Province of the
EASTERN CAPE
EDUCATION

CHIEF MARKER'S REPORT

SUBJECT:	PHYSICAL SCIENCES P1

1. ANALYSIS OF QUESTION BY QUESTION PERFORMANCE

QUESTION 1

1. The questions assess the learners' core knowledge of physics and their ability to identify laws relationship, facts, concepts and then recall the relevant information.
2. LO 2 AS 1 was relevant.
3. 3/5 (60 %) Performance for the question varied from poor to good in the performing schools.

4. A lack of basic knowledge is evident. The questions are all fair, but many schools perform poorly because the questions cover all the Physics topics. It is clear that the curriculum is not covered in many centres, as certain questions were not attempted.

QUESTION 2

1. The questions test the learners' core knowledge of physics and their ability to identify relationships, facts, laws and concepts. It also assesses the learners' insight and application of these laws, relationships and physical phenomena.
2. LO1 AS2; LO2 AS 2 + 3
3. 7/25 (37%) General poor performance in most centres. The bright candidates scored well.

4. Questions 2.1; 2.2; 2.6; 2.8 were poorly answered. Learners lack of basic knowledge and the inability to answer multiple choice questions is evident. Many pupils guess the answers. Educators need to teach the strategies required and basic concepts so that learners have the necessary skills to cope with these questions.

QUESTION 3

1. The aim of the question was to test the learners' ability to apply problem solving strategies to solve multi-step questions. Insight in vertical projectile motion and the translation of data was expected from the learners.
2. LO1 AS 2, 3 LO2 AS 2
3. 6/19 (33%) Performance ranged from poor to average.

4. This was a fair question with good progression from easier to more difficult subsections.
   Q3.1 The majority of learners gave the correct response. A few lost the mark for writing 3 sec.
   Q3.2 Well answered. Many candidates did not add 100 m to their calculated answer.
   Q3.3 Although many learners did not score full marks, they received marks for showing the correct displacement after 3 and 6 seconds. Many learners however could not give the correct shape of the graph as they lack the required translation skills.
   Q3.4 Mathematical skills that were required to answer this question were evidently lacking in most learners responses which translated into poor performance. Many learners clearly do not know the symbols in the formulae they tried to apply. This question (level D) was not attempted by most learners. Bright candidates did well in this question.

QUESTION 4

1. The question assesses the application of knowledge of conservation of mechanical energy and conservation of momentum.
2. LO2 AS1; AS 3 LO1 AS 3 LO2 AS 3
3. 4/13 (29%) General poor performance. Many learners could not link conservation of mechanical energy to conservation of momentum.

4. Q4.1 Although this seemed a straight forward definition, many candidates could not give the correct answer. Most of the candidates linked conservation of mechanical energy to free fall.
   Q4.2 Well answered. Most candidates calculated E_p and E_k correctly.
   Q4.3 This was a multi-step question. Because learners could not link conservation of mechanical energy with conservation of momentum, most of the candidates only started with the second part of the calculation and could only score two (2) marks.

QUESTION 5

1. The question assesses the application of knowledge principles regarding F_{net} and the Work-Energy theorem. Content from gr. 11 was also tested in the form of force diagrams.
2. LO1, AS 2 and AS 3 LO2 AS 2, AS 3
3. 4/15 (28%) Performance varied from poor to average in the performing schools.

4. Q5.1 Many learners do not have the skill required to draw a free body diagram. Missing arrows and/or labels caused learners to eventually loose four (4) marks.
   Q5.2 The majority of learners failed to give the correct reason. They could not relate that the vertical forces are perpendicular to the direction of motion.
   Q5.3 It is evident from the learners' performance that energy principles are not being taught correctly in most centres. Most learners do not correctly apply $W_{net} = W_{app} + W_f$. They are confused about when to use cos 0º and cos 180º
   Q5.4 The specific method to do this question was given, which made it easy for learners who knew the definition that was referred to. Most learners who attempted the question scored full marks.
   Q5.5 The majority of learners gave the correct answer but failed to give the correct explanation. They could not establish the relationship between W_{net} and cos ϴ .

QUESTION 6

1. Scientific reasoning, problem solving and defining concepts related to the Doppler-Effect is assessed. This question illustrates the application of Physics in every day life.
2. LO1 AS 3 ; LO2 AS 2
3. 4/6 (50%)Performance varied from average to good. The question was well answered and it is evident that educators concentrate on the work relating to the Doppler Effect.

4. Q6.1 The majority of candidates gave the correct response.
   Q6.2 Many learners did not achieve full marks as they did not use the correct formula as on the data sheet. Many learners who used the correct formula substituted correctly, but failed to score full marks. This was as a result of the lack of mathematical skills to change the subject of the formula. Poor knowledge of the symbols caused learners to loose marks. Lack of calculator skills is also evident.
   Q6.3 Most learners answered this correctly as no explanation was required.

QUESTION 7

1. The question tested the learners' knowledge and understanding of interference while also assessing their ability to interpret the diagram.
2. LO2 AS 1, AS 2
3. 2/7 (31%) Overall poor performance. All candidates from a number of centres scored full marks. Many learners did not answer this question indicating that it was not taught at all.

4. Q7.1 Most learners could not express themselves adequately to explain "interference".
   Q7.2 Many learners could not answer this question as they lack translation skills and basic knowledge.
   Q7.3 Many of those that gave the correct answer could not give the correct explanation. This indicates an inability to distinguishing between constructive and destructive interference.

QUESTION 8

A very good question.

1. To define scientific concepts related to diffraction of light and to evaluate the investigative, problem solving and data interpretation skills of the learners.
2. LO1 AS2; AS 3
3. 4/10 (42%) Performance was adequate. A substantial number of learners scored full marks.

4. Q 8.1 Was well answered, although many learners failed to explain diffraction correctly.
   Q 8.2 Most learners could answer this question.
   Q 8.3 Although the performance was fair, data interpretation and translation skills are lacking for the majority of learners. Many learners do not understand the relationship between the given variables. Many learners gave the correct answer but could not motivate correctly.
   Q 8.4 Most learners identified the correct formula and substituted correctly. Marks were lost due to incorrect conversion and rounding off of answers.

QUESTION 9

1. The question assessed the learners' knowledge of capacitance and the relationships between capacitance, charge, electric field intensity and the resultant force experienced by a charge between parallel plates.
2. LO2 AS 1 ; LO1 AS 3 ; LO2 AS 1
3. 5/17 (26%) Performance was poor to average.

4. Q9.1 Many learners could not give the definition of capacitance, but instead defined a capacitor.
   Q9.2 Although many centres achieved full marks, many learners lost marks for not converting *mm* to *m* correctly. Because this was a straight forward calculation, a wrong answer indicated the lack of proper use of a calculator (which is also evident in other questions).
   Q9.3 More than 60 % of the learners could not give the correct graph. Many did not show that the current starts off with a definite value on the y-axis.
   Q9.4 Many learners achieved full marks in this question, although a few could not change the subject of the formula correctly.
   Q9.5 Although this was a straight forward question, the majority of learners could not score high marks for this question. Most of the learners used Coulomb's Law. This indicates that many learners did not understand this problem which highlights the need to revise gr. 11 work properly.

QUESTION 10

Very well constructed and original question in true NCS mode.

1. The aim was to test the relevant application of Ohm's Law. The question accesses the learners' ability to explain the practical application of various aspects of series and parallel connections in electric circuits.
2. LO2 AS1, 2, 3 ; LO1 AS3
3. 4/16 (26%) Generally poor to average performance.

4. Q10.1 Many learners could not state the definition of Ohm's Law. As a result, they struggled with the application in the next section.
   Q10.2 To calculate the effective resistance in a parallel combination is still a challenge to many learners. This indicates a lack of mathematical skills. Many learners failed to apply the concept of dividing the current in a parallel combination. Because the majority of learners fail to understand the relationship between I, V and R, they struggled to apply the correct formulae for this subsection.
   Q10.3 Less than one percent scored full marks. Most scored 1 or 2 out of 4. The principle tested here was: addition of a resistor in parallel decreases the total resistance which leads to an increase in current. Most learners guessed the answer and could not give the correct explanation, even in the performing centres.

QUESTION 11

1. This question assesses the learners' problem solving skills and understanding of graphical representation of information. It also tests the learners' knowledge on the difference between AC and DC in terms of expressing it graphically.
2. LO1 AS3
3. 4/10 (43%) Performance in most centres was fair. There are still centres whose learners do not attempt this question.

4. Q11.1.1 and Q11.1.2 Learners that performed poorly showed an inability to interpret the graph. V_{max} is on the graph. Learners show a lack of understanding of subscripts in V_{rms} and V_{max}. This indicates a lack of a basic knowledge of AC.
   Q11.1.2 Many learners are not exposed to the formula sheet as they are confused by the different formulae (AC) on the sheet. Many learners failed to see that this is a multi-step question.
   Q11.2 Because many learners failed to give the correct graph, it highlights the learners lack of understanding of the difference between AC and DC. Many learners lost one mark for not drawing the graph correctly (although they knew the shape).

QUESTION 12

1. The aim was to assess the learners' insight and knowledge of the photoelectric effect and the electromagnetic spectrum. The question also assessed whether learners can relate their scientific knowledge to everyday life situations.
2. LO 2 AS 1 & 3 ; LO 1 AS 3
3. 5/12 (38%) Performance was generally poor, although many learners from performing schools achieved full marks.

4. Q12.1 and 12.2 was well answered in most centres. This was a good question. It focussed on the importance of ultraviolet waves as well as its dangers.
   Q12.3 and 12.4 Many learners did not attempt these questions. From those who attempted the question, most learners failed to use the mass of the electron given in the data sheet. Due to the wrong selection of formulae, the answer to 12.4 was attempted in 12.3 and vice versa. This contributed to the overall poor performance.
   Q12.5 Many learners gave the correct answer, but could not scientifically substantiate their answer.

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

MARKING:

1. All educators need to be exposed to marking. At District level all educators must undergo training in marking their specific subjects.
2. The general guidelines to marking must be made available to teachers / schools.
3. Educators must stress the fact that learners are penalized for not following instructions.
4. Rounding off answers to two (2) decimal places remains a problem and educators need to emphasize this for the benefit of their learners.

EDUCATORS:

1. Expose learners to the formula and data sheet that is used in the final examinations throughout the year.
   Teachers must emphasize the fact that learners need to start with the exact formula as on the formula sheet – many learners loose many of marks because they do not use the formula sheet. The correct use of subscripts needs to be emphasized.
2. The Work-energy theorem $W_{net} = \Delta E_k$, equations related to net work and energy and all other laws, definitions, other equations, correct abbreviations and units must be mastered by learners.
3. Despite including the correct method to answer questions on conservation of mechanical energy and the work-energy theorem in the reports of 2008 and 2009, no improvement is evident in most schools. This indicate that educators do not get or do not read the reports.
4. Educators need to demonstrate projectile motion during teaching time and explain the significance of direction in vertical motion. The concept of relative velocity needs to be taught.
5. Although teachers are encouraged to make use of past NCS papers, this should not become a teaching tool. Educators must first teach the basics as prescribed in the content document and the examination guideline, before using past examination papers for revision and consolidation of the work.
6. Teachers need to be trained on poorly taught topics identified at the marking centre and reported on in this report.

7. Ensure the curriculum is covered well in time.
8. Provision must be made in the school programme for revision during and after school hours.
9. Do revision regularly, particularly Grade 11 work. Use the past NCS papers, examiners' reports and exemplars as revision tools.
10. There is clear evidence indicating that in poor performing schools no homework is done. Schools must develop and enforce a homework policy. Educators must ensure that learners actually get and do homework daily. Remedial work in the form of corrections and explaining again must be done. The whole process must be closely monitored by the school management team. 11. Educators must emphasize all definitions and ensure that learners memorise them.

8. ANY OTHER COMMENTS

1. District officials must organise marking guidelines discussion workshops in their districts. 2. Examiner's Reports must be sent to schools by the end of January each year - many schools still have not received the 2009 report.