XCl_2, candidates had to identify the valency of X. In addition, they had to recall

the hydroxide radical. Many candidates omitted the bracket when writing the formula of the hydroxide of X, thus resulting in XOH_2 as a common distractor.

Item (d)

This question was satisfactorily well answered as it was a knowledge-based question. Candidates were required to recall the formula and valency of hydroxide. A good majority of candidates opted for the correct answer.

Item (e)

This was the most scoring MCQ item. Candidates could easily recall that carbon monoxide is converted to a harmless gas in the catalytic converter.

Item (f)

This item proved to be challenging for those who could not apply their knowledge of the reactivity series and hence could not identify calcium as the most reactive metal.

Item (g)

Satisfactorily well attempted by a majority of candidates who identified oxygen as the gas that decreases during eutrophication.

Item (h)

This was a knowledge-based question. Candidates had to recall the solubility rules. The mnemonic 'SUBALECA' used for the solubility of sulfates, was noted on the scripts of some candidates.

Item (i)

Few candidates could identify nitrogen dioxide as gas released into the atmosphere during lightning.

Item (j)

This was the most challenging and least scoring MCQ question , revealing that students have not been exposed to the colour of solutions formed when a metal reacts with an acid.

Question 2

Question 2 carried a total of 11 marks and included the writing formula of compounds, matching exercise on uses of salts, and focussed on concepts of neutralisation, flue-gas desulfurisation.

Item 2(a) – Writing formulae of compounds

Candidates could write the correct formula for sodium nitrate and iron (III) chloride. The most common mistake was to write oxygen as capital letter 'O' when writing formula of radicals. The symbol of chlorine was also incorrectly written as CL instead of Cl. Omission of brackets when writing formulae of compounds remains an area that requires students' attention. Wrong placement of the brackets was also observed for example Na $(NO)_3$ or $K_2(SO)_4$

Item 2(b) – Matching exercise on uses of salts

Most candidates could identify the use of calcium sulphate in the making Plaster of Paris. Few candidates could not understand the instructions and numbered each salt and corresponded them a letter/number. Attention of students is to drawn to the fact that matching exercise requires them to match the corresponding answers with a line unless instructed otherwise. It is also to be noted that the extra option 'to make glass' was often randomly matched to a given salt.

Item 2(c) (i) – Define neutralisation

A good majority of candidates provided the correct definition of neutralisation as a reaction of an acid with a base/ alkali to produce salt and water. However, some candidates gave incorrect products formed during neutralisation, for instance, salt and hydrogen. Other incorrect answers included the reaction between a metal and an acid; the reaction between a base and an alkali; the process of making something neutral; to neutralise a substance with an acid or base;

to find out whether the solution is acidic or alkaline or neutral. It has also been noted that candidates do not have a good grasp of command verbs. Instead of giving a definition, many candidates stated the applications of neutralisation, for example to decrease the pH of soil or to treat wasp stings.

Item 2(c)(ii) – Reducing emission of sulfur dioxide into the atmosphere

Calcium carbonate or limestone was the most correct answer. Many candidates also mentioned calcium hydroxide, calcium oxide and water, which were acceptable answers.

Item 2(d) – Acids used to prepare salts

Very few candidates could obtain both correct answers. Identifying sulfuric acid as the acid required to produce a sulfate salt was a challenge for most of the candidates. was commonly given as an incorrect answer. Recalling the names of common acids correctly, without spelling mistake, is an area that requires attention. Responses such as nitrate acid, chloric acid or hydrochloride acid were incorrect answers.

Question 3

This question carries 10 marks and requires mostly one-word answer. This question was graded and catered for all ability of students. However, only the higher ability students could score full marks for this question.

Item 3(a) – Identification of class of compounds

Although the term' class of compound' is not commonly used, the item was well answered by the majority of candidates. Metal oxide or base was the expected correct answer provided by a good number of candidates.

Item 3(b) (i) (ii) – Identification of metal

Candidates were required to recall the observations of metal with oxygen. A significant number of students could identify R as the least reactive metal. While the correct answer provide by most candidates was copper, mark was also awarded for silver as an answer. Gold was not acceptable as the correct answer. Students are advised to read instructions carefully. Low ability candidates ignored the instructions and observations provided in the table. however, the higher ability candidates went the further mile in identifying the name of metal that could correspond to Q and R, that is Magnesium and Copper.

Item 3(b)(iii) – Laboratory safety precaution

Many students could identify a suitable precaution relevant to the experiment, including wearing gloves, goggles; using tweezers, tongs, pliers or forceps to hold the metal when heating as well as avoid staring at the flame or looking at the flame directly with naked eyes. However, general safety laboratory precautions such as wearing lab coat/mask, stay away from the flame/burner or to be under the supervision of the teacher were not accepted answers. Students should be more familiar with common instruments used for simple experiment. It has been noted that some candidates use general terms such as 'do not hold with bare hands' rather

than specific one such as ‘using a pair of tongs’. Spelling mistakes in writing the words ‘gloves’ and ‘goggles’ were also noted.

Item 3(c)(i) – Naming of gas produced

Many candidates could correctly identify the gas formed as hydrogen. It was observed that lack of attention in reading questions carefully lead to common incorrect answer such as magnesium sulfate, which was the salt formed.

Item 3(c)(ii) – Naming of a metal

Candidates were required to name a metal that did not react with dilute sulfuric acid. Various metals were accepted, namely copper, mercury, silver, gold, palladium, platinum. This question revealed that some candidates did not grasp the concept of reactivity of metals. Some of them did not refer to the metals learnt in the syllabus, but provided names of metals from the Periodic table such as Iridium, Tungsten, Osmium.

Item 3(d) – Word equation and balanced chemical equation

Students have to learn the reaction of metals with water and with steam as per their syllabus content. Calcium oxide was the most common incorrect answer where candidates showed the misconception regarding the products produced for both reactions. Writing of balanced chemical equation proved to be challenging for many candidates.

Question 4

This question carries 10 marks and is on the unit 'Atmosphere and the Environment'. The items focussed on air pollution, global warming and water pollution. It was found that very few low ability students attempted this question.

Item 4(a) – Sources and effects of atmospheric pollutants

This item was well attempted by the majority of candidates. Depletion of ozone layer or its effects on skin and eyes were correctly stated as harmful effects of CFCs. Lightning and internal combustion engines of vehicles/Burning of fossil fuels were common correct sources of NO stated by the majority of candidates. As for SO_2 the effects on the environment as well as on people were accepted answers. Some common correct answers included skin, eyes and lung/respiratory problems and the formation of acid rain. Correct sources of CH_4 included decay of vegetation and animals, cattle breeding and landfills. Few candidates wrote the name of CH_4 rather than the source of CH_4.

Item 4(b) – Effect of global warming on beach and marine environment

This question was well answered by a majority of candidates. The correct answers included ideas related to beach erosion due to melting of glaciers/rise in sea level; coral bleaching; ocean acidification; loss of marine life and marine habitat. Some contradictory statements were also noted such as 'melting of ice caps caused a *decrease* in temperature leading to extinction of certain species' . Students should be encouraged to verify their answers as contradictory answers are penalised.

Item 4(c) – Pollutants present in industrial waste

This question proved to be challenging for even the higher ability students. the most common incorrect answers were oil, sewage, fertilisers, which are sources of water pollution. The correct answers inlcuded heavy metals, dyes, detergents, acids/alkalis, pesticides/herbicides.

Item 4(d) – Sources of water pollution

Many candidates mentioned the use of detergents and pesticides. Fertilisation was often used instead of fertilisers in agriculture. Eutrophication was also a common incorrect asnwer. Few candidates used dumping of waste, ignoring the instruction of giving other sources of pollution. Accepted answers included sewage, oil spills, fertilisers or agricultural run off, nuclear waste.

Question 5

Question 5 was the least scoring question. The items focussed mainly on the unit 'Mixtures and Separation techniques. For the first part of the question, candidates were required to identify the different separation techniques while for second part they were required to respond to questions related to distillation. Candidates encountered much difficulty for second part which consisted of open-ended questions. It is to be noted that this question was barely attempted by low ability students.

Item 5(a) – Identification of separation techniques

Most students who attempted this question scored at least one mark. Candidates could easily identify crystallisation as the method used to obtain zinc sulfate crystals from its solution. Candidates who could recall that iodine is a solid that sublimes correctly answered (a)(iii). The separation of lead (II) sulfate from a mixture of lead (II) sulfate and water proved to be challenging. This item required candidates to apply the solubility rules. Many candidates could not recognise lead (II) sulfate as being an insoluble salt. Many candidates gave 'distillation' as the most common incorrect answer, ignoring that filtration is the correct technique to separate an insoluble salt from water. Answers also revealed that there is a lack of proper understanding of key terms e.g some candidates wrote filtrate instead of filtration.

Item 5(b)(i) – Naming of apparatus

Candidates could not recall the proper names of apparatus. The wire gauze was often referred to as a grid or metal grill, metal gauge, metal wire or tripod were other common errors for equipment A. The condenser (equipment B) was referred to as a tube or a cooling tube or a conductor.

Item 5(b)(ii) – Function of equipment B

Many candidates could generally state that equipment B (the condenser) was used to cool down the vapour. However, a common incorrect answers were that the condenser convert liquid to gas or to cool down the hot solution/water/distillate.

Item 5(b)(iii) – Identification of error in experimental set-up

Candidates were expected to identify the incorrect position of the thermometer and secondly the incorrect labelling for the the flow of water in the condenser. Instead of identifying the errors, some candidates suggested the corrective measures such as 'the thermometer must be placed opposite the side arm' and 'water in must be at Y and water out at X', which revealed that they could identify the mistake. However, there were water in as an error and water out as the second error, which counted as only one error regarding the mistake to be identified. Few candidates could not name the distillation flask and stated that the thermometer must be placed higher and not directly in the beaker/funnel. Other incorrect answers included the presence of the wooden block or the absence of the retort stand to hold the flask or that the thermometer was upside down.

Item 5(b)(iv) – Use of boiling chips

This part was satisfactorily answered by high ability students who mentioned that the boiling chips are used to ensure smooth boiling or to prevent bumping or splashing of the solution. Incorrect answers included 'to smoothen the experiment or to prevent spilling of the solution or to increase the rate of boiling'.