Province of the
EASTERN CAPE
EDUCATION

CHIEF MARKER'S REPORT

SUBJECT:	PHYSICAL SCIENCE P2

1. ANALYSIS OF QUESTION BY QUESTION PERFORMANCE

QUESTION 1

1.1 Application of scientific knowledge.
1.2 LO 2 , AS 1
1.3 Learner responses vary from poor to excellent.

It is clear that most learners lack basic chemistry knowledge.
Educators must devise teaching methods where revision of definitions form an integral part.
In question 1.4 many learners confused the electrolytic cell (electrolysis) with the membrane cell (chlor-alkali industry).

QUESTION 2

1.1 Recall and applying scientific knowledge
1.2 LO2 ; AS 1, AS 2 ,LO 1, AS 3
1.3 Responses vary from poor to very good.

Learners lack basic scientific knowledge.
They are lacking the skills to answer multiple choice questions. It is apparent that little was done in preparing the learners to answer multiple choice questions.

QUESTION 3

1.1 In this question, basic organic chemistry principles and IUPAC nomenclature were tested.
1.2 LO 2 , AS 1 , AS 3
1.3 Where teachers lack understanding and with little teaching experience in organic chemistry the learners did poorly in this section. Otherwise, it was well answered.

3.1 Many learners guessed the answer. It was not well answered.
3.2 Naming of organic chemistry compounds, using IUPAC nomenclature still remains a challenge. The learners lost marks because of:

- omission of hyphens.
- naming the compound alphabetically and numerically.

Responses vary from poor to excellent.
3.3 , 3.5 This question was answered fairly well. Many learners were able to draw the structural formulae for organic compounds.
3.4 Well answered. Many learners used the correct common name (acetic acid) instead of the ethanoic acid for the compounds.

QUESTION 4

1.1 This question was divided in two parts:

- Testing of basic organic chemistry (4.1 – 4.2)
- Testing of investigative skills using a simple organic chemistry practical as an example.

1.2 LO 2 , AS 1 ;LO 2 ,AS 3 ;LO 3 AS 2 ; LO1 , AS 2 , AS4
1.3 Responses vary from poor to very good.

4.1 – 4.2 Nomenclature and structural formulae presents a challenge to many learners.
4.3.1 Learners struggled to formulate an investigative question. They included "fixed volume" as a variable instead of the viscosity / chain length relationship.
4.3.2 Learners failed to explain their answer using the data supplied.
4.3.3 Candidates could not relate dependent and independent variables.
4.4 – 4.5 Most candidates guessed the answer. The explanation, therefore, was not well formulated.
On the whole, this was a good question which was well presented.
Practical investigations need urgent intervention.

QUESTION 5

1.1 Basic organic chemistry and reaction of the simpler organic compounds (alkanes and alcohols) were tested.
1.2 LO 2 AS 1 AS 3 ; LO 3 AS 2
1.3 Although this was a fair and appropriate question, it was generally not well answered. Lack of understanding of organic reactions (and probably poor teaching) hampered learners' responses.

5.1 The use of the word "flammable" in the question (and marking guideline) confused many learners.
5.2 Well answered.
5.3.1 , 5.5 The writing of equations using structural formula created problems. Most learners used condensed and also molecular formulae. Writing of structural formulae must be emphasised by teachers.
5.3.2, 5.6 Many candidates confused "hydration" with "hydrolysis" and hydrogenation.
5.3.3 The way the question was asked favoured the learners (option between name or formula).
5.4 Straight forward organic reaction. However only the brighter learners were able to write the complete balanced equation using the molecular formula.

The basics of organic chemistry must be taught thoroughly and revised as often as possible.
The basics include:

- Nomenclature
- Functional groups
- In structural formula do not include condensed alkyl groups (e.g. CH_3)
- Structural fomulae
- Isomerism

Candidates lost marks because of lack of knowledge, which could probably be attributed to a lack of good teaching.

QUESTION 6

1.1 The question consists of two parts:

- Simple recall on rate of reactions (definitions)
- Investigative type questions, with interpretation of data.

1.2 LO 2 AS1 ; LO 1 AS 1 AS 2
1.3 A very good question which mixed recall (previously mix-and-match questions) with interpretation and application of data. Language, however, posed a big challenge to many learners in expressing their answers, e.g. 6.2.5.Hence the question was generally poorly answered.

6.1 Well answered. Simple recall and stating of definitions.
6.2.1, 6.2.7 Learners were unable to give the relationship between scientific concepts. The range of answering varies from very poor to good. This was dependent on the language used.
6.2.2 Learners could not identify the hazardous nature of SO_2 . Many learners guessed the answer.

6.2.3 Well answered. This was due to the wide variety of variables given in the marking guideline.
6.2.4 Responses vary from poor to excellent.
6.2.5 Not well answered. See 1.3 above.
6.2.6 Poorly answered. Most learners could not interpret the question.

QUESTION 7

1.1 The question contains two sections:
- Basic understanding of chemical (industrial) processes.
- Chemical equilibrium with emphasis on the equilibrium costant (Kc).

1.2 LO 2 AS 1-3 ; LO3 AS 2 ; LO 1 AS 3
1.3 A very challenging, high order question, especialy the K_c – calculation.

7.1 Recall, writing balanced chemical equation. Fairly well answered.
7.2, 7.3 The splitting of the answers in two parts benefited many leaners. However, this was mostly poorly answered. Only learners taught by experienced educators, did well in this question. Again many learners could not correctly express what they wanted to say.
7.4 Some candidates guessed the answers. In general , it was well answered.
7.5 A very high order question. Most learners (80%) did not even attempt the question. It was extremely difficult for the learners to answer at schools where teachers lack experience and understanding of chemical equilibrium.
Nonetheless, it was a good and appropriate question in which the reasoning abilities of stronger candidates were fully tested.

QUESTION 8

1.1 Recall and applying electrochemical principles.
1.2 LO 1 , AS 3 ; LO 2 AS 1-3 ; LO 2 AS 2
1.3 Although this was a straight forward question, many learners failed to apply their content knowledge.
The responses of candidates range from poor to excellent.
The use of the standard electrode potential tables is not well taught. This is a basic requirement for learners in order to answer questions on electrolysis, electrochemistry and the chlor-alkali industry.

8.1 Straight forward. Well answered.
8.2 Many learners could not identify standard conditions pertaining to electrochemical cells correctly. Answered moderately well.
8.3 Many candidates answered using the half reaction instead of the oxidising agent only.
8.4 Many candidates fail to use the equations on the data sheet correctly, hence losing one mark. Answered fairly well.

8.5	Responses vary from poor to good. Many learners gave the cell notation, instead of the net-ionic equation.
8.6	Many candidates guessed the answer. Well answered.
8.7	Poorly answered. This can be attributed to lack of understanding from both learners and educators. Learners failed to link equilibrium with redox.

QUESTION 9

1.1	Recall and application of knowledge applicable to electrolytic processes.
1.2	LO 2 AS 1, AS 2 AS3 ; LO1 AS 1
1.3	The question was fair, but learner responses were poor. This can be attributed to their inability to use the standard electrode potential tables. Lack of understanding and experience by educators may also be a contributing factor.
9.1, 9.5	Mainly guessing. Well answered.
9.2, 9.3, 9.6	Electroplating must be emphasised. The learners responses were also irrelevant to the question. They gave an explanation in terms of chemical instead of visible changes. They could also not clearly explain the changes to be made to the electrolytic cell. Hence the responses varied from poor to good.
9.4	Many learners could not write the correct half-reaction.

QUESTION 10

1.1	The question dealt with batteries and the application of electrochemical cells.
1.2	LO 1 AS 3 ; LO 2 AS 3 ; LO3 AS 2
1.3	The question was fair but challenging. However, due to the omission of data (i.e charge on an electron) in question 10.6, all the learners were awarded five (5) marks. Apart from this, the question was generally poorly answered.
10.1	Pure recall. However, most learners could not give the correct oxidation number. This may be due to lack of revision.
10.2	Learners fail to cancel ions, electrons or compounds that appear more than once in the equation. Poorly answered.
10.3	The response was given as a half-reaction. Candidates could not identify lead as the reducing agent. Poorly answered by learners who were not able to use the tables.
10.4	Only the half-reaction containing O_2 was given. Poorly answered.
10.5	Application of scientific knowledge limited the candidates responses.

7. ANY ADVICE THAT YOU COULD GIVE TO EDUCATORS TO HELP LEARNERS TO REACH THE EXPECTED LEVELS

- An educators workshop on poorly taught sections identified during the marking process must be conducted at district level, as early as February.
- Follow the NCS, SAG, content documents and examination guideline.
- Workshops must be arranged in all districts to discuss the content documents and examination guidelines. There are still many educators who do not follow these documents correctly, because they are unfamiliar with it.
- Teaching and learning must give exposure to LO 1 type questions.
- Practical investigations must form part of teaching, to develop confidence in learners to answer investigative type of questions.
- Expose learners to practical application questions by site visits and field trips.
- Educators have to plan their teaching well in advance. Organic chemistry and chemical systems must be taught earlier in the year. Educators must follow pace-setters.
- Expose learners to higher order questions.
- Teach learners to make use of the data sheets especially the standard electrode potential table. They should be given enough practice on how to use this table to answer questions on electro chemistry. Supply each learner with both tables.
- Curriculum must be covered well in time to ensure that there is enough time for revision.
- Debates on reasoning and explanation type questions improve learner's performance.

8. ANY OTHER COMMENTS

- Under qualified educators is a major contributing factor towards poor performance. As they are not qualified they do not have the confidence to teach as per NCS requirements and thus they do get teach the demanding sections. They must be given more support.
- Those who are qualified and willing have too much administrative work as a teacher to fulfill certain requirements of the NCS curriculum.
- It is advisable to develop materials on investigative type of questions from across the curriculum in both the papers and distribute to the schools so they, the learners can practice writing investigative questions and hypotheses.
- Educators usually complain that the physical science curriculum is broad and deep. They do not have enough time. Splitting this subject into two may have a positive effect towards this. By doing this the contact time is increased.