ZANZIBAR EXAMINATIONS COUNCIL

CANDIDATES' ITEMS RESPONSE ANALYSIS REPORT FOR THE FORM THREE ENTRANCE EXAMINATION 2023

215 PHYSICS

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FOREWORD

The Zanzibar Examinations Council has prepared the Item Response Analysis Report for the 2023 Form Three Entrance Examination in Physics Subject. The purpose of this report is to provide feedback to students, teachers, parents, policy makers, curriculum developers and other educational stakeholders about the performance of the candidates in this subject.

The Form Three Entrance Examination is the evaluation which intends to measure to what extent the candidates have learnt in their two years of Ordinary Secondary Education. Through examination results, the candidates receive a grade that indicates their level of performance which helps to make decisions whether they may continue to another level of education or not.

The analysis presented in this report is intended to contribute towards the understanding of possible reasons behind the candidates' responses in Physics subject. The report shows some of the reasons that made the candidates whether to perform good or bad. The possible factors that lead the candidates get good performance include understanding and identifying the demand of the questions, ability to follow instructions on the question given and high knowledge in applying an appropriate formula.

The factors that may indication the candidates to perform poorly like, failure to identify the requirement of the question by providing the irrelevant responses and lack of numeral skills in applying an appropriate formula.

The detailed analysis displays that, samples from the candidates' scripts to show poor and good responses has been inserted. Finally, various Tables with three different colours which reveals how individual question was performed have been attached.

Hence, the feedback and recommendations provided in this report will enable various stakeholders to take appropriate measures to enhance the performance of the future candidates in Physics subject through the National Examinations prepared in Zanzibar.

Finally, Zanzibar Examinations Council would like to express sincere appreciation to the Examination officers and all who participated in the completion of this report.

Dr. RASHID A. MUKKI

DIRECTOR

ZANZIBAR EXAMINATIONS COUNCIL

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1. 0 INTRODUCTION

This report on Physics items response is based on the analysis of the performance of the candidates who sat for the Form Three Entrance Examination in 2023. The analysis of this report is based on the 2010 Physics Syllabus of Tanzania and adhered to 2015 Zanzibar Form Two Examination Format of Zanzibar Examinations Council.

The Form Three Entrance Examination in Physics had eleven questions distributed in three Sections A, B and C where Sections A and B are compulsory. Section A consisted of three questions which were multiple choices, matching items and filling the blanks.

Each question carried 10 marks. Section B comprised of five questions whereby each question carries a total of 10 marks. Section C consisted of three questions whereby question 9 was a compulsory and candidates were supposed to attempt either 9a or 9b and any other one question to make up total number of two questions. Hence, the candidates were required to attempt a total of ten questions.

2.0 SAMPLED CANDIDATES

The numbers of candidates scripts who have been analyzed were **3,936** (**16.69%)** of all candidates **(23,584**) who sat for this paper**.** In this analysis, the candidates' scores for each question are interpreted as follows: from 00 to 29 percent is considered as poor, average the scores range from 30 to 64 percent and good the candidates' score from 65 to 100 percent.

Performance are shown by using different coloured tables. The colour presented are green colour means good performance, yellow colour means average performance and red colour means poor performance.

3.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE PER QUESTION

This section identifies the questions set for candidates in sections A, B and C. Also it identifies the percentage of candidates who attempted the questions with those who got poor, average and good performance. Finally, the extracts of poor and good responses have been inserted.

3.1 SECTION A: OBJECTIVE QUESTIONS

This section comprises three types of questions from different topics which include Force, Measurements, Newton's laws of motion, Energy, Pressure, Introduction to laboratory practice, Structure and properties of matter, Simple machine, Magnetism, Current electricity, Archimede's principles and law of floatation, Motion on a straight line, Light, Static electricity and Temperature.

The candidates were required to answer all three types of questions where by each question carried 10 marks thus, making a total of 30 marks. The analysis of each

question in this section is categorised in three level of performance which are good (6.5 to 10), average (3 to 6) and poor (0 to 2.5).

3.1.1 Question 1: Multiple Choice Items

This question consisted of 10 multiple choice items derived from 10 topics; Force, Measurements, Newton's laws of motion, Energy, Pressure, Introduction to laboratory practice, Structure and properties of matter, Simple machine, Magnetism and Current electricity. The following is the number of items used in this question.

Item i.

The candidates were required to identify the push or pull of a body. The candidate were supposed to choose among the following alternatives, A Displacement, B Energy, C Force and D Velocity.

Item ii.

This item required the candidates to point out the instrument used to measure the diameter of a thin object. The distracters were A Beam balance, B Metre rule, C Measuring cylinder and D Micrometer screw gauge.

Item iii.

The candidates were required to identify the Newton's 3rd law of motion. In this item the alternatives were A Action is greater than reaction, B Action and reaction are equal and opposite, C Action and reaction are equal and parallel and D Reaction is less than action.

Item iv.

In this item the candidates were required to identify the phenomenon which is not the form of energy. The distracters were as follow; A Heat, B Light, C Sound and D Weight.

Item v.

The item wanted the candidates to identify the reason of making the dam's wall to be thicker at the bottom than at the top. The reasons were presented in the following alternatives, A Accommodate more water, B Accommodate less water, C Counterbalance the pressure and D Reduce energy generation.

Item vi.

This item required the candidates to select materials that used in a class A fire. The alternatives were as follow, A Kerosene and wood, B Magnesium and sodium, C Petrol and kerosene and D Wood and paper.

Item vii.

This item required the candidates to identify the phenomenon taking place when kerosene rises up a wick. The options were as follow, A Capillarity, B Cohesion, C Osmosis and Surface tension.

Item viii.

The item required the candidates to identify the spanner to loosen a nut on a bolt. The candidate required to select the following alternatives, A Longer stem, B Shorter stem, C Heavier stem and D Weaker stem.

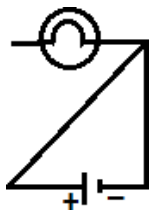
Item ix.

The candidates were required to understand the occurrence of attraction force between two magnets. The options were as follows, A Neutral points meet together, B North pole meets with South Pole, North Pole meets with North Pole and South Pole meets with South Pole.

Item x.

In the item, the candidate was required to understand the difference between closed and open circuit. The alternatives were as under.

A.



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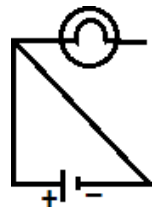
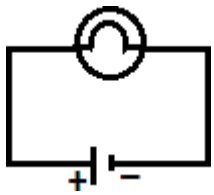
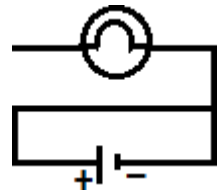




C.



D.

Generally, this question was attempted by **3,932 (99.90%)** and **4 (0.1%)** did not attempt it. The statistical analysis of the general performance of candidates was presented in the Table 1a.

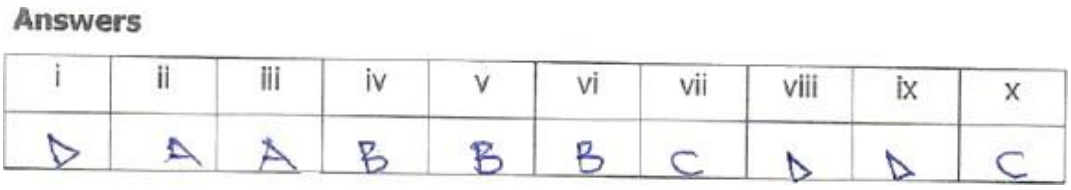
Table 1a: Analysis of the candidates' performance

PERFORMANCE ANALYSIS OF SCORES						OVERALL PERFORMANCE	
POOR		AVERAGE		GOOD			
0 – 2.5		3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
513	13.04	1,932	49.14	1487	37.82	3,419	86.95

The above Table shows that percentage performance is average that leads to overall performance of **86.95** percent.

513 candidates **(13.04%)** have poor performance. This is due to the inadequate and lack of understanding the topics tested as shown in extract 1.1

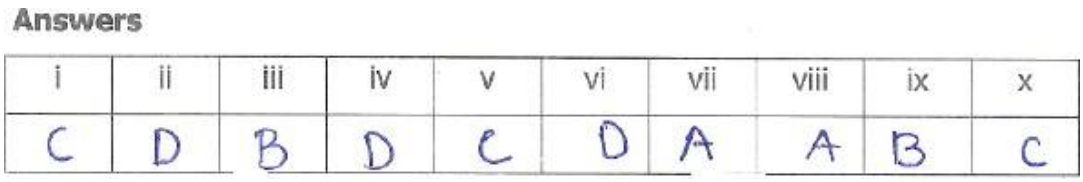
Extract 1.1 Poor Extract



Extract 1.1 shows example of script of candidate who performed poorly by providing wrong responses and wrote the wrong letters, even though managed to get the last item.

For those candidates who scored better by getting 37.82 percent is due to the fact that they had an ability and adequate knowledge on all items correctly as shown in Extract 1.2.

Extract 1.2 Good Extract



Extract 1.2 shows the response of good score of the candidate that had an ability to understand and manipulate the calculation on the topics tested.

3.1.2 Question 2: Matching items

This question demanded the candidates to match 10 items (i - x) in **list A** with the correct responses in **list B** by writing the letter of the correct response against the item number. List A consisted of 10 premises and list B consisted of 12 descriptions. The items are derived from the topic of Archimedes Principle and law of floatation.

The following analysis shows the strength and weakness of the candidate's performance in each item.

The item i.

The candidate was required to match the statement, 'A substance that has no fixed shape and yield easily to external pressure', with correct description from list B.

The item ii.

The candidate was required to match the statement, 'Measure weight of a body' with correct description from list B.

The item iii.

The item required the candidate to match the statement, 'Ratio of density of object to the density of water' with correct description from list B.

The item iv.

The candidate was required to match the statement, 'Shows maximum depth of the ship that should be under water' with correct description from list B.

The item v.

The candidate was required to match the statement, 'Tendency of an object to fall or drop to lower levels in a fluid' with correct description from list B.

The item vi

This required the candidate to match the statement, 'Tendency of an object to be suspended on the fluid surface' with correct description from list B.

The item vii.

The item required the candidate to match the statement, 'The force that enables the object to float' with correct description from list B.

The item viii.

The candidate was required to match the statement, 'Used for measuring the relative density' with correct description from list B.

The item ix.

The item required candidate to match the statement, 'Weight of a solid when in fluid' with correct description from list B.

The item x.

It required the candidate to match the statement, 'Weight of a body in air' with correct description from list B.

The answers for the matching item question are:

i) I is Fluid (ii) G is Spring balance (iii) A is Relative density

(iv) K is Plimsol line (v) H is Sinking (vi) J is Floatation

(vii) B is Upthrust (viii) L is Hydrometer (ix) D is Apparent weight

(x) F is Real weight.

Generally, those items required to measure skills of remembering and understanding on topic of Archimedes Principle and law of floatation.

This question was attempted by **3,911(99.36%)** of the candidates while **25 (0.64%)** did not attempt it. The analyses of candidates' performance are shown in table 1b below.

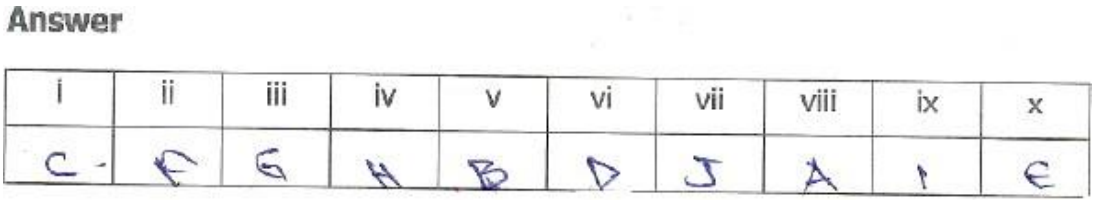
Table 1b: Analysis of the candidates' performance

PERFORMANCE ANALYSIS OF SCORES						OVERAL PERFOMANCE	
POOR		AVERAGE		GOOD			
0 – 2.5		3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,423	61.95	708	18.11	780	19.94	1,488	38.05

The analysis in the above table shows that a high percentage performance **is 61.95** percent which are poor that leads to overall performance of **38.05** percent to be average.

Also**, 2,423 (61.95%)** have performed poorly. This is due to the lacking of understanding and practicing of the topics tested as shown in extract 2.1.

Extract 2.1 Poor Extract



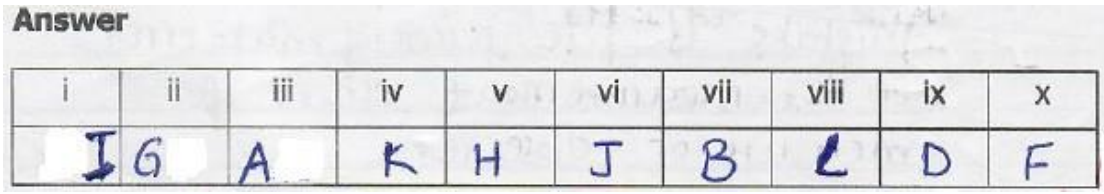
Answer

i	ii	iii	iv	v	vi	vii	viii	ix	x
C	F	G	H	B	D	J	A	I	E

Extract 2.1 shows example of script of candidate who responded poorly because of lack of knowledge and poor understanding of the options selected, thus led to give wrong answers.

For those candidates who showed good performance had adequate knowledge on the topic of Archimedes Principle and law of floatation and this will be justified through the script of the candidate who did well. Extract 2.2 shows a sample of good response from the candidate.

Extract 2.2 Good Extract



Answer

i	ii	iii	iv	v	vi	vii	viii	ix	x
I	G	A	K	H	J	B	L	D	F

Extract 2.2 shows the response of good score due to the fact that the candidate had an ability to remember, understand and had adequate knowledge on choosing all items correctly as required.

3.1.3 Question 3: Filling the blank question

This question consisted of 10 items whereby the candidates were required to fill the blanks that were given. The items were derived from 10 topics including "Pressure, magnetism, Motion on a straight line, Light, Current electricity, Static electricity, Temperature, Energy, Introduction to laboratory practice and Simple machine".

The analysis below indicates the strength and weakness of the candidates' performance in each item.

Item i.

The candidates were required to fill only one gap in this item. The item was "The force acting normally per unit area is called _____". The candidates were required to recall the definition of pressure.

Item ii.

The item was written as "The angle between true north and compass needle direction is _____''. The candidates were needed to recall the definition of angle of declination in the topic of magnet.

Item iii.

The item was "The rate at which a distance covered in a specific direction is known as _____". The candidates required to understand the concept of velocity.

Item iv.

This item tested the candidates about the force. The item was written as "The objects that emit their own light are referred as _____" . The candidates were tested to recall the concept of light in the part of luminous and non-luminous object.

Item v.

The item was written as "The instrument which is used to measure very small amount of current is called _____". The examinee required to understand the application of Ammeter in the current electricity.

Item vi.

This item was required to test the candidates on the bodies used to test negative charge in the static electricity. The item was "When ebonite rod rubbed with _____ it acquires negative charge.

Item vii.

The candidates were tested on the concept of conversion of given Temperature from one unit to another. The item was written as "0^{o}C is equivalent to _____ Kelvin". The candidates were required to apply the knowledge of conversion of unit from Centigrade to Kelvin

Item viii.

This item tested the candidates on the transformation of energy. The item was written as "A device used to convert solar energy into electrical energy is known as _____". The examinee was needed to remember and understand how energy can be transformed from one form to another.

Item ix.

The item required to test the candidates on the definition of first aid kit. The item was written as "A box containing items that are used to give help a sick or injured person is called _____. The examinee was assessed his/her understanding on the scientific terms used in the laboratory box.

Item x.

The candidates were required to recall the formula for finding velocity ratio of a screw jack. The item was written as "Mathematically _____ is the formula used to calculate velocity ratio of the screw jack". The candidates were required to remember the formula used in simple machine.

This question was attempted by **3,800 (96.54%)** of the candidates however, **136** candidates **(3.46%)** did not attempt this question. The analyses of candidates' performance are shown in table 1c below.

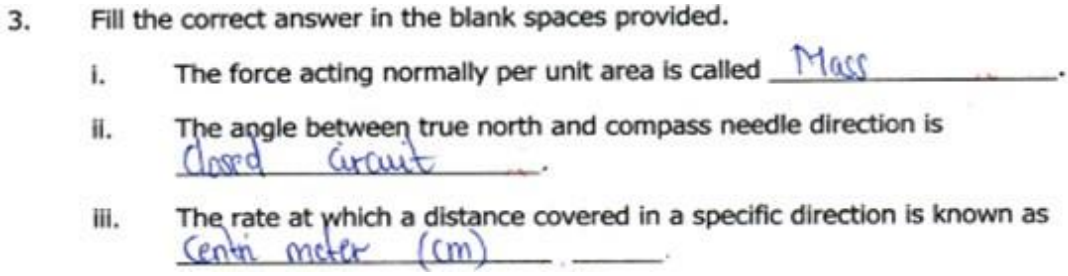
Table 1c: Analysis of the candidates' performance

PERFORMANCE ANALYSIS OF SCORES						OVERAL PERFOMANCE	
POOR		AVERAGE		GOOD			
0 – 2.5		3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,841	74.76	639	16.82	320	8.42	959	25.24

The analysis in the above table showed that the high performance of **74.76** percent is poor that leads to overall performance of **25.24** percent to be poor.

Also**, 2,841** candidates **(74.76%)** have performed poorly. This is due to the lacking of understanding of the topics examined as shown in extract 3.1.

Extract 3.1 Poor Extract


3. Fill the correct answer in the blank spaces provided.

i. The force acting normally per unit area is called Mass.

ii. The angle between true north and compass needle direction is Closed Circuit.

iii. The rate at which a distance covered in a specific direction is known as Centi meter (cm)

iv. The objects that emit their own light are referred as Electricity.

v. The instrument which is used to measure very small amount of current is called Kelvin.

vi. When ebonite rod rubbed with positive it acquires negative charges.

vii. 0°C is equivalent to Small amount Kelvin.

viii. A device used to convert solar energy into electrical energy is known as Solar Energy

ix. A box containing items that are used to give help to a sick or injured person is called First aid kit.

x. Mathematically formula is the formula used to calculate velocity ratio of the screw jack.

Extract 3.1 Consists of a sample from the script of a candidate who provides wrong answers. Such responses indicate that the candidate did not understand demand of the question and had limited knowledge on the topics tested as he/she copied some words that are found in the third question.

Generally, few candidates who scored full marks were able to fill the correct words in the gaps provided. This is because he/she understands the requirements of the question as seen in extract 3.2.

Good extract. 3.2

3. Fill the correct answer in the blank spaces provided.

   i. The force acting normally per unit area is called pressure.

   ii. The angle between true north and compass needle direction is angle of declination

   iii. The rate at which a distance covered in a specific direction is known as velocity

   iv. The objects that emit their own light are referred as luminous body.

   v. The instrument which is used to measure very small amount of current is called Ammeter.

   vi. When ebonite rod rubbed with fur it acquires negative charges.

   vii. 0°C is equivalent to 273 K Kelvin.

   viii. A device used to convert solar energy into electrical energy is known as Solar panel.

   ix. A box containing items that are used to give help to a sick or injured person is called first aid kit.

   x. Mathematically $2\pi R/P$ is the formula used to calculate velocity ratio of the screw jack.

Extract 3.2 shows a sample of responses from the script of candidate who had good performance. This examinee managed well to fill the phrases required in the question. This implies that the candidate had adequate knowledge, remember and understand the demand of question.

3.2 SECTION B: SHORT ANSWER QUESTIONS

This section consists of five (5) compulsory questions. Each question carried a total of ten (10) marks making a total of fifty (50) marks. The performance ranges used in the analysis of questions in this section starts with those candidates who scored 0 to 2.5 marks which is considered as poor, from 3 to 6.0 marks which is average and from 6.5 marks to 10 marks which is considered as good performance.

3.2.1 Question 4: Measurements

This question was divided into three parts a, b and c.

The analysis below indicates the strength and weakness of the candidates' performance in each item.

Question 4(a), required the candidates to define the terms 'error' and 'mistake'. Candidates who define these two terms had a clear knowledge about the terms used in measurement.

Question 4 (b), required the candidates to mention three reasons that causes errors to rise and distinguish between zero error and instrumental error. The candidates who managed to remember those reasons and the difference between both types of errors had a wide knowledge about errors.

Question 4 (c), requires the candidates to apply formula of finding perimeter of a given body. The candidates who managed to apply the correct formula for finding perimeter had adequate knowledge on the topic tested.

This question was attempted by **3,531 (89.71%)** and **405 (10.29%)** did not attempt this question. The analyses of candidates' performance are shown in table 2a below.

Table 2a: Analysis of the candidates' performance

PERFORMANCE ANALYSIS OF SCORES						OVERAL PERFOMANCE	
POOR		AVERAGE		GOOD			
0 – 2.5		3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
3,068	86.89	295	8.35	168	4.76	463	13.11

The analysis in the above table showed that a high performance of **86.89** percent is poor that leads to overall performance of **13.11** percent to be also poor.

Also, **3,068 (86.89%)** have performed poorly. This is due to the lack of understanding of the topics tested as shown in extract 4.1.

Extract 4.1 Poor Extract

4. a. Define the following terms as used on measurement.

i. Error

Is the box containing item that are useful to give electrical energy

ii. Mistake

is the rate at which distance covered in a specific directions

b. i. Errors usually arise due to several reasons. Mention three (3) of them.

1) Errors arise to several instrument
2) Errors increase when to measure
3) Errors are instrument used to measurement

ii. Distinguish between zero error and instrumental error

ZERO INSTRUMENT	ERROR INSTRUMENT
Zero instrument are instrument which is not to measure	Error instrument are instrument which is used to measure

c. Juma measured the length and width of his book and he found that the length was 26cm and the width was 20cm. What was the perimeter of Juma's book in metre.

Solution

Perimeter = Length + width
= 26cm + 20cm
= 46cm

Juma's book in metre = 1 meter = 100cm
= 1 meter x 46cm = 2cx meter = 46cm
100 cm 100cm = 0.46m

∴ The Juma's book in metre = 0.46m

Extract 4.1 above is a sample from a script of the candidate who provided poor responses. In part (a) he/she just copied some of sentences in the question paper then made his/her answers, but in part (b) wrote some phrases he/she recalled from the subtopic of error and in part (c) used the formula which is incorrect.

Some of the candidates performed well as they were able to meet the demand of the question and had adequate knowledge on the topic asked as seen in extract 4.2.

Extract 4.2 Good Extract

4. a. Define the following terms as used on measurement.

i. Error

Error is a deviation from the true reading.

ii. Mistake

Mistake is a substance that occur when a person doing same thing wrong.

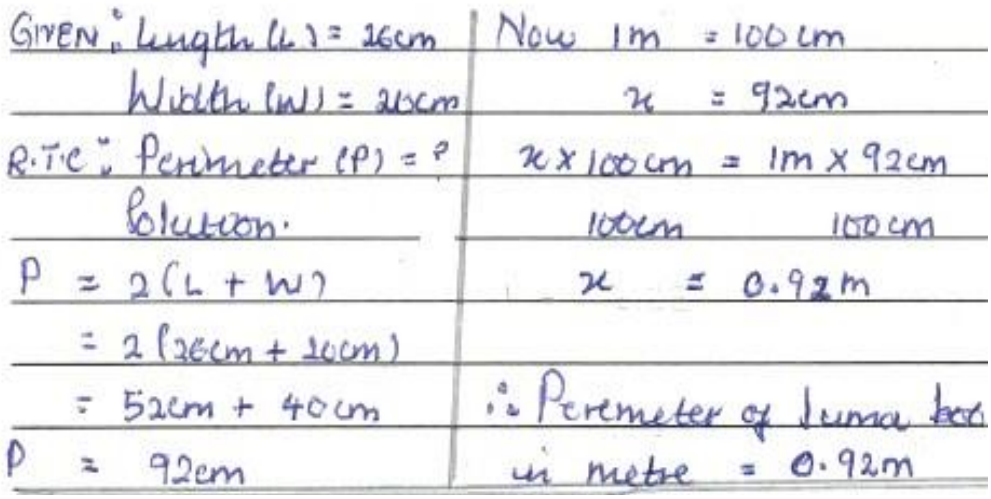
b. i. Errors usually arise due to several reasons. Mention three (3) of them.

i) Fault during manufacture
ii) Damage during use.
iii) Human factor.

ii. Distinguish between zero error and instrumental error

Zero error is a typer of error that occur wher observer take measure before or after zero mark While Instrumental error is a typee of error that caused by instrument it self.

c. Juma measured the length and width of his book and he found that th length was 26cm and the width was 20cm. What was the perimeter of Juma's book in metre.



Extract 4.2 shows the sample from the script of the candidate who provided good answers. The responses indicate that the candidate was knowledgeable and had the skills of applying the correct formula for finding perimeter.

3. 2. 2 Question 5: Light

This question was divided into three parts a, b and c.

The analysis below indicates the strength and weakness of the candidates' performance in each item.

Question 5(a), required the candidates to define the term 'shadow' and 'regular reflection'. Candidates who define both terms had a clear knowledge about the terms used in light.

Question 5(b), required the candidates to mention three (3) characteristics of light. The candidates who managed to remember and write those characteristics had a sufficient knowledge about light.

Question 5(c), required the candidates to apply formula of finding number of images formed between two plane mirrors. The candidates who managed to apply the correct formula had adequate knowledge on the topic asked.

This question was attempted by **3,487 (88.59%)** candidates while **449 (11.41%)** did not attempt this question. The analyses of candidates' performance are shown in table 2b below.

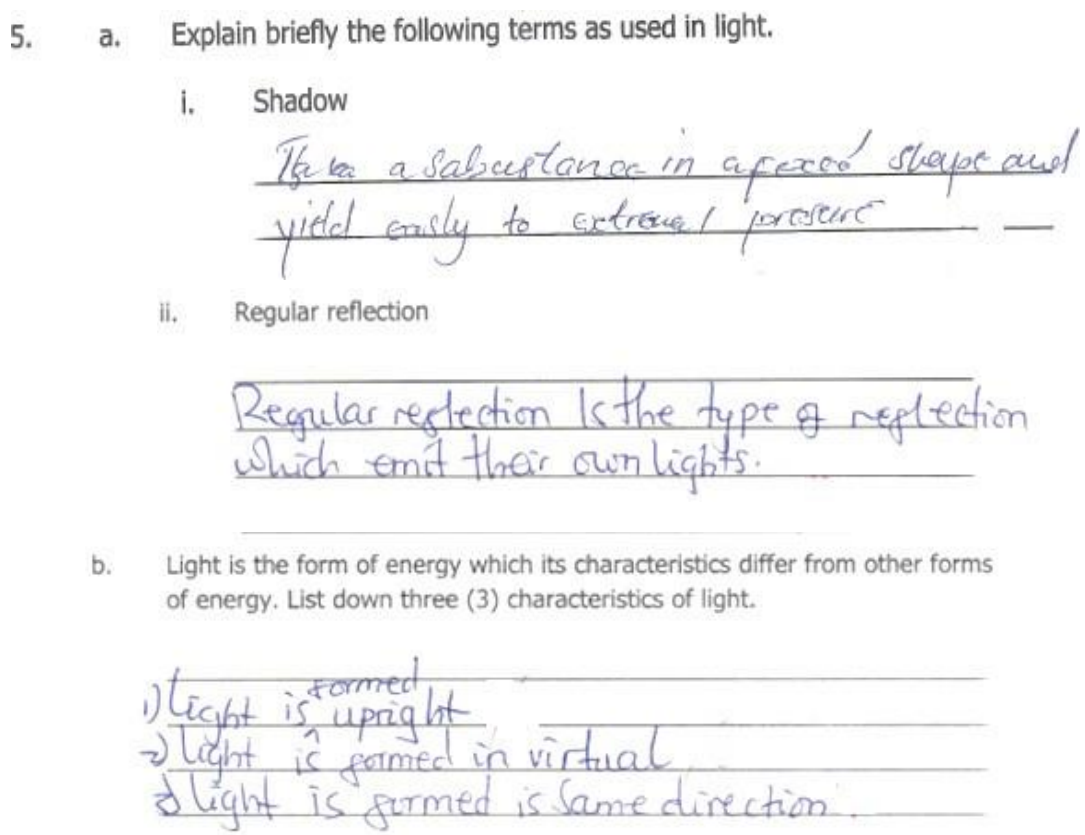
Table 2b: Analysis of the candidates' performance

PERFORMANCE ANALYSIS OF SCORES						OVERAL PERFOMANCE	
POOR		AVERAGE		GOOD			
0 – 2.5		3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,739	78.55	421	12.07	327	9.38	748	21.45

The analysis in the above table showed that a high performance of **78.55** percent is poor that leads to overall performance of **21.45** percent to be poor.

Also, **2,739 (78.55%)** have performed poorly. This is due to the lack of understanding the concept used in the topic as shown in extract 5.1.

Extract 5.1 Poor Extract



c. Calculate the number of images if two plane mirror placed at

i. Perpendicular angle

Solution

Perpendicular angle = 2

ii. Angle 360°

Solution

Angle = $\frac{360}{2}$

Plane mirror = $\frac{180}{2}$

= 180°

Extract 5.1 shows a sample of a response of the candidate who scored poor marks. It indicates that the candidate did not understand the requirement of the question instead he/she wrote some of phrases used in question 2 above.

For those candidates who scored better by acquiring **9.38** percent succeeded due to the fact that the candidates had an ability and adequate knowledge on defining, writing the characteristics and applying the correct formula as required as shown in Extract 5.2

Extract 5.2 Good extract

5. a. Explain briefly the following terms as used in light.

i. Shadow

it the darkness region formed when ~~oby~~ opaque materials rise in the path of light

ii. Regular reflection

it the types of reflection which occur ut appear in a smooth surface.

b. Light is the form of energy which its characteristics differ from other forms of energy. List down three (3) characteristics of light.

i) Light travels in a fix pirtert Speed 3×10^8 m/s

ii) It transfer energy

iii) It travels in a straight line

c. Calculate the number of images if two plane mirror placed at

i. Perpendicular angle

Solution

Number of images = $\frac{360^\circ}{\theta} - 1$ | $N = \frac{360^\circ}{90} - 1$ | $N = 3$ ans

∴ The number of images = 3 ans | $N = 4 - 1$

ii. Angle 360°

Solution

Number of imge = $\frac{360^\circ}{\theta} - 1$ | $N = \frac{360^\circ}{360^\circ} - 1$ | $N = 0$

$N = 1 - 1$ | ∴ Number of image is 0

Extract 5.2 shows the responses from the script of a candidate who managed to define the term shadow and regular reflection. He/she managed to write those features of light and did well in manipulating the formula of finding number of images in plane mirrors. The candidate able to obtain full marks due to the adequate knowledge of light they have.

3.2.3 Question 6: Current electricity

This question had three parts a, b and c. in part (a) the candidates were required to define (i) Newton and (ii) Fundamental force. In part (b), the candidates were required to give property of some of the given fundamental forces. In part (c), the candidates were required to calculate weight of the object given.

This question was attempted by **3,422 (86.94%)** candidates while **514 (13.06%)** did not attempt this question. The analyses of candidates' performance are shown in table 2c below.

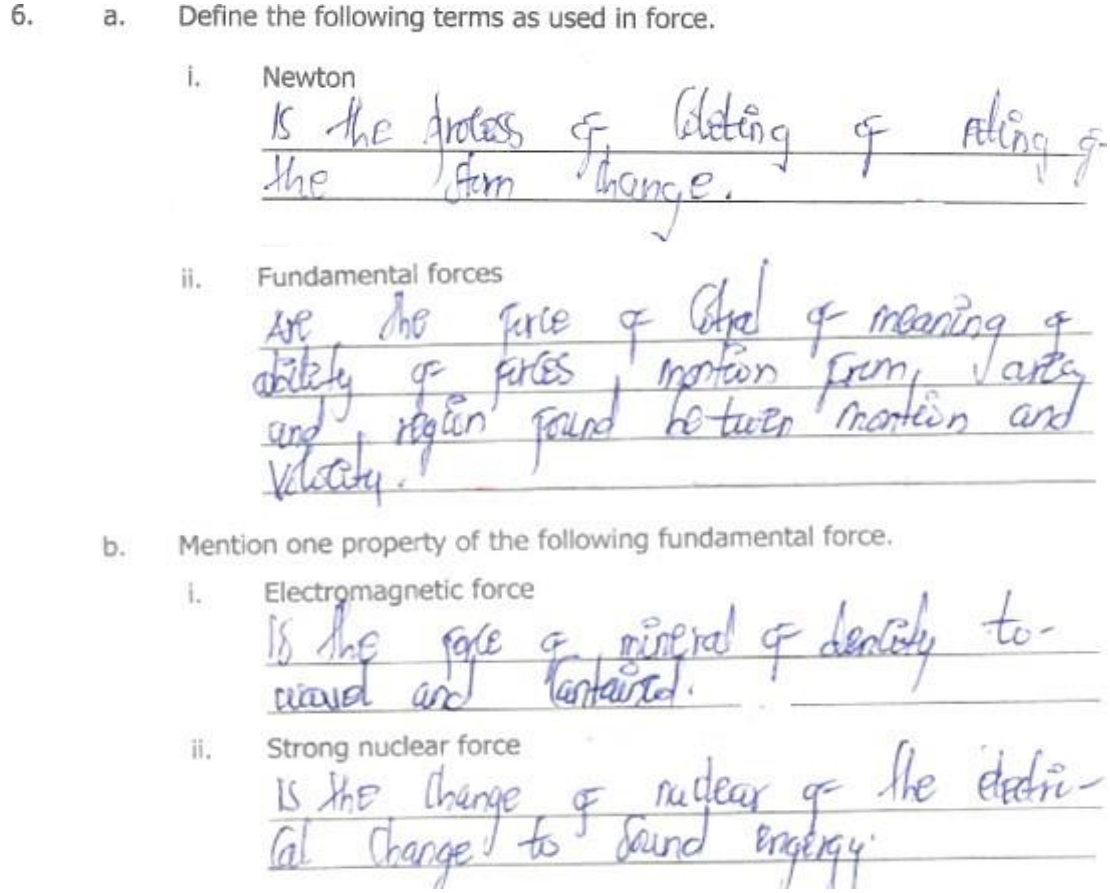
Table 2c: Analysis of the candidates' performance

PERFORMANCE ANALYSIS OF SCORES						OVERAL PERFOMANCE	
POOR		AVERAGE		GOOD			
0 – 2.5		3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
3,121	91.20	197	5.76	104	3.04	301	8.80

The analysis in the above table showed that a high performance of **91.20** percent is poor that leads to overall performance of **8.80** percent to be poor.

Also**, 3,121 (91.20%)** have performed poorly. This is due to the deficient understanding of the topics examined as shown in extract 6.1.

Extract 6.1 Poor Extract



iii. Gravitational force

Is the force of Certain strong nuclear and the charge of negative.

iv. Weak nuclear force

Are the number of images plane placed at characteries of carbonated of large momenter of Certain region

c. If an object has a mass of 6000g, how much would it weigh on the earth?

Density of mass = Mass of density / Mass of volume.

= 6000g / 40

= 1000 g

Extract 6.1 Consists of a sample from the script of the candidate who provided irrelevant answers. Such responses indicate that the candidate did not understand demand of question and had limited knowledge on the topics tested, instead, he/she wrote words which are meaningless.

Few candidates who obtained higher marks were able to define the required terms and mentioned the property of each fundamental force required and finally apply the right formula for finding mass of object given as seen in extract 6.2.

Extract 6.2 Good Extract

6. a. Define the following terms as used in force.

i. Newton

Is the amount of mass force that require the a mass of one kilogram, 1kg and acceleration of 1m/s 1m/s^2

So, 1N = 1kg x 1m/s^2

ii. Fundamental forces

Are forces that are basic in nature and can not be explained by the action of another force. Example Electromagnetic force.

b. Mention one property of the following fundamental force.

i. Electromagnetic force

It is basically attractive force and strong than gravitational force.

ii. Strong nuclear force

It is the strongest force than weak nuclear force.

iii. Gravitational force

It is the weakest force among of the other forces.

iv. Weak nuclear force

It is strong than gravitational force. and is weak than Strong nucleur force.

c. If an object has a mass of 6000g, how much would it weigh on the earth?

Solution.

Mass of an object, m = 6000g = 6kg.	~~from~~ W = mg
Gravity, g = 10N/kg.	W = 6kg × 10N/kg
Weight, w = ?	W = 60N
from.	∴ Weight of an object on the earth is 60N

Extract 6.2 shows the sample of response from the script of the candidate who provided good answers. The responses indicate that the candidate was knowledgeable in defining terms given, listing the property of fundamental force and had the skills of applying the correct formula for finding mass of object on the earth.

3.2.4 Question 7: Static electricity

This question had three parts, namely (a), (b) and (c). In part (a, i) the candidates were required to state the fundamental law of static electricity and (ii) the examinee were needed to list three methods of charging body. In part (b) the candidates were required to define the gold leaf electroscope. In part (c) the candidates were required to draw a well labeled diagram of gold leaf electroscope.

This question was attempted by **3,483 (88.49%)** candidates and **453 (11.51%)** did not attempt this question. The analyses of candidates' performance are shown in table 2d below.

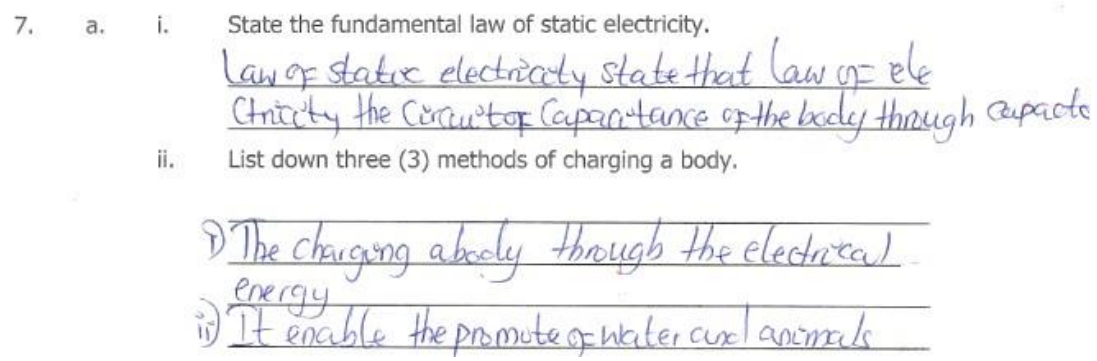
Table 2d: Analysis of the candidates' performance

PERFORMANCE ANALYSIS OF SCORES						OVERAL PERFOMANCE	
POOR		AVERAGE		GOOD			
0 – 2.5		3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,064	59.26	671	19.26	748	21.48	1,419	40.74

The analysis in the above table showed a high percentage performance of 59.26 percent is poor that leads to overall performance of 40.74 percent to be average.

Also, **2,064 (59.26)** have performed poorly. This is due to the insufficient knowledge in understanding the concept and lack of drawing skills in the topics tested as shown in extract 7.1.

Extract 7.1 Poor Extract

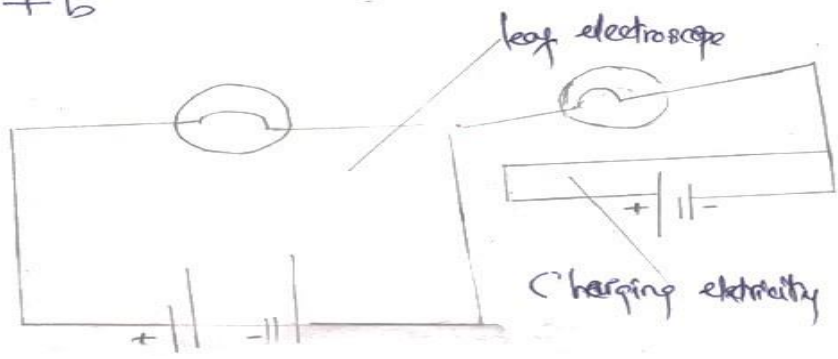


b. i. Define the gold - leaf electroscope.

Gold - leaf electroscope Is the instrument used to measure small organisms in the body

ii. Draw a well labeled diagram of the gold - leaf electroscope.

Question 7b
Answer



Extract 7.1 consists of a sample from a script of the candidate who provided incorrect answers. The responses indicate that the candidate had lower ability of remembering and understanding the required concept that was tested but he/she had some concept about drawing circuit diagrams in electricity.

Generally, the candidates who scored full marks were able to provide correct responses due to the high capacity of remembering, understanding and even drawing meaningful diagram of gold leaf electroscope as observed in extract 7.2.

Extract 7.2. Good extract

7. a. i. State the fundamental law of static electricity.

State that "like charge repel unlike charge attract."

ii. List down three (3) methods of charging a body.

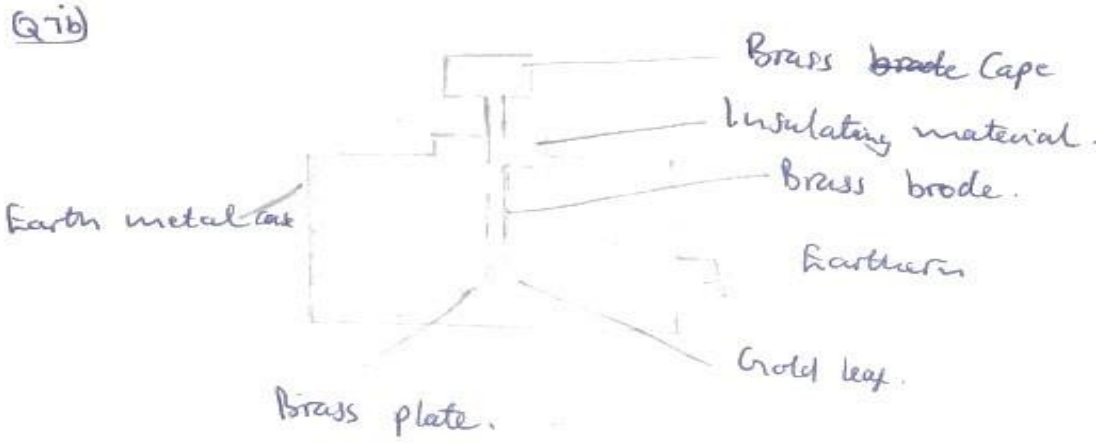
1) Charge in Contact.
2) Charge in inductor.
3) Charge in friction.

b. i. Define the gold - leaf electroscope.

Gold - leaf electroscope is a device that used to test ... of Charge in Conductor/object.

ii. Draw a well labeled diagram of the gold - leaf electroscope.

Q7b)



Extract 7.2 shows the candidate who managed to do well as the question demanded. The candidate had knowledge of concept and skills on drawing and labeling all parts required in the needed diagram.

3.2.5 Question 8: Newton's laws of motion

This question had two parts, namely (a) and (b). In part (a) the candidates were required to (i) define the term impulsive force (ii) mention three types of inertia. In part (b) the candidates were required to calculate (i) the momentum change of the bullet (ii) the velocity of recoil of the gun and (iii) momentum change of the gun.

This question was attempted by **3,390 (86.13%)** candidates and **546 (13.87 %)** did not attempt this question. The analyses of candidates' performance are shown in table 2e below.

Table 2e: Analysis of the candidates' performance

PERFORMANCE ANALYSIS OF SCORES						OVERAL PERFOMANCE	
POOR		AVERAGE		GOOD			
0 – 2.5		3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,458	72.51	686	20.23	246	7.26	932	27.49

The analysis in the above table showed that a high performance of **72.51** percent is average that leads to overall performance of **27.49** percent to be poor.

Also, **2,458 (72.51%)** performed poorly. This is due to the lack of understanding of the topics tested as shown in extract 8.1.

Extract 8.1 Poor Extract

8. a. i. Define impulsive forces

Impulsive forces Is the forces of attack of an material through the upthrust by the forces

ii. Mention three (3) types of inertia.

Netwon law of motion
Netwon third law of motion
Netwon Second law of motion

b. A bullet of mass 5g leaves a gun of mass 250g with a velocity of 50m/s. Calculate the following

i. Momentum change of the bullet.

Solution
Momentum = 50m/s
Mass = 5g

Mass of gun = 25'0g
= 50m/s x 5'g x 25'0g
= 95'0 920g/m

ii. The velocity of recoil of the gun.

Solution
Velocity (v) = Mass
Volume
= 5'g + 25'0g + 50m/s
= 80 m/s

iii. Momentum change of gun.

Solution
Momentum (m) = Mass - 5'g

In extract 8.1, the candidate provided incorrect responses to all parts of the question. This is due to failure of understanding the concept of momentum and applying the formula of calculating momentum change and velocity of recoil of a gun.

The candidates who scored high marks were capable to give correct responses in all parts of the questions. This shows that, they had an adequate knowledge on the topics and which parts they were derived from as observed in extract 8.2.

Extract 8.2: Good extract

8. a. i. Define impulsive forces

Impulsive force is the force acting on a body for short interval of time.

ii. Mention three (3) types of inertia.

- Inertia at rest.
- Inertia at motion
- Inertia at direction.

b. A bullet of mass 5g leaves a gun of mass 250g with a velocity of 50m/s. Calculate the following

i. Momentum change of the bullet.

$P = mV$

Mass of 5g in kg $= 0.005kg$

$P = mV$

$= 50m/s \times 0.005\ kg$

$\therefore$ Momentum (P) $= 0.25\ kg\ m/s$.

ii. The velocity of recoil of the gun.

P before = P after

$m_1u + m_2u = m_1v + m_2v$

$0.25 \times V = 0 - 0.25$

$0.25V = -0.25$

$\frac{0.25}{0.25} \quad \frac{0.25}{0.25}$

$V = -1$

$\therefore$ Hence ignore negative because it show the gun go back

$V = 1\ m/s$ Answer

iii. Momentum change of gun.

$P = mV$

Mass of 250g in kg $= 0.25\ kg$

Hence, $P = mV$

$P = 0.25kg \times 1m/s$

$= 0.25\ kg\ m/s$

$\therefore$ Momentum (P) $= 0.25\ kg\ m/s$.

Extract 8.2 shows a sample of good responses from a script of the candidate who scored high marks. The candidate's responses convey that, he/she had adequate knowledge on various parts of the topic being measured from this question.

3.3 SECTION C

This section consists of three questions, where candidates were required to answer two questions while question 9 is compulsory, candidates were required to answer either 9a or 9b. Each question carried 10 marks.

3.3.1 Question 9a: Motion on a straight line

This question had one part (a) which consists of a table as seen in the extract below.

Generally, this question was attempted by **1,154 (29.32%)** candidates and **2782 (70.68%)** did not attempt it. The statistical analysis of the general performance of candidates was presented in the Table 3a.

Table 3a: Analysis of the candidates' performance

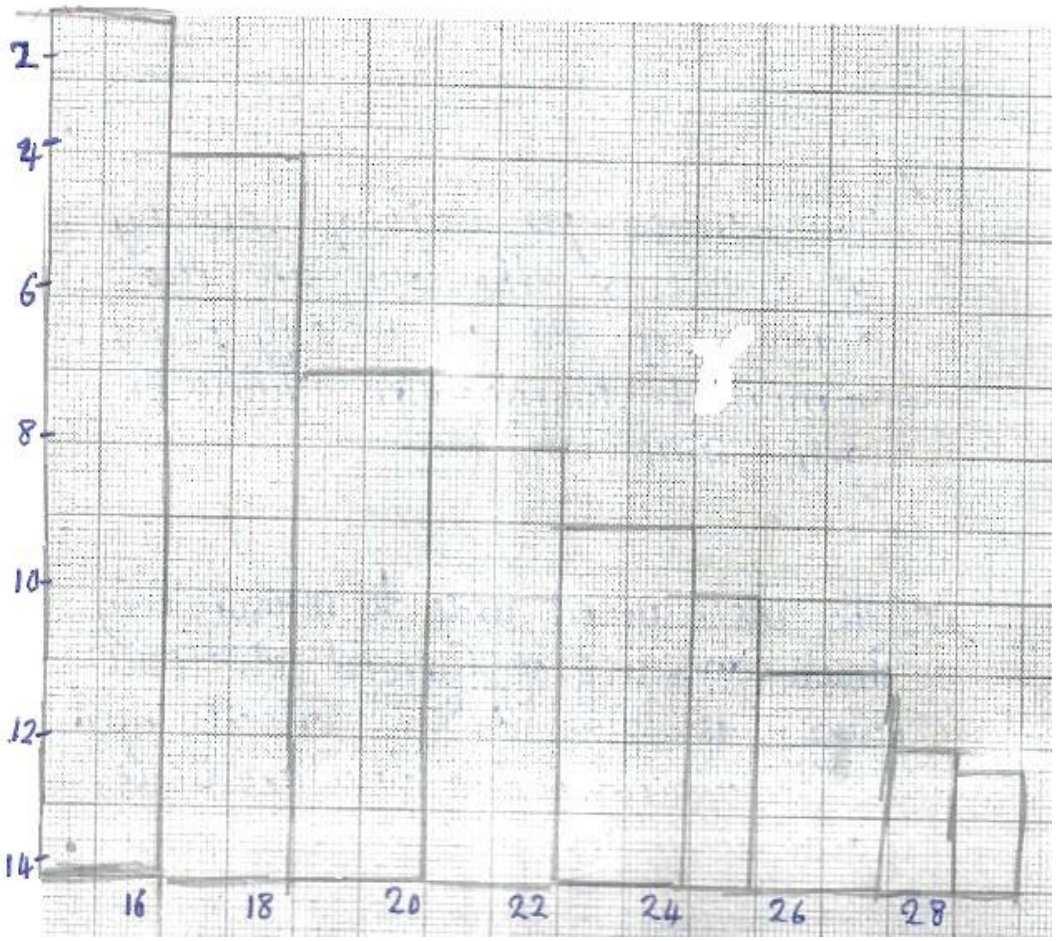
PERFORMANCE ANALYSIS OF SCORES						OVERAL PERFOMANCE	
POOR		AVERAGE		GOOD			
0 – 2.5		3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
700	60.66	243	21.06	211	18.28	454	39.34

The above table showed that a percentage performance of **60.66** is poor that leads to overall performance of **39.34** percent to be average.

Also, 700 (60.66%) have poor performance. This is due to the inadequate skill of drawing the graph on the graph paper on the topics tested as shown in extract 9a.1.

Extract 9a.1 Poor Extract

i. Plot the graph of velocity against time (On the graph paper)



ii. From the graph, calculate the slope (s).

Solution

14 + 28 = 42

16 + 18 = 34

20 + 22 = 42

24 + 26 = 49

28 + 32 = 60

= ~~260~~ 226

260 226 - 360 = 166

166 + 250 = 376

∴ The grap Slope 376.

iii. What is the nature of the graph?

The natur of the graph is velocity agai n time determine the motion of moving object

iv. What is the physical meaning of the slope (s)?

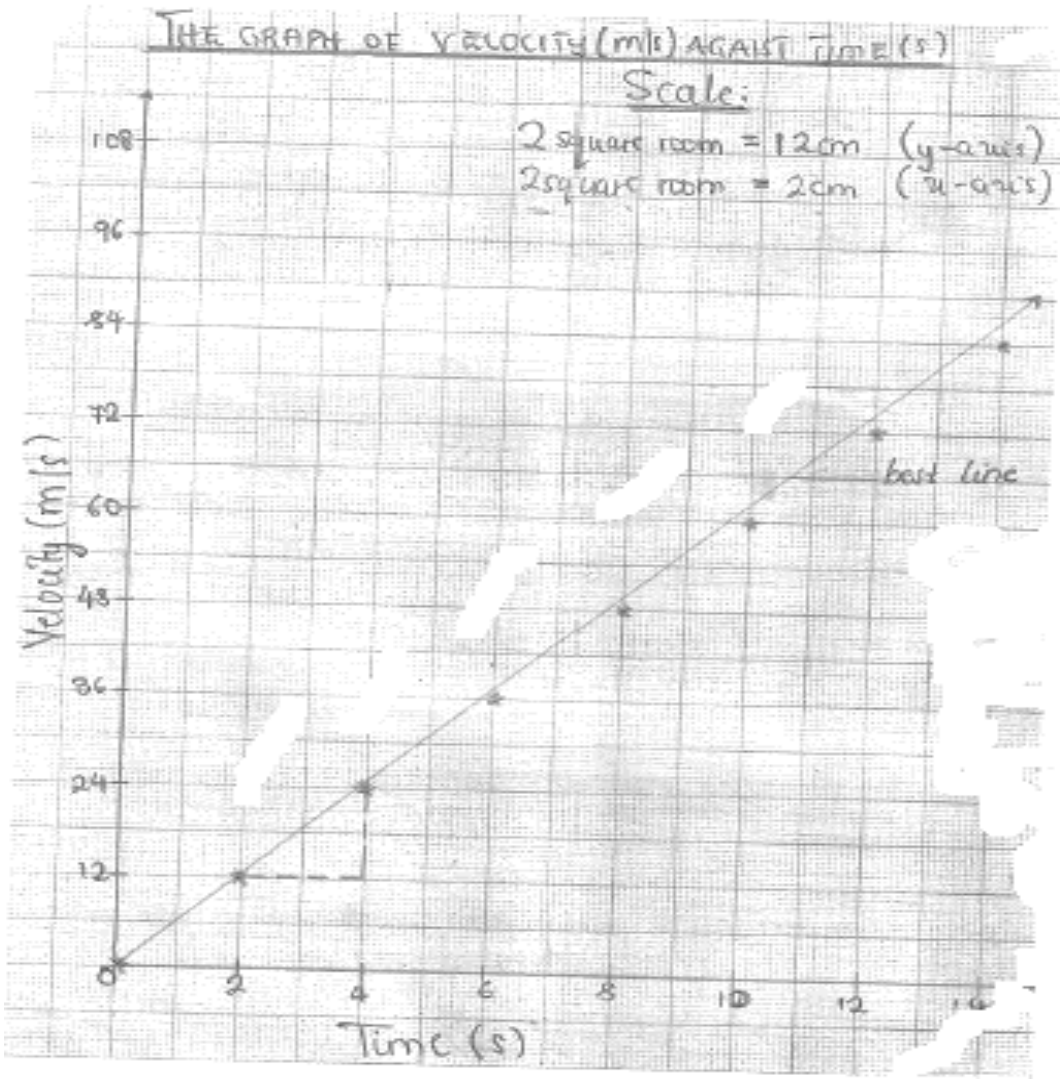
The physical meaning of Slope is data Colle cted wher determine moving and motion is Slope for the physical graph object leaves static method

In Extract 9a.1 the candidate provided incorrect responses to all parts of the question due to failure to draw the graph and find the slope from the graph even though, he/she had knowledge of drawing bar chart and had some skills of addition of numbers.

The candidates who did well had sufficient knowledge on the requirement of the question. They succeeded to draw the graph and find the slope from the graph. Extract 9a.2 shows a sample of a candidates' script who performed better.

Extract 9a.2 Good Extract

i. Plot the graph of velocity against time (On the graph paper)



ii. From the graph, calculate the slope (s).

Slope = Vertical $(y_2 - y_1)$ / Horizontal $(x_2 - x_1)$

$= \frac{24 - 12}{4 - 2}$

$= \frac{12\ m/s}{2\ s}$

$= 6\ m/s^2$

∴ The slope = $6\ m/s^2$

iii. What is the nature of the graph?

Nature of the graph is straight at origin. or Also the Velocity is directly proportionally to the time.

iv. What is the physical meaning of the slope (s)?

Physical meaning of the slope is means the Acceleration.

The candidates who performed well in this question had sufficient knowledge of converting given numbers to the drawing. They also used skill of drawing the graph on the graph paper and finally used the content and numerical skills of graph to find the slope and interpret the line to the nature of the slope and giving meaning of the slope.

3.3.2 Question 9b: Introduction to laboratory practice

In this question the candidates were required to write the name of the devices given, draw the devices and give their uses.

This question was attempted by **2,956 (75.10%)** candidates and **980 (24.90%)** did not attempt this question. The analyses of candidates' performance are shown in table 3b below.

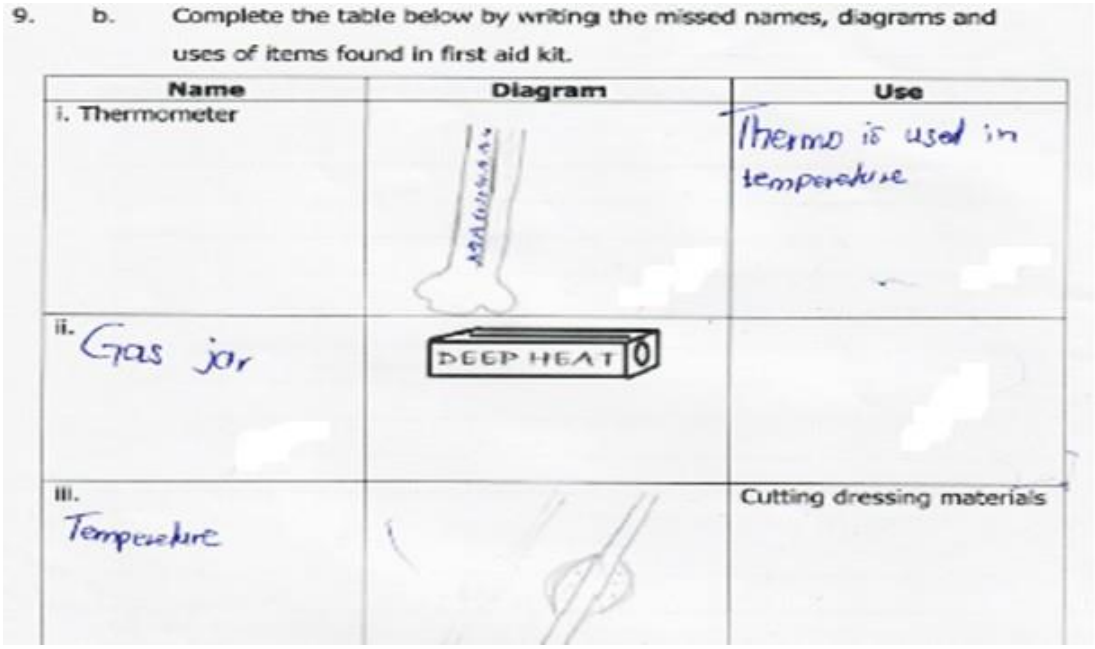
Table 3b: Analysis of the candidates' performance

PERFORMANCE ANALYSIS OF SCORES						OVERALL PERFORMANCE	
POOR		AVERAGE		GOOD			
0 – 2.5		3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
538	18.20	899	30.41	1,519	51.39	2418	81.80

The analysis in the above table showed that a high percentage performance of **51.39** percent is good that leads to overall performance of **81.80** percent to be good.

Also, **538 (18.20%)** have performed poorly. This implies that the candidate lacked understanding on the devices given as shown in extract 9b.1.

Extract 9b.1 Poor Extract



In the extract 9b.1, the candidate failed to provide the correct response to all parts of the question. The candidate failed due to deficient knowledge he/she had in drawing, recalling the concept of devices used in this question but he/she had an idea on drawing some objects.

Generally, the candidates who scored full marks were able to provide correct responses due to the high capacity of remembering, understanding and even applying his/her knowledge drawing meaningful diagram of the devices given as seen in extract 9b.2.

Extract 9b.2 Good Extract

9. b. Complete the table below by writing the missed names, diagrams and uses of items found in first aid kit.

Name	Diagram	Use
i. Thermometer		Use for measuring body temperature
ii. Liniment		Reducing muscle pain
iii. Scissor and razor blade		Cutting dressing materials
iv. Disposable sterile gloves		Used to protect our body from germ of any body board fluid
v. Sterile gauze	 	Covering minor wound

Extract 9b.2, shows a sample of good responses from the candidate who had sufficient information on writing the name of the devices given, drawing them and giving their functions.

3.3.3 Question 10: Pressure

This question had two parts, namely (a) and (b). In part (a) the candidates were required to (i) explain the reason of a tractor with wide tire to get stuck in the muddy place compared to vehicle with narrow tire.

This question was attempted by **1,943 (49.36%)** candidates although **1,993 (50.64%)** did not attempt this question. The analyses of candidates' performance are shown in Table 3c below.

Table 3c: Analysis of the candidates' performance

PERFORMANCE ANALYSIS OF SCORES						OVERAL PERFOMANCE	
POOR		AVERAGE		GOOD			
0 – 2.5		3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
1,663	85.59	143	7.36	137	7.05	280	14.41

The analysis in the above table showed that a high percentage performance of **85.59** percent is poor that leads to overall performance of **14.41** percent to be poor.

Also, **1,663 (85.59%)** have performed poorly. This is due to the lack of understanding on the topics tested as shown in extract 10.1.

Extract 10.1 Poor Extract

10. a. i. Explain briefly why a tractor with wide tire cannot easily get stuck in the muddy place as compared to vehicle with narrow tire?

Becose physica is study of science of Art is the prepati with togethe to a body relative density of problem is a correct of sciene.

ii. Write two (2) units of pressure.

normaly per force

b. i. Mention two (2) properties of pressure in liquids.

i. liquid state.
ii liquid eletrical.

ii. The areas of the piston of a hydraulic press are 4×10^{-4} m^2 and 3×10^{-2} m^2 respectively. If the smaller piston is pushed down with a force of 200N. Calculate the force required to push the larger piston.

$3\times10^{-2}\ m^2 \times 4\times10^{-4}\ m^2$
$30^{-2}\ m^2 \times 40^{-4}\ m^2$
$30^{-2}\ m^{2+4} \times 40^{-4}\ m^{2+4}$
$30^{-4} \times 40^{2-4} = 12\ 0^2$
$= 120^2$

Extract 10.1 showed the candidate who did not understand the question and provided irrelevant responses against the answers required by the question. The candidate just copied some sentences which are meaningless.

The candidates who scored higher marks were able to give correct responses in both parts of the questions. This shows that, the candidates had adequate knowledge on the topic and from which parts they were derived as observed in extract 10.2.

Extract 10.2 Good Extract

10. a. i. Explain briefly why a tractor with wide tire cannot easily get stuck in the muddy place as compared to vehicle with narrow tire?

Because a tractor with wide tire has large surface area, thus require a small pressure but a vehicle with wide narrow tire has small surface area, thus require a large pressure, thus it gets stuck in the muddy place.

ii. Write two (2) units of pressure.

i) N/m^2

ii) Pascal

b. i. Mention two (2) properties of pressure in liquids.

i) It increase with increase in depth.

ii) It increase with increase in density.

ii. The areas of the piston of a hydraulic press are 4×10^{-4} m^2 and 3×10^{-2} m^2 respectively. If the smaller piston is pushed down with a force of 200N. Calculate the force required to push the larger piston.

Solution

$$F_2 = \frac{F_1 A_2}{A_1}$$

$$F_2 = \frac{200N \times 0.03m^2 \times 1000}{0.0004m^2 \times 10000}$$

$$F_2 = 200N \times \frac{3.00}{4}$$

$F_2 = 200N \times 75$

$F_2 = 15,000N$

∴ the larger pistone is 15,000N

This candidate in Extract 10.2 provided the correct responses required by the question. The candidate gave the short explanation on the concept that "wide tire produce small pressure and narrow tire produce large pressure".

3.3.4 Question 11: Simple machine

This question had three parts, namely (a), (b) and (c). In part (a) the candidates were required to define the term 'inclined plane' and 'Pitch'. In part (b) the candidates were required to name two devices that can operate through application of wheel and axle. In part (c) the candidates were required to perform calculation on velocity ratio and mechanical advantage.

This question was selected by **1,135 (28.84%)** candidates while **2801 (71.16%)** did not pick this question. The analyses of candidates' performance are shown in Table 3c below.

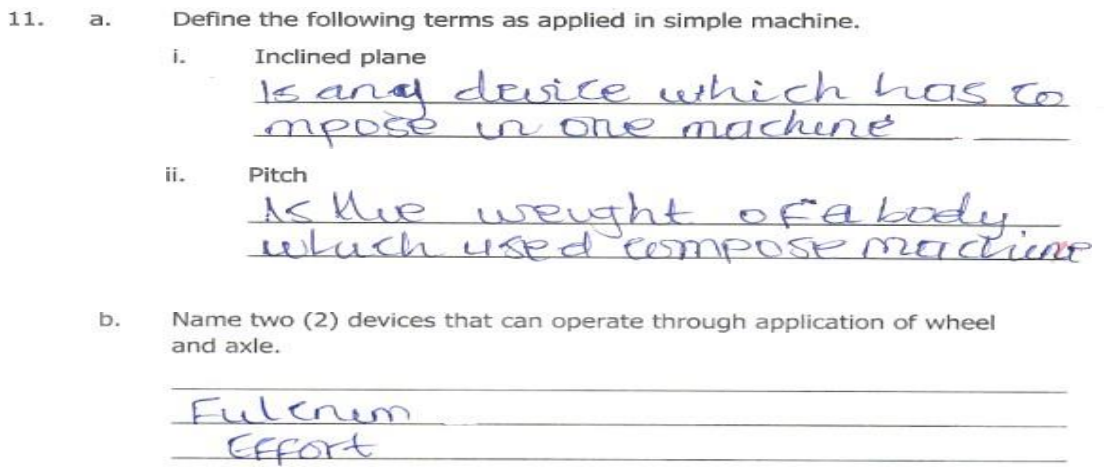
Table 3d: Analysis of the candidates' performance

PERFORMANCE ANALYSIS OF SCORES						OVERAL PERFOMANCE	
POOR		AVERAGE		GOOD			
0 – 2.5		3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
626	55.15	236	20.80	373	24.05	509	44.85

The analysis in the above table showed that a high performance of **55.15** percent is poor that leads to overall performance **of 44.85** percent to be average.

Also, **626 (55.15)** have performed poorly. This is due to the lower ability of understanding and applying the knowledge on the topics tested as shown in extract 11.1.

Extract 11.1 Poor Extract


11. a. Define the following terms as applied in simple machine.

i. Inclined plane

Is any device which has to mpose in one machine

ii. Pitch

Is the weight of a body which used compose machine

b. Name two (2) devices that can operate through application of wheel and axle.

Fulcrum

Effort

c. A force of 500N is used to raise a load of 4000N through an inclined plane. Given that the slant height and the vertical height of the plane are 21m and 7m respectively. Calculate

i. The velocity ratio of the plane.

GIVEN
Effort = 500N
Load = 4000N
Velocity = ?
Solution
E.d
L.d
= 500N
= 4000N
8N

ii. Mechanical advantage of the plane.

GIVEN
Load = 21
Effort = 7m
Solution
Load =
Effort
21
7
= 3

iii. Efficiency of the plane.

M.A × 100%
V.R
8 × 100%
3
8 × 33.3
266.4

The Extract 11.2 shows a sample of candidate's weak responses. The candidate failed to answer correctly in part (a) and part (b) but in part (c) he/she changed the formula of the item (i) to the item (ii) and that of part (ii) to part (i) but finally, came to the right answer of item (iii). This implies that he/she had some idea about calculation of simple machine.

Extract 11.2 Good Extract

11. a. Define the following terms as applied in simple machine.

i. Inclined plane

Inclined plane is the smooth flat rigid surface slanted on at an angle horizontal.

ii. Pitch

Pitch is the distance between two success thread.

b. Name two (2) devices that can operate through application of wheel and axle.

(i) Car tyres

(ii) Wheel barrow

c. A force of 500N is used to raise a load of 4000N through an inclined plane. Given that the slant height and the vertical height of the plane are 21m and 7m respectively. Calculate

i. The velocity ratio of the plane.

Solution.

$V.R = \frac{\text{Slant height}}{\text{Vertical height}}$

$= \frac{21m}{7m}$

$= 3.$

∴ The velocity ratio of the plane is 3

ii. Mechanical advantage of the plane.

Solution

M.A = Load / Effort

= 4000N / 500 N

= 8

∴ The mechanical advantage of the plane is 8.

iii. Efficiency of the plane.

Solution

Efficiency = M.A / V.R × 100%

= 8/3 × 100%

= 800%/3

= 266.66%

The Extract 11.2 shows that the candidate had provided the correct responses as required by the question. He /she managed to define, list the devices and apply the correct formula for finding velocity ratio, mechanical advantages and efficiency of the plane.

4.0 CONCLUSION

The analysis of the candidates' performance shows that two questions were performed well, four questions have average performance and six questions have poor performance.

In addition, some candidates had failed to identify the requirement of the question by providing the irrelevant responses. Another problem encountered by the candidates was lack of skills of drawing graph. Further, some candidates provided incorrect answers due to in appropriate formula they used.

It is expected that the feedback provided in this report will enable teachers, students and other educational stakeholders to take appropriate measures to improve teaching and learning of the Physics subject in Zanzibar Secondary Schools.

5.0 RECOMMENDATIONS

In order to increase performance in the future, it is recommended that;

1. Teachers must ensure that their candidates have sufficient knowledge and understanding of entire topics before doing examinations.
2. Candidates should be given enough exercises so as to increase their understanding and writing skills. This enables the students to have long term memory on the topic taught.
3. Candidates have to make thorough preparation for the examinations and they have to carefully read and understand the demand of the question when doing examination.
4. Candidates should work hard on attaining mathematical skills to improve their learning, so that they can be able to solve problems which include calculations.
5. Monitoring on the learning and teaching process in schools by academic masters, head of schools, Education inspectors and other education stakeholders should be directed at identifying and re-dressing and/or eliminating the short coming observed in this report.
6. Teachers should use different measurement tools to assess their students during the learning and teaching process.

SUMMARY OF CANDIDATES' PERFORMANCE PER QUESTION AND TOPIC WISE IN 2023

S/N:	TOPIC	QUESTION NUMBER	PERCENTAGES OF CANDIDATES PER QUESTION	REMARK
1	Force, Measurements, Newton's laws of motion, Energy, Pressure, Introduction to laboratory practice, Structure and properties of matter, Simple machine, Magnetism and Current electricity	1	86.95	Good
2	Introduction to laboratory practice	9b	81.80	Good
3	Static electricity	7	40.74	Average
4	Archimedes Principle and law of floatation	2	38.05	Average
5	Motion on a straight line	9a	39.34	Average
6	Simple machine	11	44.85	Average
7	Newton's laws of motion	8	27.49	Poor
8	Pressure, magnetism, Motion on a straight line, Light, Current electricity, Static electricity, Temperature, Energy, Introduction to laboratory practice and Simple machine	3	25.24	Poor
9	Light	5	21.45	Poor
10	Pressure	10	14.41	Poor
11	Measurements	4	13.11	Poor
12	Current electricity	6	8.80	Poor

APPENDIX II

SUMMARY OF CANDIDATES' PERFORMANCE PER QUESTION AND TOPIC WISE IN 2022

S/N:	TOPIC	QUESTION NUMBER	PERCENTAGES OF CANDIDATES PER QUESTION	REMARK
1	Work, Energy and Power, Static electricity, Current electricity, Measurement, Newton's laws of motion, Pressure, Light, Simple machines, Archimedes' Principle, and law of flotation, Magnetism, Motion in a straight line, Introduction to laboratory practice and Force.	1	60.00	Average
2	Measurement	9b	52.78	Poor
3	Simple machine	10	39.08	Poor
4	Simple machine	2	38.22	Average
5	Magnets, Archimedes' Principles and law of floatation, Motion in a straight line, Force, Sustainable Energy Sources, Structure and Properties of matter, Pressure, Static electricity, Light and Energy.	3	27.75	Average
6	Force in Equilibrium	9a	27.52	Poor
7	Light	5	22.10	Poor
8	Sustainable energy sources and Archimedes' Principle and the law of Flotation	4	20.28	Average
9	Sustainable energy sources and Archimedes' Principle and the law of Flotation	8	18.77	Poor
10	Temperature	7	12.34	Poor
11	Current electricity	6	11.27	Poor
12	Pressure	11	6.27	Poor