EXAMINATIONS AND ASSESSMENT CHIEF DIRECTORATE
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2025 NSC CHIEF MARKER'S REPORT

SUBJECT	TECHNICAL SCIENCES		
QUESTION PAPER		**2**	
DURATION OF QUESTION PAPER	1h30 Minutes		
PROVINCE	Eastern Cape		
NAME OF THE INTERNAL MODERATOR	Nota P.P.		
NAME OF THE CHIEF MARKER	Mpangele P.		
DATES OF MARKING	28/11-13/12/2025		
HEAD OF EXAMINATION:	Mr Mabona		

SECTION 1: (General overview of Learner Performance in the question paper as a whole)

The evaluation of learner performance is based on the analysis of a sample of 100 scripts, with the outcomes systematically presented in the accompanying tables and graphs Figure 1. The overall sample performance was 53%, reflecting an improvement of 5% compared to the 2024 presentation, which recorded 48.4%.
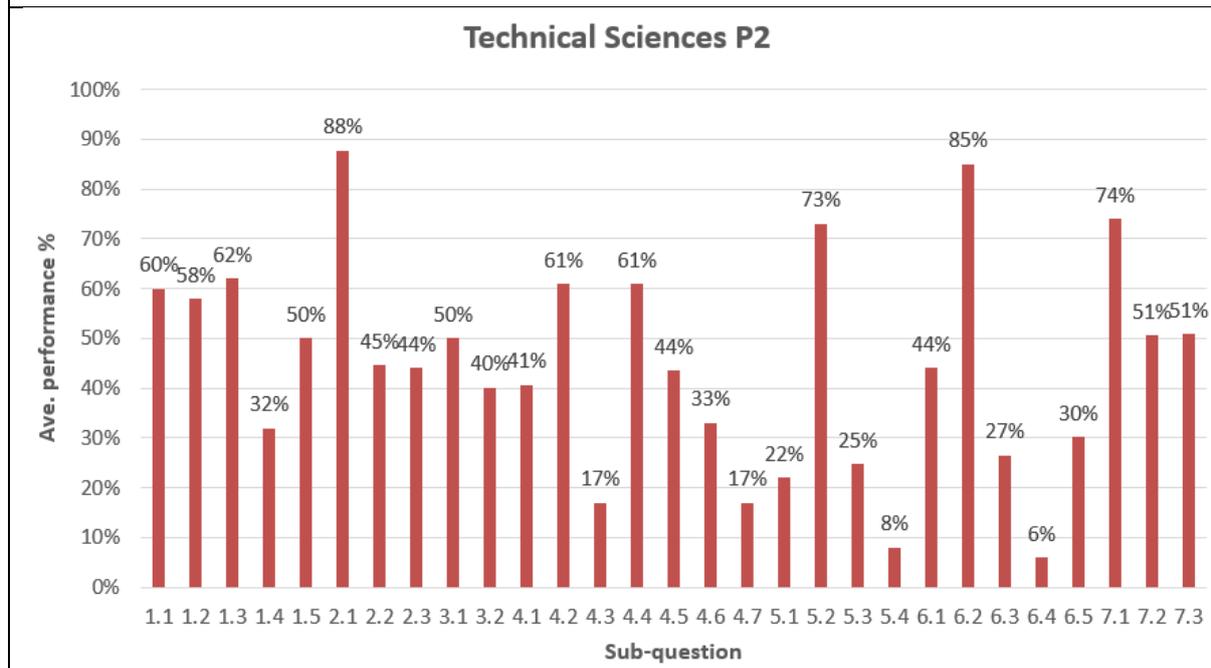
FIGURE 1: OVERALL PERFOMANCE FROM QUESTION 1-7

From the graph it can be seen that candidates perfomed

Best perfomed questions:

Question 2.1(81%) based on hydrocarbons and isomerism

Question 5.2 (73%)type of p-n junction diode

Question 6.2(85%)identification of electrodes(anode)

Question 7.1(74%)definition of reduction

Least perfomed questions:

Question 4.3 chemical formula of the reactant(Cl_2)

Question 4.7 Structural formula of the monomer

Question 5.1 type of a diode

Question 5.4 characteristics of the p-n junction diode.

Question 6.5 alternate energies

A closer analysis of the scripts indicates that several questions presented notable challenges for learners. Questions 4, 5, and 6 covering physical properties (organic reactions (39% correct responses), and electronic properties of matter (27% correct responses) were identified as the most poorly answered, with 6,4% being the lowest in the entire paper at 6%, almost all learners from the sampled scripts could not give the chemical formula of the substance that forms at electrode N. Furthermore, Question 2 also reflected suboptimal performance, with only 57% of learners responding correctly although question 2 is perceived as the easier question in the whole paper.

These findings underscore the need for teachers and subject advisors to implement targeted and deliberate instructional interventions. Strengthening conceptual understanding in the identified areas will be essential for improving learner performance in future assessment.

Learner performance is predicted to be **slightly lower** compared to the October/November 2024 paper.This is based on the high cognitive demand of many items and the national pattern of weak performance in organic chemistry, intermolecular force explanations, and electronic properties.

The Seven-Point Scale indicates that candidates achieved a performance level of 26% in 2025, based on the 3 312 candidates who registered. This reflects a decline of 12% compared to the 2024 performance of 38%. The Seven-Point Scale findings are consistent with the Rasch analysis of the sample distribution, which also shows a decline.

The table and graph below illustrate the level distribution for learner performance from (2023 to 2025).

Year	No wrote	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7
2023	2848	1872	421	300	150	78	21	6
2024	2945	1825	422	297	184	126	72	19
2025	3312	2460	390	264	108	58	23	9

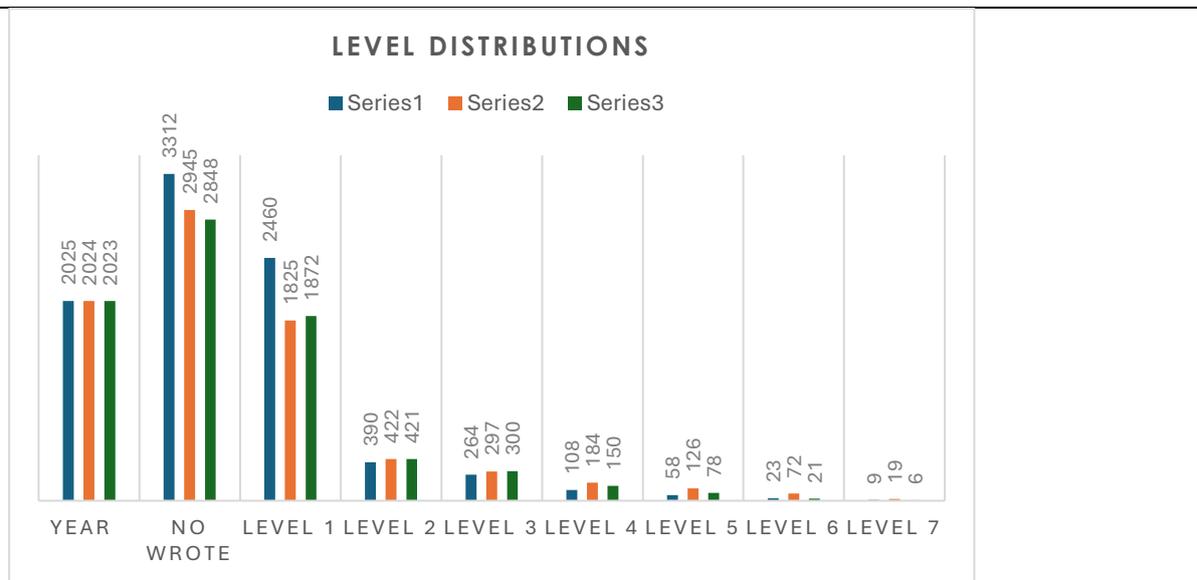**TABLE 1: LEVEL DISTRIBUTION (2023-2025)**

FIGURE : 2 LEVEL DISTRIBUTION(2023-2025)

SECTION 2: Comment on candidates' performance in individual questions

QUESTION 1
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

QUESTION 1	TOPIC	AVERAGE
1.1	Nomenclature	60%
1.2	Basic Organic Chemistry	58%
1.3	Basic Organic Chemistry	62%
1.4	Electronic Properties of Matter	32%
1.5	Electrochemical Cells	50%

TABLE 1: AVERAGE PERFOMANCE QUESTION 1

- The table above depicts the performance in question 1.
- Question 1.1-1.3 well answered questions, while question 1.4 electronic properties is the worst answered question.

(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- Many candidates did not know which group of elements are trivalent and which are pentavalent.
- They struggle to understand that group 3 elements have 3 valence electrons and group 5 elements have 5 valence electrons, possibly a poor foundation of grade 10 chemistry where the periodic table is handled.
- Most candidates get confused with polarity of anode and cathode in the variance electrolytic cells.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

Multiple choice question test deep understanding:

Learners should:

- Practise eliminating wrong options.
- Be trained on how to spot distractors.
- Use past question papers and review incorrect answers.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

- Candidates were not well prepared in electronic properties.
- Learners must be trained in all the topics.

QUESTION 2

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?		
Question	**Topic**	**Average**
2.1	Basic Organic Compounds	88%
2.2	Basic Organic Compounds	45%
2.3	Basic Organic Compounds	44%

- Question 2.1.1-2.12 this was a very fair question, candidates performed moderately well however in question 2.2.3 was poorly answered

(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- Very few candidates scored 3 marks in this question. Some drew structures that were given in the table.

- In question 2.3.1, candidates did not know how to draw the structural formula of the functional group of carboxylic acid. Many learners would draw the whole structure of compound C, without circling the functional group of the compound.
- In question 2.3.2 most candidates were struggling with the correct naming of compound C.

Errors committed by the candidates:

- Omission of hyphens and not following IUPAC naming rules (2-methyl -1-bromo-propane instead of 1-bromo-2-methyl pentane.

- Extra hydrogens or omission of bonds and hydrogens.

- Most learners don't know the names of different functional group; candidates (confused carbonyl with carboxyl, some also wrote formyl that was assessed in 2023-2024).

- Use of digits in the general formula instead of the required format ($C_6H_8O_2$ instead of $C_nH_{2n}O_2$).

(c) Provide suggestions for improvement in relation to Teaching and Learning.

- Educators should spend more time on drilling on writing the correct IUPAC names, drawing of structural formulae.

- More diagrams, models and activities must be given to learners during teaching and learning.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

- Teachers must ensure that learners are grounded in the fundamental concepts such as homologous series, hydrocarbons, isomerism, drawing of structural formula, functional groups, IUPAC naming, drawing structural formulae and names and structure of the functional groups, as a strong understanding of the basics supports learners in answering questions on physical properties as well as

organic reactions.
QUESTION 3
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

Question	Topic	Average
3.1	Physical Properties	50%
3.2	Physical Properties	40%

- Question 3 achieved an average of 42%, a noticeable decline from 55% from previous year's performance.
- Question 3.1 candidates perfomed at 50% a huge drop from 84% . There is an improvement of 3% in question 3,2 when comparing with last year's performance.

(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- Question 3.1 on the definition of vapour pressure
- **Common errors and misconception**
- In question 3.1 candidates defined boiling point instead vapour pressure, some combined the definition of vapour pressure with that of the boiling point e.g "the temperature where vapour is in equilibrium with its liquid".
- In question 3.2.3. candidates lack graphical skills.
- In question 3.4.4 most candidates were unable to identify the compound and how to support their answer,
- use the abbreviation IMF.
- No comparison between compounds.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

- Learners when answering this question firstly they must choose the compound. State which one has got strongest intermolecular force and lowest vapour pressure or they must make the comparison among those 3 compounds in order for them to score more marks.
- When explaining the trends in physical properties the following aspects should be taken into consideration**:**
- Mention the: organic molecules/ compounds in question (compound **A/B/C)**
- The chain length (branched/spherical/longer chain/shorter chain)/surface area)
- Strength of intermolecular forces.
- Lower /higher vapour pressure.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.	

- Graphs interpretation must be done thoroughly during teaching and learning as many are lacking this skill.

QUESTION 4

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

Question	Topic	Average
4.1	Organic Reactions	41%
4.2	Organic Reactions	61%
4.3	Organic Reactions	17%
4.4	Organic Reactions	61%
4.5	Organic Reactions	44%
4.6	Organic Reactions	33%
4.7	Organic Reactions	17%

- Question 4.1.1 and 4.1.2 were well answered, in question 4.1.2 most candidates were only able to give one correct reaction condition instead of two that were required in the question. Q 4.1.2. Question 4.3 and 4.7 were extremely poorly answered.

(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- Question 4.3 ,4.7, was poorly performed question most candidates lost marks because they were writing Cl, HCl and half reactions instead of Cl_2.
- Most candidates confused this reaction with addition reaction although it was a substitution (chlorination)reaction which confused the majority of candidates.
- Question 4.7 was looking for a structural formula of the monomer of PVC most candidates drew the structural formula of ethane.
- Candidates struggled to demonstrate knowledge of catalysts and reaction conditions.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

- Teachers should use variety of flow diagram type questions to train learners the learners how to answer this question.
- Expose learners on various organic reactions, writing them using structural formulae. Learners must be taught all types of the reactions prescribed for them in the examination guide lines (combustion, addition substitution and esterification reactions.)
- This will enable them to be able to have an insight on what reactions are asked on a particular examination's situation.

• Effort must be made on the side of educators to ensure that learners must understand the difference between these reactions, so that learners stop answering what is not being tested.
• The examiners must also consider the correct phrasing of the question, which will direct candidates towards specific answers.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.
• Teachers should train learners on how to draw the structural formula of monomers, and chemical formula.
• Emphasis should be placed on studying reaction conditions for the different types of organic   reactions.
• More exercises should be given to learners, to improve teaching and learning in consultation with chief markers report together with the necessary policy documents.

QUESTION 5

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

Question	Topic	Average
5.1	Electronic Properties	22%
5.2	Electronic Properties	73%
5.3	Electronic Properties	25%
5.4	Electronic Properties	8%

• Question 5.2 was well answered at 73%
• Most candidates were able to answer Question 5.2 correctly, since the options were provided, candidates only had to choose between forward bias, reverse bias, and zero bias. The high performance in this item is likely attributable to guessing rather than a clear understanding of the underlying concepts.
• The least perfomed questions are question 5.4 at 8%,5.1 and 5.3 % at 22% and 25% respectively.

(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.
• Candidates struggled to identify the diode correctly in question 5.1
• Candidates lacked understanding of characteristics of forward biased diode in question 5.4. very few knew one characteristics, even the top achievers only mentioned one.
• No practical exposure to semiconductor devices.
• **These were common characteristics mentioned by candidates:**
-Narrow depletion region

-Current flows in one direction

- **None mentioned**

-The voltage drops across the forward biased p-n junction diode.

-And current increases exponentially after barrier voltage has been exceeded.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

- Candidates must be adequately prepared in all topics, including electronic properties, despite this content previously being assessed mainly in Section A.
- Teachers are encouraged to emphasise examination techniques and key terminology, ensuring that learners can recognise the symbol of a diode and accurately identify the anode and cathode.
- Effective teaching of this topic should incorporate the Examination Guidelines, , and relevant policy documents to strengthen learners' understanding of semiconductors.

(d)Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

- The candidates demonstrated inadequate preparation for this question, which resulted in poor overall performance.
- Use of diagrams and animations must be used to explain electron movement.
- Reinforce how p-type and n-type materials behave under forward and reverse bias.

QUESTION 6

(a)General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

Question	Topic	Average
6.1	Electrolytic cell	44%
6.2	Electrolytic cell	85%
6.3	Half reactions	27%
6.4	Chemical formula	6%
6.5	Alternative energy	30%

This question was fair although candidates could not perfom in question 6.1,6.3 and 6.4.

Question 6.2 the best perfomed sub question in the entire paper.

Question 6.4 the lowest in the entire paper.

(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

- In Q6.1 many learners confused the definition of electrolyte with that of an electrolysis/electrolytic cell, this was evident as most candidates gave the answer for electrolysis or electrolytic cell instead of electrolyte or mix the two concepts
- The oxidation and reduction half-reaction were swopped around showing a lack of understanding of the Table of Reduction Potentials.

(b) Provide suggestions for improvement in relation to Teaching and Learning.
• Use electrode diagrams to show oxidation reduction • Teach "OIL, RIG" and "AnOx/Redcat" • Do more practical or virtual simulations of electrolysis
• In Question 6.1, many learners confused the definition of an *electrolyte* with that of *electrolysis* or an *electrolytic cell*. This misconception was evident as a significant number of candidates provided responses describing electrolysis or an electrolytic cell instead of defining an electrolyte, or they mixed the two concepts. • In Question 6.3, it was evident that learners struggled to use the Table of Standard Reduction Potentials, the oxidation and reduction half-reactions were swapped, indicating a lack of understanding of how to correctly interpret the Table of Reduction Potentials
(d)Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

QUESTION 7
(a)General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

Question	Topic	Average
7.1	Galvanic cell	74%
7.2	EMF calculations	51%
7.3	Cell notation	51%

• Ques 7 was moderately answered even though this topic was done in grade 11. • Candidates struggling with identification of electrodes in galvanic cells and calculation of the anode, most learners calculated "EMF" although the question required them to calculate the anode.
(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

In Question 7.2 common errors observed:

• Incorrect substitution of E° values.

• Omission of SI units in the final answer (-0,44 instead of -0,44V) , and providing half-reactions instead of electrode B.

• Candidates also demonstrated lack of mathematical skills, particularly when required to change the subject of the formula.

• Use of unconventional formulae ()

• Use of incorrect formulae

• Many candidates misidentified the anode as the cathode.

• Use of E° instead of E

In Question 7.3

• most candidates confused cell notation with net reaction.

• Candidates omitted phase boundary or representing components in the wrong order.
• Candidates use equal sign (=) or double arrows.

(c) Provide suggestions for improvement in relation to Teaching and Learning.
• Each learner must be supplied with the data sheet and Standard Reduction Potentials at the beginning of the year.
• Use colour -coded notes for electrode potentials.
• Teachers should be consistent in putting more emphasis the use of data sheet. Learners should be taught how to use the standard reduction potential table both 4A and 4B.
• Teach learners on how to write half reactions before the full cell.
• Provide more worked examples of EMF calculations.
• Educators need to put emphasis on the formulae provided on the data sheet and refrain from writing short -hand when explaining to learners.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.
• Learners must be exposed to the correct use of the reduction potential table, supported by PhET simulations to enhance conceptual understanding.
• In addition, they should engage in practical activities beyond the prescribed PAT, supplemented with relevant instructional videos.