THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

STUDENTS' ITEM RESPONSE ANALYSIS REPORT FOR THE FORM TWO NATIONAL ASSESSMENT (FTNA) 2019

031 PHYSICS

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FOREWORD

The Form Two National Assessment (FTNA) is a formative evaluation after two years of study in secondary school level. The assessment intends to diagnose the students' progress towards mastering of various concepts as stipulated in the syllabus. Basically, the students' responses to the assessment questions is a strong indicator of what the education system was able or unable to offer to the students in their two years of secondary education.

This report highlights some of the factors which made the students fail to score high marks in the questions. The factors include: inability to identify the demand of the question, inadequate content knowledge of the topics, lack of drawing competences, Poor English Language Proficiency and incompetency in Mathematical skills.

The feedback provided will enable the education administrators, school managers, and teachers to identify proper measures to be taken in order to improve the students' performance in future.

Finally, the Council would like to thank the examiners and all those who participated in preparing and analyzing the data used in this report.

Dr. Charles E. Msonde
EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report is based on analysis of students' performance in Physics subject for the Form Two National Assessment (FTNA) paper in 2019. The paper was based on the 2007 reviewed Physics Syllabus for secondary education and was intended to measure the competences acquired by the students after completing two years of study in Ordinary Level.

The paper had three sections, namely A, B and C. Section A comprised of three (3) objective questions. The first question had twenty (20) multiple choice items constructed from various topics of ordinary level physics syllabus. The second question consisted of five (5) homogeneous matching items from the topic of Measurement. The third question in this section was composed of five (5) fill in the blank space items derived from various topics. Section B had five (5) short answer questions constructed from the topics of *Work, Energy and Power, Motion in a Straight Line, Pressure, Light* and *Forces in Equilibrium*. Section C was comprised of two questions composed from the topics of *Pressure* and *Current Electricity*.

The number of students who sat for Physics FTNA 2019 was 568,305 of which 50.28 percent passed and 49.72 percent failed the assessment. In the year 2018 the students who sat for this subject were 503,875 of which 241,015 (48.01%) passed and 260,991 (51.99%) failed. This indicates that the students' performance in Physics for the year 2019 has increased by 2.27 percent.

The report also provides analysis of the students' performance in each question. The analysis categorizes the performance as weak, average and good if the percentage of students who scored at least 30 percent of the total marks allotted in the question is within the ranges of 0 – 29, 30 - 64 and 65 -100 respectively. For emphasize, these ranges are denoted by red, yellow and green colours respectively.

Furthermore, the report highlights the demand of the questions, the weaknesses observed and the possible reasons for distinguished performance. Moreover, it provides some recommendations that may help to improve the performance of the students in future assessment. Comments on individual questions and extracts of students' answers have been thoroughly explained to illustrate the respective cases. Figures are also inserted for more elaboration of students' performance. Finally, the report presents appendices which indicate the performance in each question and the difference in performance as compared to that of last year in terms of topics and grades.

2.0 ANALYSIS OF THE STUDENTS' PERFORMANCE IN EACH QUESTION

2.1 SECTION A: Objective Questions

This section consisted of three objective questions. Question 1 weighed 20 marks. Questions 2 and 3 each weighed 5 marks. Each item of the questions carried 1 mark. The section carried a total of 30 marks.

2.1.1 Question 1: Multiple Choice Items

This question consisted of twenty items numbered (i) to (xx). In each item students were required to choose the correct answer among the four given alternatives lettered A to D and write the letter against the item number in the box that was provided. The items were constructed from the topics of *Introduction to Physics*, *Introduction to Laboratory Practice*, *Measurement*, *Work*, *Energy* and *Power*, *Light*, *Static electricity*, *Current electricity*, *Magnetism*, *Forces in Equilibrium*, *Simple Machines*, *Motion in a Straight Line*, *Newton's Laws of Motion*, *Temperature* and *Sustainable Energy Sources*.

The question was attempted by 568,304 students (100%) whereby 24.8 percent of them scored from 0 to 5.0 marks, 62.8 percent scored from 6.0 to 12.0 marks and 12.4 percent scored from 13 to 20 marks. Therefore, students' performance in this question was good because the percentage of the students who scored at least 30 percent of total marks in this question is within the 65-100 range. The reasons for such performance were discussed deeply in each item. Figure 1 is a chart presenting these data.

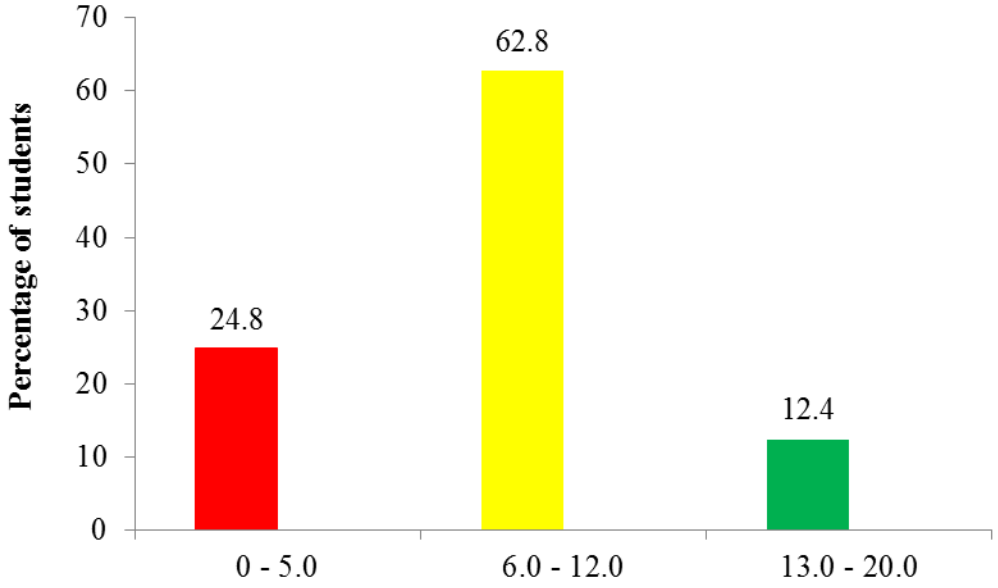


Figure 1*: Percentage of students' performance in Question 1*

Item (i) required the students to choose the response which explains why Physics, Chemistry and Biology are natural science subjects. The correct alternative was A, *They need practical and theory work for learning*. Other alternatives were B, *They need only theory*, C, *They need only practical* and D, *They need only observation.* Most of the students chose the correct response. A few students who chose incorrect answers did not understand that the three subjects are experimental sciences which create theories that are tested against observations of the natural word. They were supposed to know that theories are used to explain why things behave like they do while practicals are used to verify the theories established.

In item (ii), the students were required to choose the letter which presents a safety precaution in the Physics laboratory. The alternatives were A, *Doing experiment in the laboratory*, B, *Handling of apparatus in the laboratory*, C, *Use equipment with care in the laboratory* and; D, *Do anything in the laboratory*. The correct answer was alternative C, *Use equipment with care in the laboratory*. A good number of students were able to answer this question correctly. However, a few students chose incorrect alternatives in this item. The students who opted for incorrect alternatives did not understand well the concept of laboratory rules at the expense of safety precaution in a Physics Laboratory; hence they failed to select the required response.

Item (iii) required the students to choose the letter which presents the name of an instrument used for accurate measurement of inner diameter of a bottle neck. The

correct alternative was D, *vernier Callipers*. Other responses included A, *tape measure*, B, *micrometer screw gauge* and D, *metre rule.* Majority of students chose the correct alternative D, *Vernier Callipers* suggesting that they had adequate knowledge about the function of Vernier Callipers. Some students were attracted by alternative B, *micrometer screw gauge*. These students lacked knowledge on the concept of measurement of various instruments. They did not know that a micrometer screw gauge is merely used to measure the diameter of wires but the Vernier calliper is used to measure small lengths such as internal and external diameters of objects like bottle neck and beakers.

In item (iv), the students were required to choose a statement which explains correctly about mass. The correct alternative was A, *it is measured by beam balance*. The performance in this item was good as majority of students chose the correct answer. A few students who chose incorrect answers such as B, *it is measured by spring balance*, C, *it varies with place* and D, *it can be zero*. Those who chose alternative B did not know that, spring balance is used to measure weight and not mass and those selected alternative C did not know that mass of an object does not vary with location. Similarly, those who chose D did not understand that any object which occupies space must possess mass.

Item (v) required the students to identify the physical quantity which is measured by a hydrometer. The options were; A, *the volume of liquids*, B, *the density of liquids*, C *the density of solids* and D, *the volume of solids*. The correct answer was in option B, *the density of liquids*. Most of the students chose the required response. Some students selected incorrect alternatives. For example, one student opted for alternative C, *the density of solids*. This student had knowledge of the function of hydrometer but failed to recall that it is used for measurement of density of liquids and not solids.

Item (vi) required the students to identify the letter of an alternative which represents energy possessed by a body of mass M lifted at a height h. The correct response was D, *potential energy*. Many students managed to choose the correct answer in this item. A small number of students who failed to select the correct response were attracted by alternative A, *kinetic energy*. This is an indicator that though the students had an idea on the concept of energy, failed to distinguish between potential energy and kinetic energy. These students were supposed to know that potential energy is possessed by a body by virtue of its position unlike kinetic energy which is possessed by the body when it is in motion.

In item (vii), the students were required to choose the alternative which expresses the number of images formed when two plane mirrors are placed at an angle of 60^o. The alternatives were A, *2*, B, *3*, C, *4* and D, *5*. The correct answer was alternative D, 5. A few students managed to chose the required answer in this item. This indicates that the majority lacked content knowledge and mathematical skills on how to establish and use the formulae, $n = \frac{360^0}{\theta} - 1$ for calculating the number of images n formed when two mirrors make an angle of contact θ.

Item (viii) required the students to choose the alternative which represents a device used to demonstrate the presence of charge. The options were A, *electrophorus*, B, *earth wire*, C, *gold leaf and* D, *electroscope*. The correct answer was alternative D, *electroscope*. Most of the students chose incorrect alternative A, *electrophorus*. These students did not know that an electrophorus consists of a circular slab of insulating material together with a brass disc on an insulating handle used to determine the sign of charge on a body. On the other hand, Electroscope consists of an insulating brass rod with two pieces of thin gold foil at one end and a brass cap at the other hand used to demonstrate or identify the presence of electric charge. Thus, they failed to distinguish the functions of the two devices.

Item (ix) required the students to choose the alternative which indicates the potential difference across the resistor when a current of 0.2A flows through a 4 Ω resistor. The correct answer was B, *0.8 V*. Good performance was observed in this item as most of the students chose the required answer. However, a few students failed to use the formulae V = IR to obtain the value of V hence they chose among incorrect alternatives A, *20 V*, C, *0.05 V* and D, *8 V*. This implies that they had no knowledge of the concept of Ohm's law.

In item (x), the students were required to give the name which refers to the process of removing magnetism from a material. The required answer was B, *demagnetization*. Two distracters C, *magnetization* and D, *magnetizing* challenged the students in this question. Most of students chose these alternatives thinking that the question required them to select the alternative which represents the process of making a material a magnet. These students were supposed to know that magnetization is the process of making a substance temporarily or permanently magnetic as by insertion in a magnetic field. On the other hand, demagnetization refers to the process of removing magnetism from a material. They therefore failed to identify the distinctive characteristics of magnetization against demagnetization phenomena.

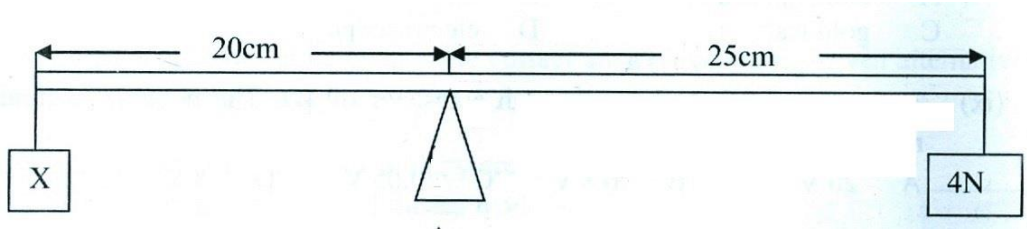
Item (xi) required the students to choose the letter of the alternative which expresses the difference between real and virtual image. The responses were A, *real image is inverted while virtual image is upright*, B, *real image is upright while virtual image is inverted*, C, *virtual image is formed by convergent rays while real image is formed by divergent rays and*, D, *real image is formed by convergent rays while virtual image is by divergent rays*. Alternative D was the correct answer for this question. Unfortunately, most of the students did not opt for it due to lack of knowledge on the characteristics of real and virtual images.

Item (xii) required the students to select the response which gives the reason why an atom is electrically neutral. The responses were: A, *It consists of equal number of electrons*, B, *It consists of equal number of protons and electrons*, C, *It consists of equal number of electrons and neutrons* and, D, *It consists of equal number of protons and neutrons*. The correct answer was presented by alternative B. Most of the students managed to choose the correct answer. This indicates that students had knowledge that, in an atom the number of protons and electrons are equal and the magnitude of their charges are equal and opposite hence the atom is electrically neutral since the charges cancel each other.

Item (xiii) required the students to choose the option which represents the calculations for the amount of current flowing in the circuit when a potential difference of 12 V is applied across a resistor of 24 Ω. The correct response was A, *0.5 A.* Most of the students chose the correct answer implying that they understood the formula $I=\frac{V}{R}$ which relates the current I, resistance R and the potential difference V across the resistor. However, some of the students chose alternative B, *2 A*, indicating that they used incorrect formula for finding the current in a circuit. Those who chose alternatives C, *0.5* Ω and alternative D, *288* Ω had no knowledge on the SI unit for current flowing in a circuit since the symbol "Ω" is the SI unit of resistance and not current.

In item (xiv), the students were required to choose the alternative which represents the name of the end of the pole of a magnet where the stroking begins when a north pole is used in the stroking method of magnetization. The choices were A, *South Pole*, B, *North Pole*, C, *West* and, D *East*. The correct alternative was B, *North Pole*. Many students selected this option correctly showing that they had adequate knowledge on the concept of magnetization. A few students who selected incorrect alternatives did not understand that the end with which stroking begins bears polarity nature of the stroking pole.

In item (xv) the students were required to choose the alternative which shows the calculations for finding the unknown weight X from Figure 1 which shows a ruler balanced by placing the load of 4N at its ends. The value of X was chosen from among the alternatives A, *5 N*, B, *0.5 N*, C, *100 N* and D, *200 N*.



The correct alternative was A, *5 N* but most of students did not choose it, indicating that they failed to apply the principle of moment of force to evaluate the value of unknown weight X.

Item (xvi) required the students to choose an alternative which represent an example of a third class lever among the alternatives A, *Scissors*, B, *fishing pole*, C, *Pliers* and D, *Nut cracker*. The correct answer was B, *fishing pole*. Analysis of students' responses showed that most of them were able to choose the correct response. Those who failed this item either lacked knowledge concerning to the characteristics or examples of levers. Fishing pole is in third class of lever where a fish is a load, the contact of the pole and the holding hand is the fulcrum and the tension of the bent portion of the pole provides the effort.

In item (xvii) the students were required to select a letter which represents the factor which causes the change of the distance between two moving objects. The options were A, *both are moving with the same velocity*, B, *both have the same acceleration*, C, *Both have different acceleration* and, D, *both have no accelerations*. The correct answer was C, *Both have different acceleration* and it was chosen by most of the students. A few students who chose incorrect alternatives A, B or D did not understand that velocity and acceleration are vector quantities; therefore if two objects are moving with the same velocity or acceleration, then they are always in parallel.

Item (xviii) required the students to identify an alternative which illustrates well the Newton's third law. The alternatives included; A, *Inertia*, B, *Momentum*, C, *Rocket propulsion* and D, *Circular motion*. Alternative C was the correct answer because in it there is an action (the ejected gas) and the reaction (the flying rocket), both of which are acted by equal and opposite forces. Unfortunately most of the students

choose alternative, A, *inertia*. Those students failed to understand that inertia is a tendency of a body to resist the change of its state of rest or motion in straight line.

In item (xix) students were required to choose the alternative which expresses a temperature of -40 ^{o}C in kelvin (K) scale. The given alternatives were; A, *313K*, B, *233K*, C, 273*K* and D -40*K*. The correct answer for this item was from alternative A and it was selected by a few students who used correctly the formulae $T = 273 + \theta$ to convert the temperature θ in ^{o}C into temperature T in K.

Item (xx) assessed knowledge of the students in identifying renewable and non-renewable source of energy. The students were required to choose an option which represents non-renewable sources of energy among the given alternatives; A, *Wave energy*, B, *Biofuels*, C, *Radiant energy* and D, *Fossil fuel*. The correct response for this item was alternative D. Most of the students were able to choose the correct response; hence the performance in this item was good.

2.1.2 Question 2: Matching Items

This question consisted of five (5) items in list A and seven (7) phrases in list B constructed from the topic of *Measurement*. Students were required to match each item in list A with a correct phrase in list B and write the letter of the corresponding phrase against the item number in the table provided. In this question, each item carried a weight of one (1) mark making a total of five (5) marks.

The question was attempted by 568,296 (100%) students whereby 24.4 percent of them scored from 0 to 1.0 mark, 36.3 percent scored from 2.0 to 3.0 marks and 39.3 percent scored from 4.0 to 5.0 marks. This analysis explicates that the performance was good as 75.6 percent scored above 30 marks. Figure 2 portrays the performance in this question.

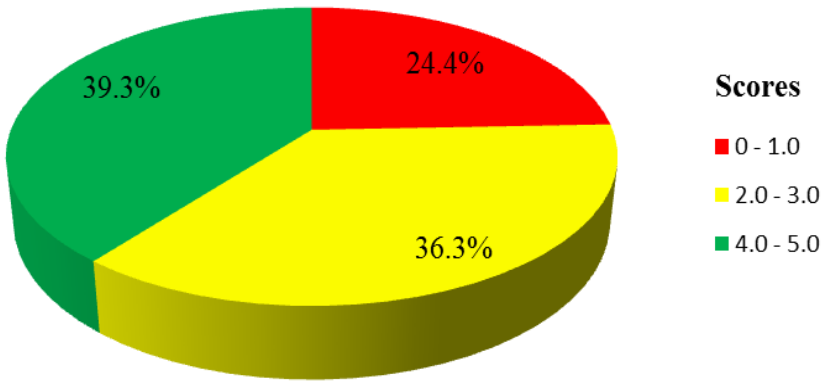


Figure 2: *The percentage of students' performance in Question 2*

Item (i) required the students to identify the response which matches with the statement; *An instrument that measures length, depth, internal and external diameters.* The correct response was C, *Vernier caliper.* Most of the students were able to match this item correctly and a few matched it with an inappropriate responses particularly G, *Magdeburg experiment*. These students did not understand that Magdeburg refers to a pair of large copper hemispheres with mating rims used to demonstrate the power of atmospheric pressure while Vernier caliper is an instrument used to measure small lengths and diameters of objects. So, the Magdeburg is used in atmospheric pressure whereas a Vernier caliper is used in measurement.

Item (ii) required the students to select the response which matches correctly with the stem; *An instrument that measures volumes of liquid.* The appropriate response was A, *Measuring cylinder.* This item was attempted very well by most of the students indicating that measuring cylinders are well known and frequently used by many students for measuring volume of liquids during practical work. On the other hand, a few students who selected inappropriate response chose alternative B, *Pipette* suggesting that they lacked knowledge on the functions of a pippete and that of measuring cylinder.

In item (iii), students' responses showed that most of them matched correctly the response E, *spring balance*, with the statement *an instrument that measures force of pull.* Further analysis on the response of students who matched it wrongly revealed that most of them lacked knowledge of measurement and practical experiences. Also others failed to associate *force of pull* with *weight*, the physical quantity which is commonly known to be measured by a spring balance.

Item (iv) required the students to identify the response which matches correctly with the statement *An instrument that transfers specific amount of liquid from one container to another.* The correct response was B, *Pipette*. This item was attempted well by majority of the students implying that they were familiar with the use of Pipette. Responses of those who matched incorrectly had shown that most of them matched it with alternative A, *measuring cylinder*. This shows that those students lacked knowledge that distinguishes the use of pipette and measuring cylinder.

In item (v), students were required to match the statement, *An instrument that measure body temperature*. The appropriate response was F, *Clinical thermometer.* The performance in this item was high as most students responded correctly. A very few students provided incorrect response since a clinical thermometer is commonly

used in hospitals for measuring human body temperature especially when one is suspected to have malaria disease.

2.1.3 Question 3: Fill in the Blank Spaces Items

This question had five (5) items with incomplete statements. Students were required to complete the statements by writing correct answers in the space provided. The items were constructed from different topics of *Measurement*, *Simple Machines*, *Newton's Laws of Motion*, *Light* and *Structure and Properties of Matter*. The question carried a total of five (05) marks, each item carrying one (01) mark.

The question was attempted by 568,266 (100%) students whereby 90.2 percent scored from 0 to 1.0 mark, 8.2 percent scored from 2.0 to 3.0 marks and 1.6 percent scored from 4.0 to 5.0 marks. This analysis reveals that the performance in this question was very poor as the general performance was only 9.8 percent. The performance in this question is shown in Figure 3.

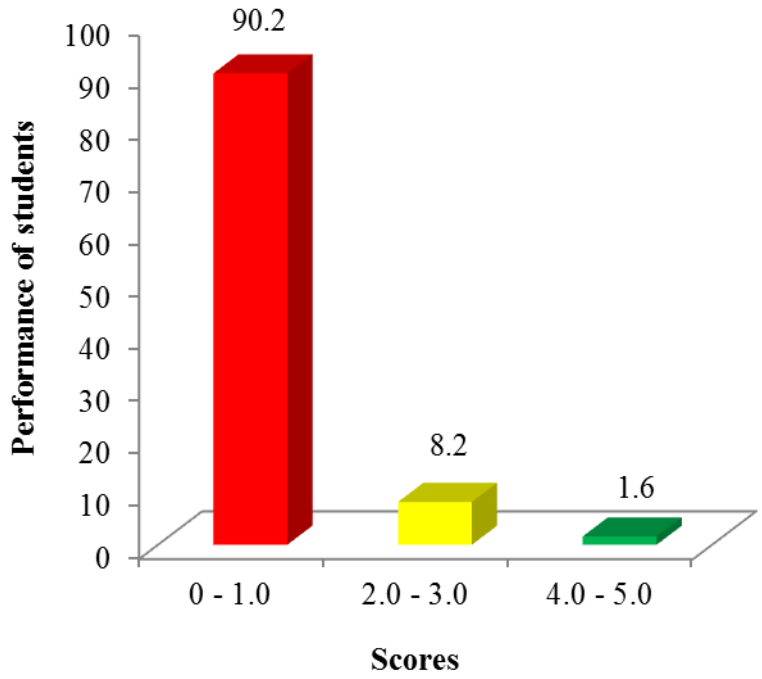


Figure 3: *Percentage of student's performance in Question 3*

Item (i) required the students to write the name of the basic physical proportions of measurement which cannot be obtained from any other proportions by either multiplication or division. The correct answer was *Fundamental physical quantity.* Few students were able to write the correct response in this item while the rest

provided either incorrect answer or failed to write anything. It was noted that a number of students failed this item by writing *derived quantity*, indicating that they did not know that derived quantities are the quantities which are derived from the fundamental quantities through multiplication or division.

In item (ii), the students were required to provide a name whose physical examples are staircase, winding roads uphill, wedges and a screw. The appropriate answer was *Inclined plane*. A very few students wrote the correct answer, the rest either did not write anything or provided incorrect response. This indicates that many students did not know examples of inclined plane. Students were supposed to understand that an inclined plane, also known as a ramp is a flat supporting surface tilted at an angle, with one end higher than the other, used as an aid for raising or lowering a load. Students failed to recall some examples of inclined planes as ramps, sloping roads and hills, chisels, hatchets, carpenters' planes and wedges which are commonly used in daily life experience.

Item (iii) required the students to write the term used to represent the resistance of a body to change its state of rest. The correct response was *inertia of rest.* Performance in this question was weak due to various challenges such as failure of some students to understand the demands of the question and lack of knowledge. They failed to understand that inertia refers to a property of matter by which it continues with its existing state of rest or uniform motion in a straight line, unless that state is changed by an external force. So it resists a change in its state of rest.

Item (iv) required the students to write the name given to objects which emit light when they are hot. The correct answer was *Incandescent object.* Performance of the students in this item was poor as most of them wrote *Luminous objects*. They failed to understand that luminous object is any object which emits light whether when it is cold or hot.

In item (v), the students were required to write the term which represents the materials which do not obey Hook's law. The correct response was *Brittle or plastic or elastomeric materials*. Most of the answers in this item were correct except for a few students who lacked the knowledge of the tested concept hence did not write anything or completed the statement by writing any physics terminology such as acceleration, work and others. The students were supposed to utilize their local environment to identify the nature of materials which when subjected to stress are deformed permanently at the extent that they cannot regain their original shape or size.

2.2 Section B: Short Answer Questions

2.2.1 Question 4: Work, Energy and Power

This question had three parts namely (a), (b) and (c). Part (a) required the students to define the terms (i) Work (ii) Power and (iii) Energy. Part (b) required them to calculate the power which can lift 200 kg of water through a vertical height of 6 m in 10 seconds and; in part (c) the students were required to calculate the kinetic energy of a 1000 kg car travelling down the road at a speed of 15 m/s.

The question was attempted by 568,291 (100%) students whereby 51.0 percent scored from 0 to 2.5 marks, 32.9 percent scored from 3.0 to 6.0 marks and 16.1 percent scored from 6.5 to 10.0 marks. Generally, the question was averagely performed as 49.0 percent scored from 3.0 to 10.0 marks. Figure 4 interprets the students' performance in this question.

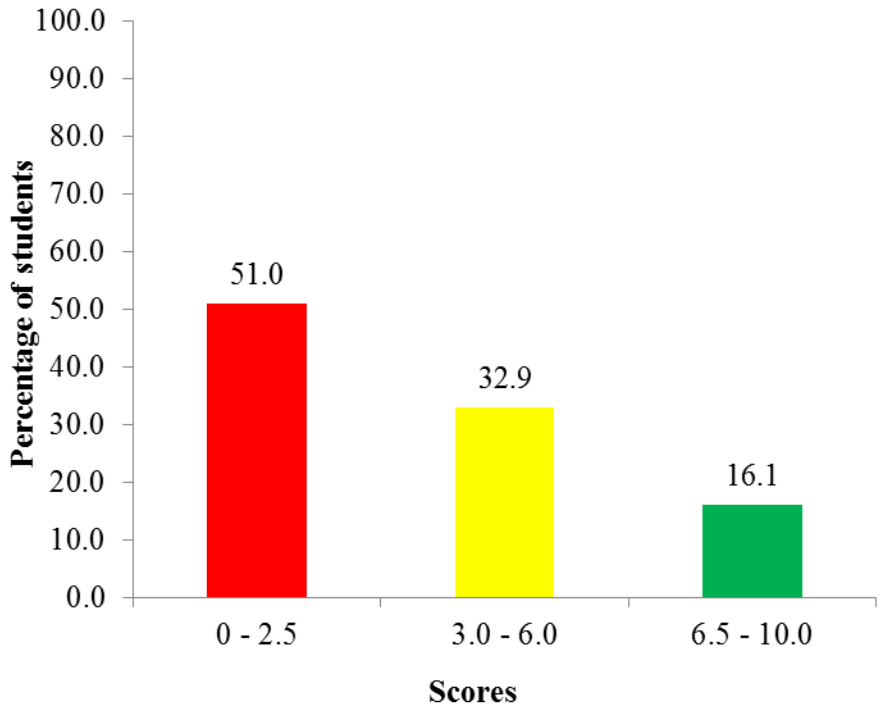
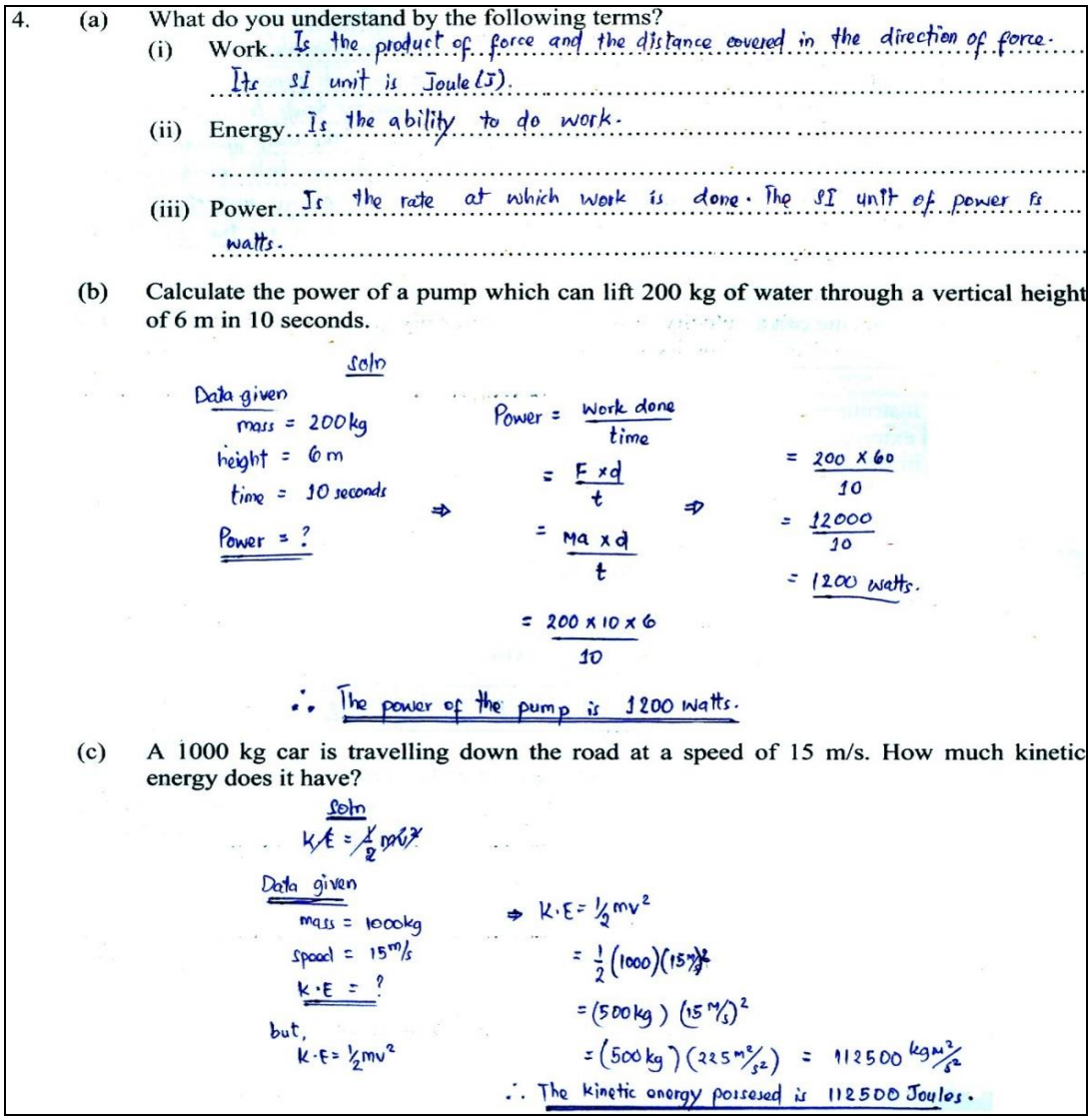


Figure 4: *Distribution of students' scores in Question 4*

The average number of students (278,463) who attempted well this question had shown good understanding of concepts of work, energy and power. Most of them showed an incredible understanding in part (b) which challenged majority of students by revealing that *power is the rate of doing work*. Firstly, they calculated

work done as a product of gravitational force and distance and then divided work done with time to obtain the required power. In part (c) these students applied correctly the formula $K.E=\frac{1}{2}mv^2$ for kinetic energy, substituted the given data and obtained correctly the required value of kinetic energy. Extract 4.1 shows a sample of good response in this question.

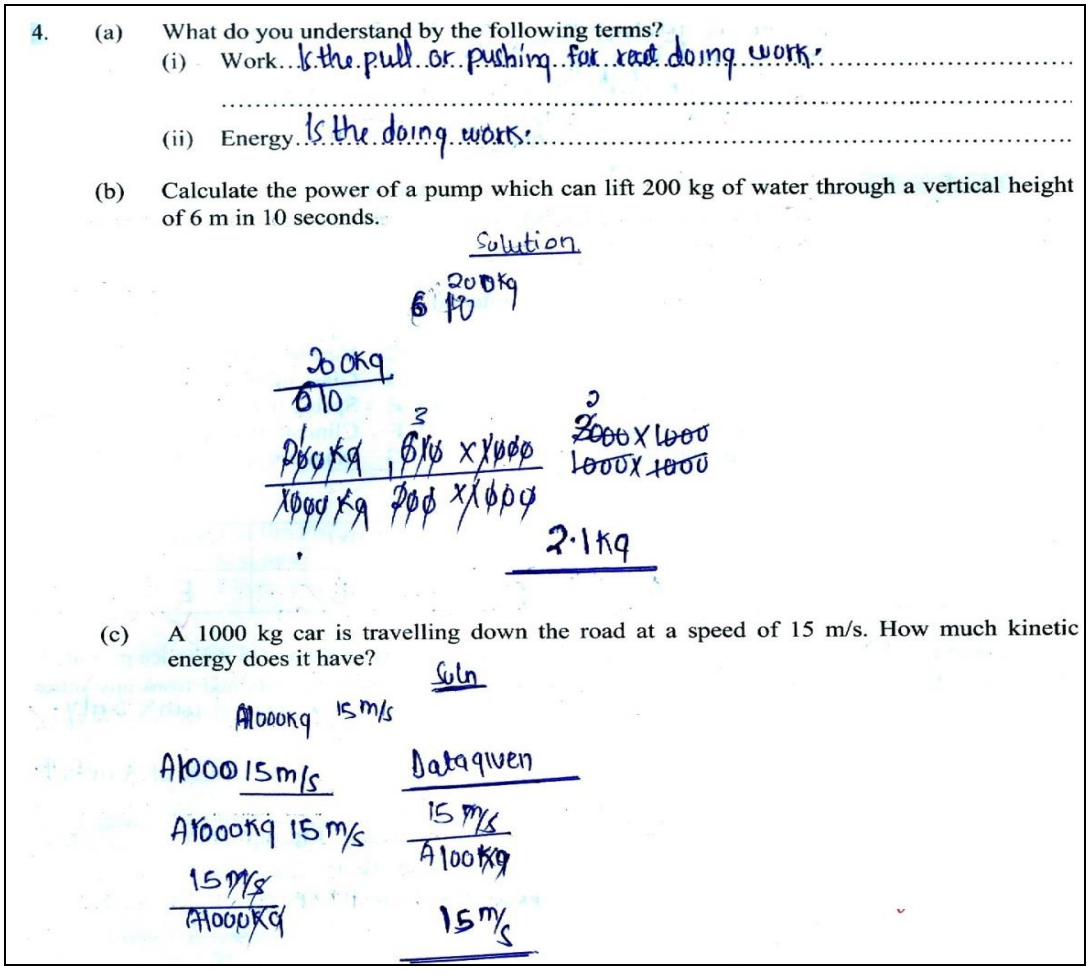


Extract 4.1: A sample of the student's good responses in Question 4

In extract 4.1, the student defined work, Energy and Power correctly. In part (b) he/she applied the formulae for Power precisely, substituted the data given and performed computations accurately. Furthermore, the student managed to formulate

the expression for the kinetic energy, utilized proper SI units and finally obtained its correct value by doing appropriate calculations.

The students who performed poorly in this question lacked both knowledge and numerical skills hence they wrote incorrect answers. For example one of them defined work as *any activity or job human or living thing are do* instead of *work is a product of force and distance moved by the force*. Also some students calculated power by adding mass; distance and time instead of using the formulae $\text{Power} = \frac{\text{Workdone}}{\text{Time taken}}$. Extract 4.2 shows a sample of responses from one of the students who performed poorly in this question.


4. (a) What do you understand by the following terms?
(i) Work... is the pull or pushing for act doing work.
(ii) Energy... is the doing work.
(b) Calculate the power of a pump which can lift 200 kg of water through a vertical height of 6 m in 10 seconds.
Solution
200kg
6 10
200kg
10
200kg, 6m x 1000 2000 x 1000 / 1000 x 1000
1000kg 200 x 1000
2.1kg
(c) A 1000 kg car is travelling down the road at a speed of 15 m/s. How much kinetic energy does it have?
Soln
A1000kg 15m/s
A1000 15m/s
A1000kg 15m/s
15m/s
A1000kg
Data given
15m/s
A100kg
15m/s

Extract 4.2: A sample of student's poor responses in Question 4

The student provided incorrect definitions of Work, Energy and Power. He/she calculated power and kinetic energy without using the formulae indicating he/she lacked the content knowledge on the concept of Work, Energy and Power.

2.2.2 Question 5: Motion in a Straight Line & Newton's Laws of Motion.

In this question students were required to (a) (i) Briefly explain motion of an object under gravity by taking an example of a ball thrown straight up into the air and (ii) calculate acceleration when a car with a velocity of 60 km/h is uniformly retarded and brought to rest after 10 second. They were also required to (b) (i) distinguish between distance and displacement and (ii) provide one example of the law of inertia of a body. In part (c), they were required to determine the mass which will be given to a body with an acceleration of 7 m/s^2 by a force of 3 N.

The question was attempted by 568,270 (100%) students whose scores were as follows: 87.5 percent scored 0 to 2.5 marks including 74.6 percent who scored zero marks, 10.2 percent scored 3.0 to 6.0 marks and 2.3 percent scored 6.5 to 10.0 marks. This displays that the question was poorly performed as only 12.5 percent scored from 3.0 to 10 marks. Figure 5 shows the students' performance in this question.

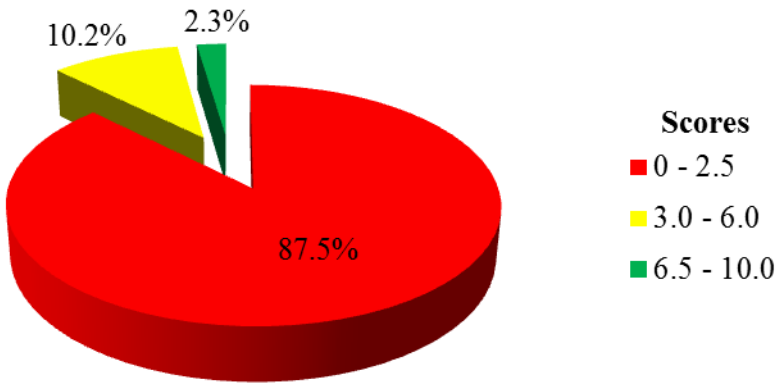
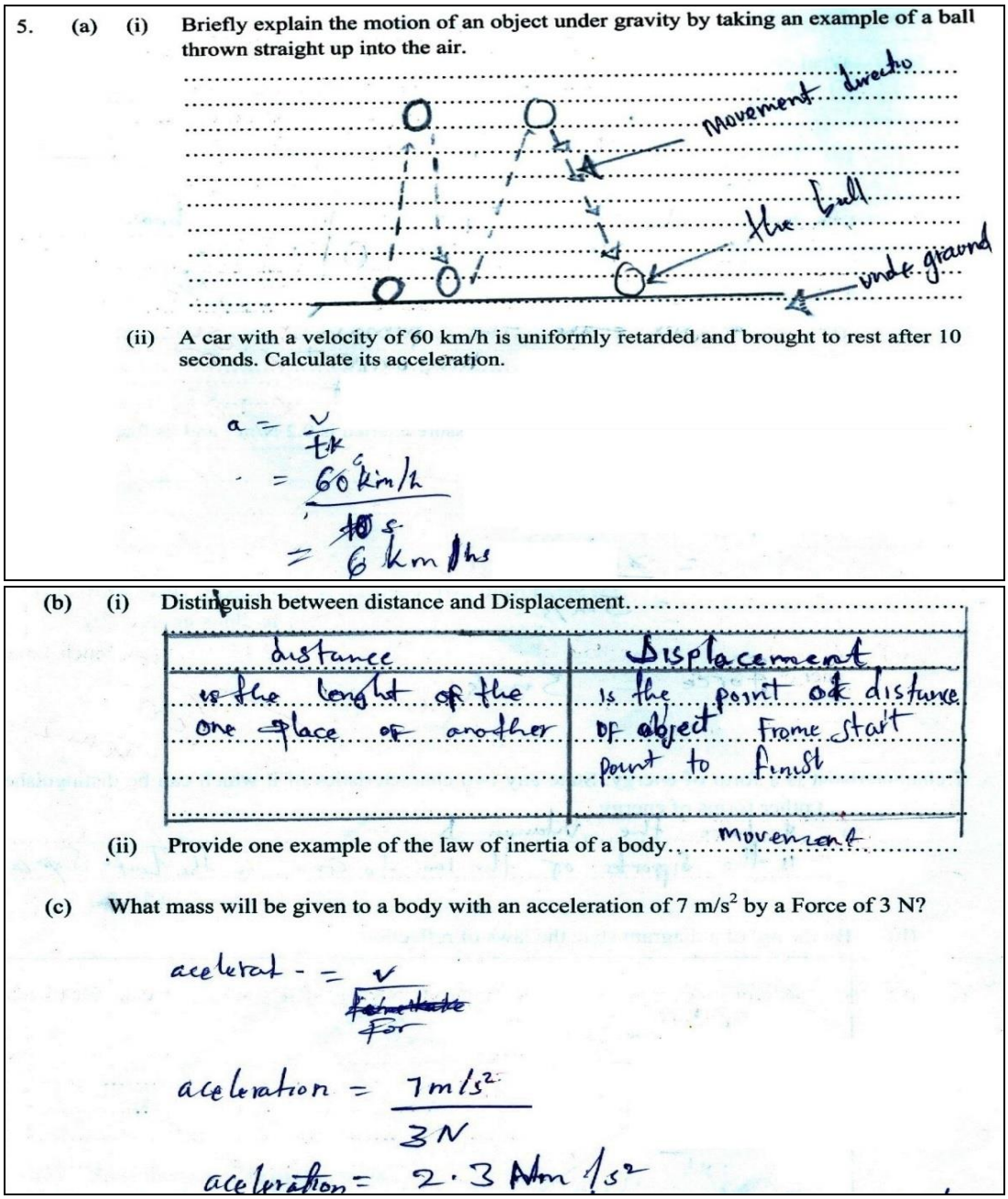


Figure 5*: Performance of students in Question 5*

The students who performed poorly in this question failed to provide clear explanation about the motion of an object under gravity. They didn't know that when an object is thrown straight up into air, its velocity is decreased by gravity to zero at the maximum height then it will reverse its direction and fall down under the pull of gravity. Not only that but also they lacked Mathematical skills, hence used inappropriate formula to calculate the acceleration in part (a) (ii). Others failed to

change the units of velocity expressed in km/h to m/s. Moreover, most of them were unable to apply the formula Force = mass × acceleration or Mass = $\frac{\text{Force}}{\text{Acceleration}}$ in order to calculate mass in part (c). Extract 5.1 shows a sample of responses given by one of the students who attempted the question poorly.



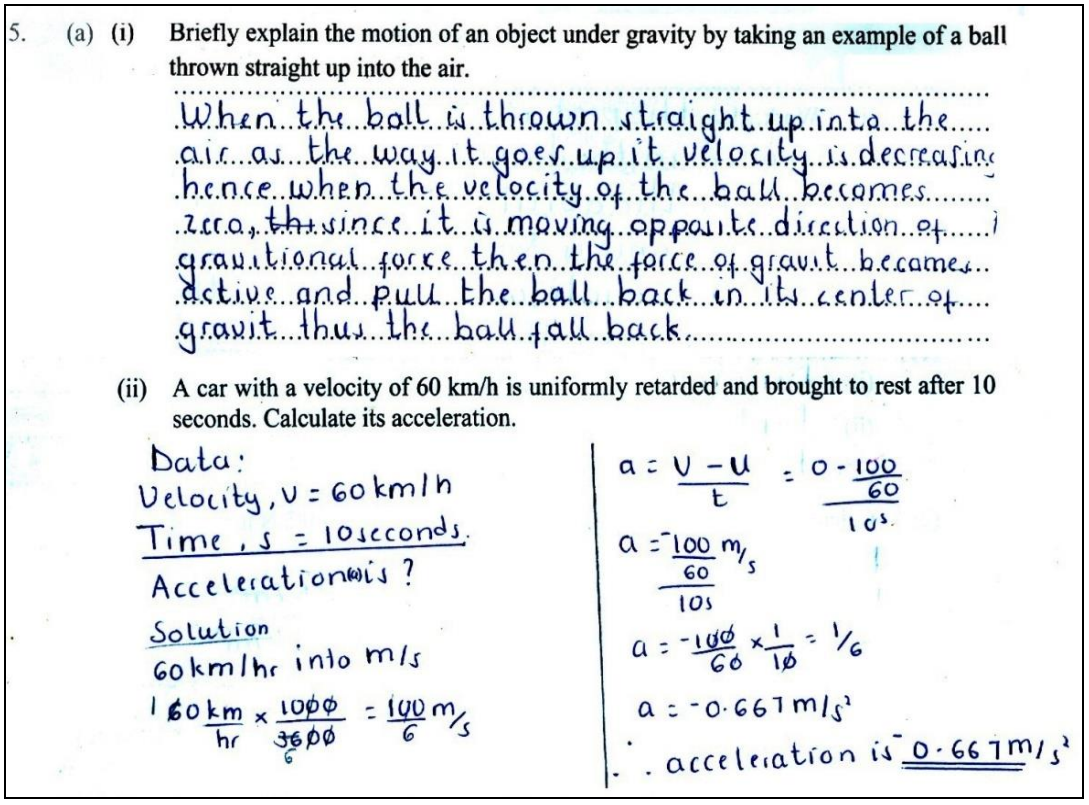
Extract 5.1: *A sample of students' poor responses in Question 5*

In extract 5.1, the student failed to explain the motion of a body under gravity in words instead he/she drew a diagram to illustrate the motion of the ball when thrown up in the air, then returns to the ground and again bounces off to the air. Also, in part (a) (ii) and (c) the student provided incorrect calculations.

However, a few students had shown clear understanding on the effect of gravity to the motion of a body thrown straight up into the air. One student who managed to respond appropriately wrote as follows:

> *If a ball is thrown straight up into the air it will move upward, stop momentarily after reaching the maximum height thereby attaining zero velocity and then falls downward by gravity. On its way downwards, the magnitude of velocity increases thereby increasing the acceleration downwards. The force of gravity and its acceleration are always directed downwards towards the earth.*

They also showed systematic calculations which included appropriate formula, accurate substitution of data and correct computation to obtain the final answers in part (a) (ii) and (c) which required calculations. Extract 5.2 is one of the examples of good responses in this question.



5. (a) (i) **Briefly explain the motion of an object under gravity by taking an example of a ball thrown straight up into the air.**

When the ball is thrown straight up into the air as the way it goes up it velocity is decreasing hence when the velocity of the ball becomes zero, since it is moving opposite direction of gravitational force then the force of gravit became active and pull the ball back in its center of gravit thus the ball fall back

(ii) **A car with a velocity of 60 km/h is uniformly retarded and brought to rest after 10 seconds. Calculate its acceleration.**

Data:
Velocity, v = 60 km/h
Time, s = 10 seconds.
Acceleration is ?

Solution
60 km/hr into m/s

$60\frac{km}{hr} \times \frac{1000}{3600} = \frac{100}{6} m/s$

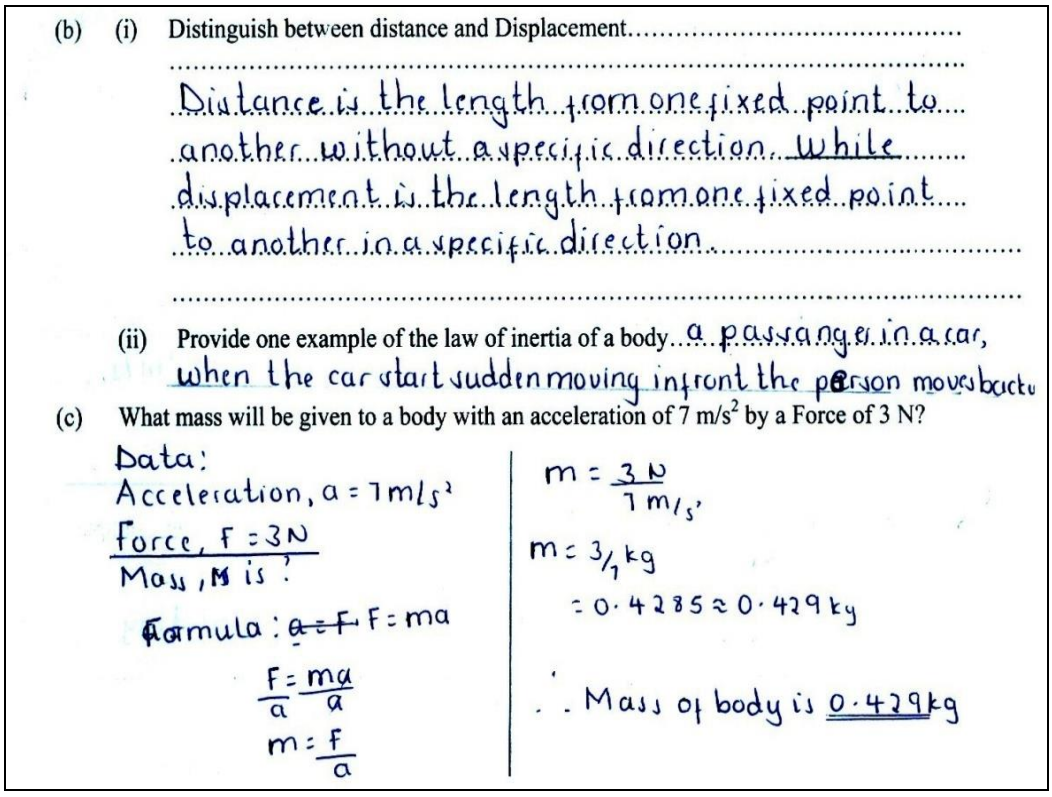
$a = \frac{v-u}{t} = \frac{0-\frac{100}{60}}{10s}$

$a = \frac{-100\ m/s}{\frac{60}{10s}}$

$a = -\frac{100}{60} \times \frac{1}{10} = 1/6$

$a = -0.667\ m/s^2$

∴ acceleration is $-0.667\ m/s^2$



Extract 5.2: A sample of students' good responses in Question 5

Extract 5.2 shows responses from one of the students who had adequate knowledge on the concepts of linear motion and Newton's laws of motion. The student provided correct answers to each item of the question.

2.2.3 Question 6: Pressure

In this question the students were required to (a) state Pascal's principle of pressure, (b) state three factors that affect the liquid pressure and (c) calculate the area of object if the pressure exerted is 0.2 N/m^2 and its force is 2 N.

The question was attempted by 568,288 (100%) students whereby 74.5 percent scored from 0 to 2.5 marks, 13.4 percent scored from 3.0 to 6.0 marks and 12.1 percent scored from 6.5 to 10.0 marks. This performance reveals that the question was poorly performed as 25.5 percent scored 3.0 marks and above. Figure 6 shows the performance of students in this question.

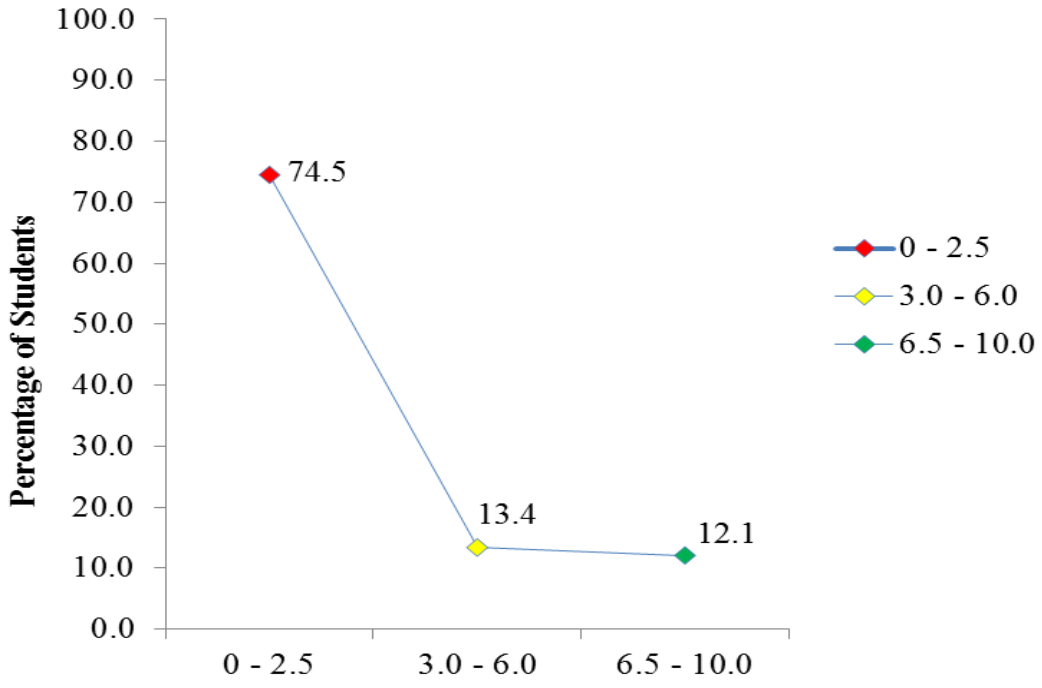
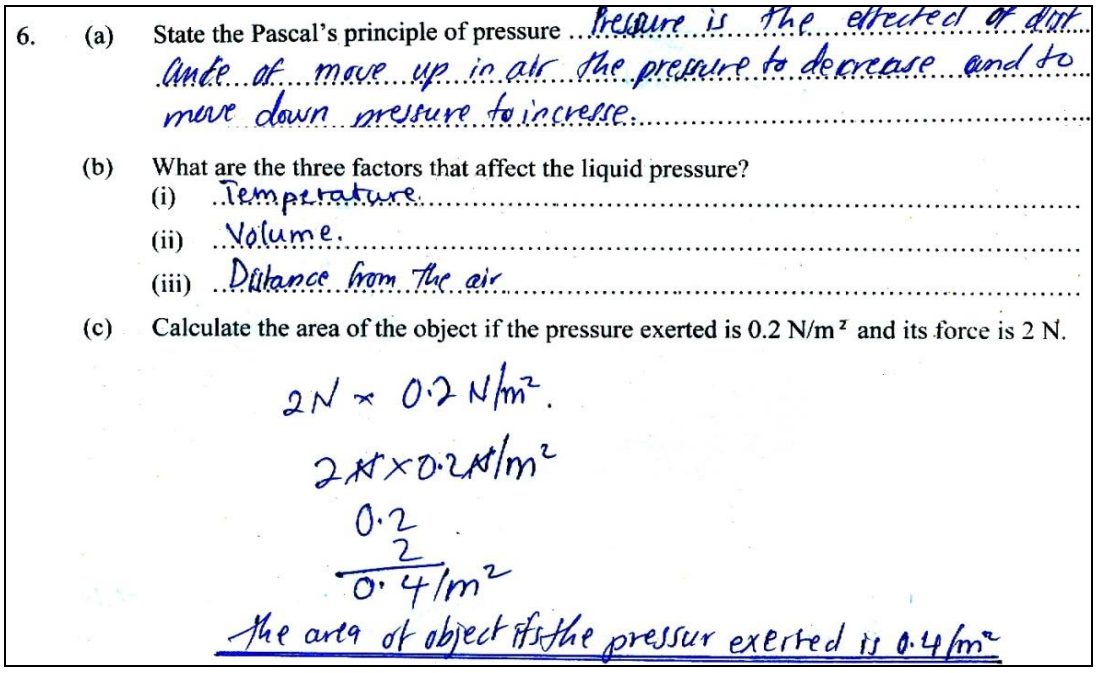


Figure 6: *Distribution of students' scores in Question 6*

Analysis of the responses of the students who scored low marks revealed that in part (a) most of them did not manage to state Pascal's principle of pressure, hence they left the space blank. Some of them decided to fill the space by copying statements used to formulate some questions especially Questions 1 and 2. In part (b), a good number of them failed to use the formula for pressure in liquid which is *the product of density of the liquid, acceleration due to gravity and depth/height of the liquid in the container* ($P = h\rho g$) in order to identify the three factors which affect liquid pressure. However, some students calculated pressure by direct substitution of data hence lost some marks required for the formula. Extract 6.1 shows a sample of answers of one student who gave poor responses in this question.


6. (a) State the Pascal's principle of pressure ... Pressure is the effected of dist... ante of move up in air the pressure to decrease and to move down pressure to increase.

(b) What are the three factors that affect the liquid pressure?
(i) Temperature.
(ii) Volume.
(iii) Distance from the air

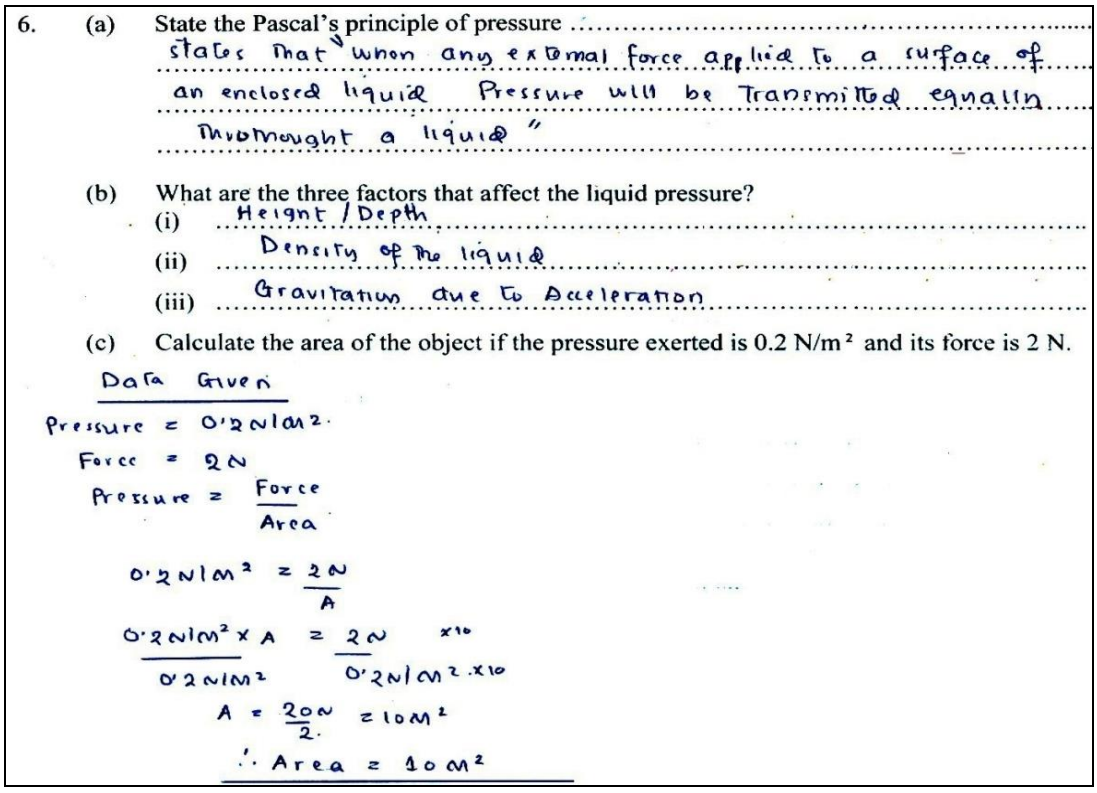
(c) Calculate the area of the object if the pressure exerted is 0.2 N/m² and its force is 2 N.

2N × 0.2 N/m².
2N × 0.2N/m²
0.2
2
0.4/m²
The area of object is the pressur exerted is 0.4/m²

Extract 6.1: A sample of poor students' responses in Question 6

In extract 6.1, the student lacked both content knowledge and Mathematical skills of the concepts tested. For instance, in part (c), he/she calculated *area as a product of force and pressure* while *area is force over pressure*.

The students who attempted well this question were able to write correctly Pascal's principle which states that *any external pressure applied to the surface of enclosed fluid will be transmitted equally throughout the liquid.* Moreover these students mentioned correctly the three factors that affect liquid pressure which are *density of the liquid, acceleration due to gravity and height of the liquid column*. Not only that but also, they applied the formula for $\text{Pressure} = \frac{\text{Force}}{\text{Area}}$ and calculated correctly the required area in part (c). Extract 6.2 shows the responses given by one of the students who attempted well the question.



Extract 6.2: A sample of students' good responses in question 6

In extract 6.2, the student managed to state accurately Pascal's principle, factors that affect liquid pressure and systematically obtained the required area by applying appropriate relationship between Pressure, Force and Area.

2.2.4 Question 7: Light

The question required the students to (a) state any two characteristics of light which can be distinguished from other forms of energy, (b) state with the aid of a diagram the laws of reflection and (c) determine the number of images formed if two mirrors are set (i) at an angle of $60^{o}$and (ii) parallel to each other.

The question was attempted by 568,279 (100%) students whereby 82.4 percent scored from 0 to 2.5 marks, 11.9 percent scored from 3.0 to 6.0 marks and 5.7 percent scored from 6.5 to 10.0 marks. This analysis shows that the performance in this question was poor, as only 17.6 percent scored from 3.0 to 10.0 marks. Figure 7 shows the students' performance in this question.

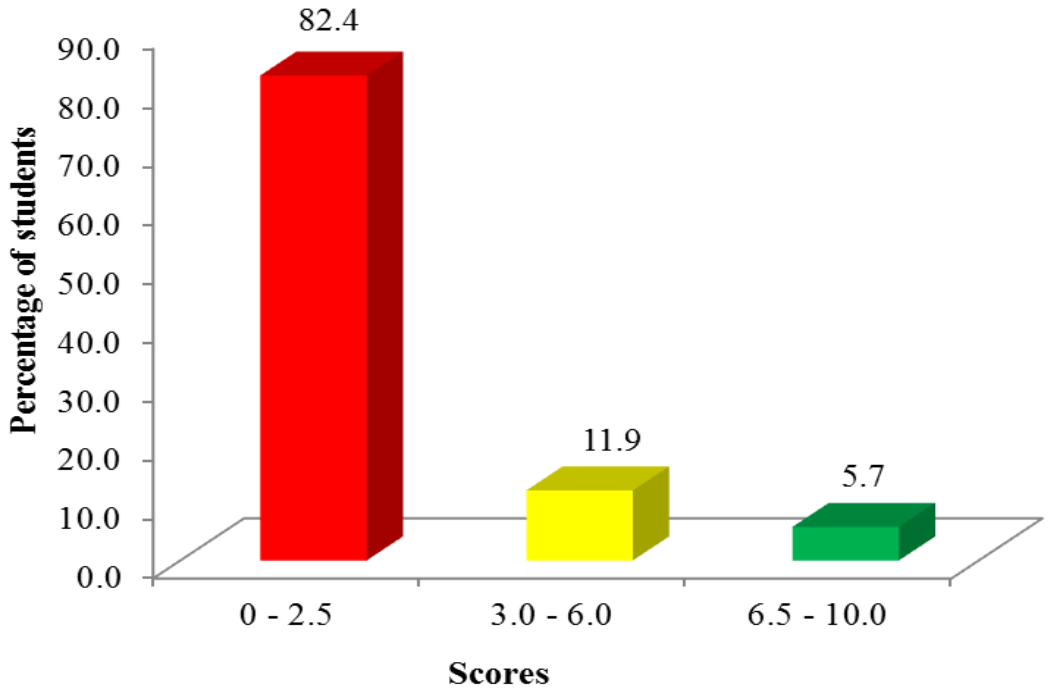


Figure 7: *The percentage of students' performance per score in Question 7*

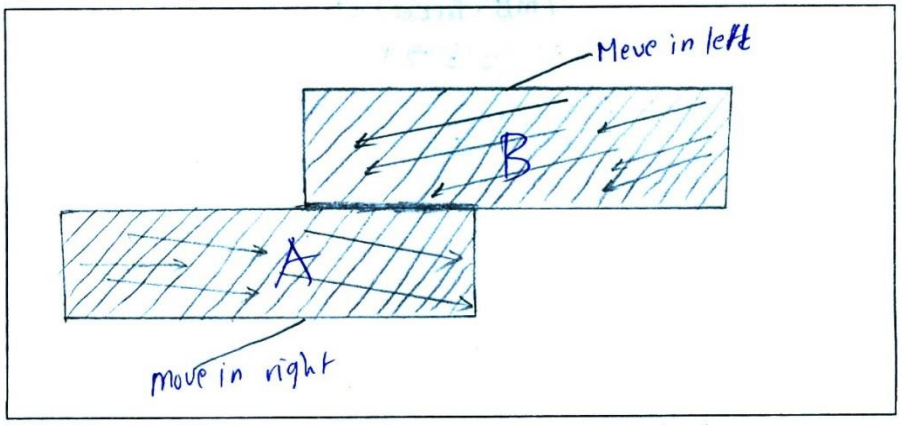
Most of the students who performed poorly in this question did not understand part (a) of the question hence they stated forms of energy like *Heat Energy, Kinetic energy , Potential energy* instead of stating characteristics of light energy. It was also noted that most of them failed to score marks in part (b) due to drawing the diagram showing reflection of light on plane mirror instead of laws of reflection. The responses of these students in part (c) showed that most of them did not know that the number of images n formed between two plane mirrors placed at an angle θ between them is given by $n = \frac{360}{\theta} - 1$. Some of them used incorrect formulae and others skipped this part of the question. Other students strived to obtain the number of images formed on a plane mirror without using the formulae. Extract 7.1 presents the poor responses of one of the students in this question.

7. (a) Light is a form of energy. State any two characteristics of it which can be distinguished from other forms of energy.

(i) friction is the form energy

(ii) Magnetisim is the form energy

(b) By the aid of a diagram state the laws of reflection.



friction is product by two part of any specment to join in the different motion. Example. Two hands to joined in one place and to move in up and down or forwad and back this experment it's product of friction. any product of friction is hot.

(c) How many images can be formed if two mirrors are set?

(i) At an angle of 60^0

$90° - 60° = 30°$

$\frac{30}{15} = 2$

Angle of 60° is formed 2 images

(ii) Parallel to each other.

$90° - 90° = 0$

$0 - 1 = 1$

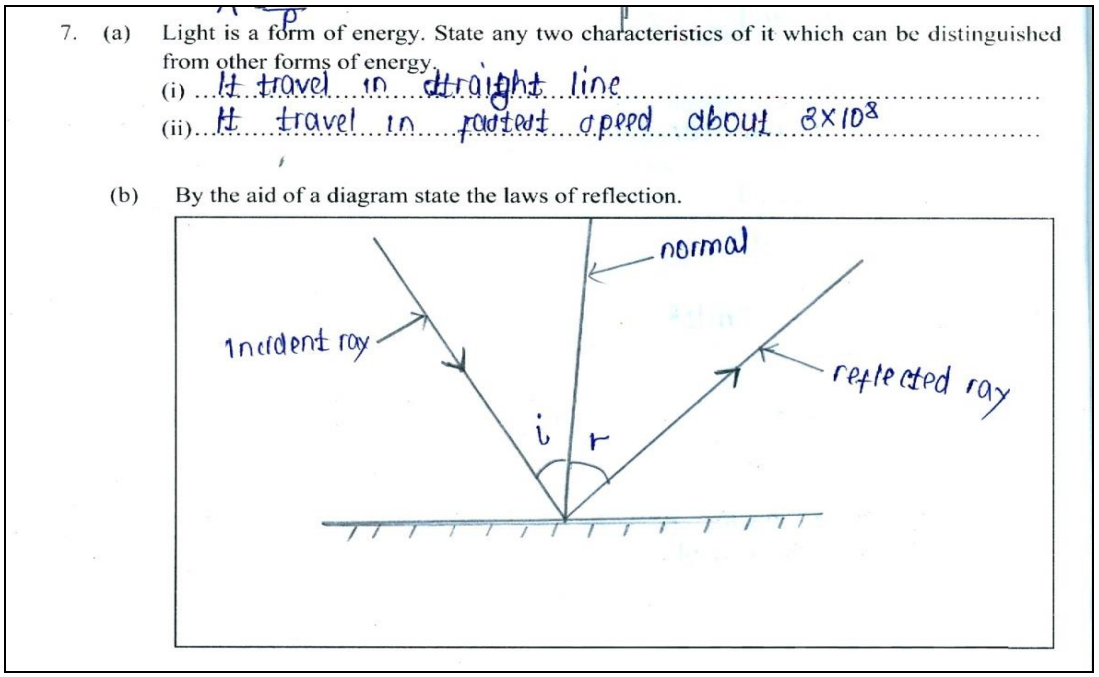
Patallet to form 1 images

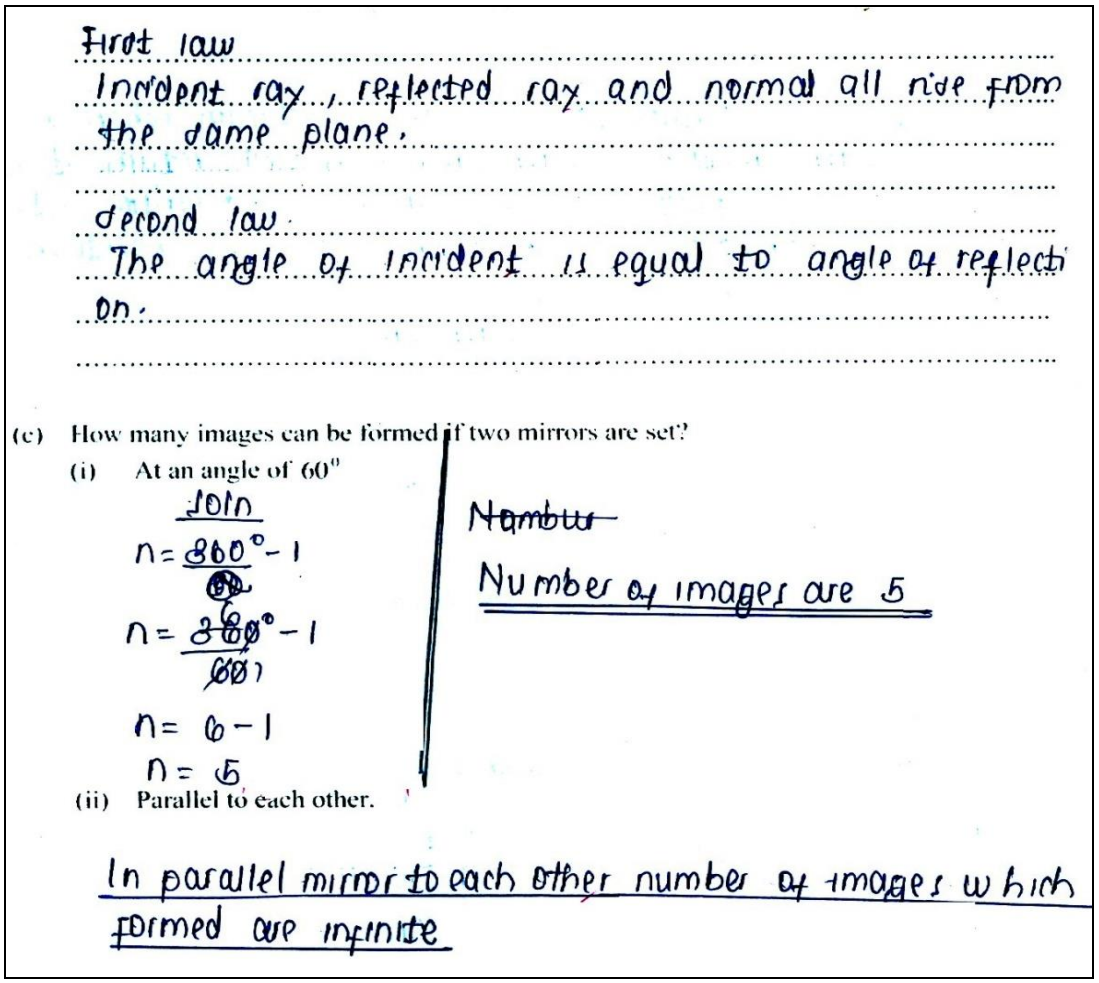
Extract 7.1: A sample of students' poor responses in Question 7

Extract 7.1 shows that the student did not understand the requirements of the question in part (a) and (b) and hence he/she provided irrelevant answers to these

items. Consequently, in Part (c) the student deemed to lack knowledge on the concept of light specifically images formed on plane mirrors.

On the other hand, a few students who attempted this question well stated correctly the characteristics of light that *is a form of energy which travels in straight lines, travel with fastest speed about* $3x10^8$ *m/s and it travels in vacuum.* Also they were able to state and illustrate the laws of reflection and made the calculations to determine the number of images formed by two plane mirrors appropriately. Extracts 7.2 illustrates the responses given by one of the students who attempted the question correctly.



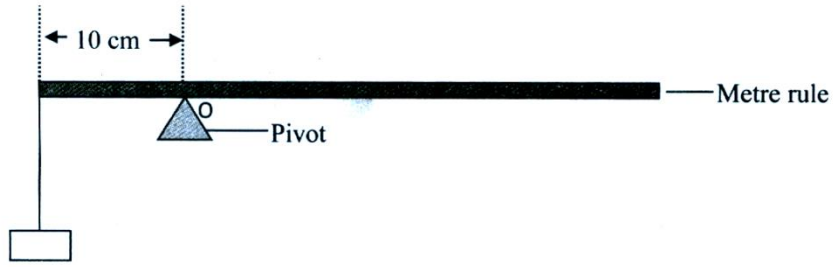


Extract 7.2: A sample of students' good responses in Question 7

Extract 7.2 shows responses of one of the students who had mastered well the characteristics of light, laws of reflection and the concept of formation of multiple images by plane mirrors.

2.2.5 Question 8: Forces in Equilibrium

In this question the students were required to (a) state the principle of moments, (b) distinguish between stable equilibrium and unstable equilibrium and; (c) calculate the mass of a rule given that a metre rule is pivoted about a point O and it is balanced by a load of 0.2 N as shown in the following Figure.



The question was attempted by 568,294 (100%) students out of them, 85.7 Percent scored from 0 to 2.5 marks, 12.5 percent scored from 3.0 to 6.0 marks, and 1.8 percent scored 6.5 to 10.0 marks. Figure 8 signifies the performance of the students in this question.

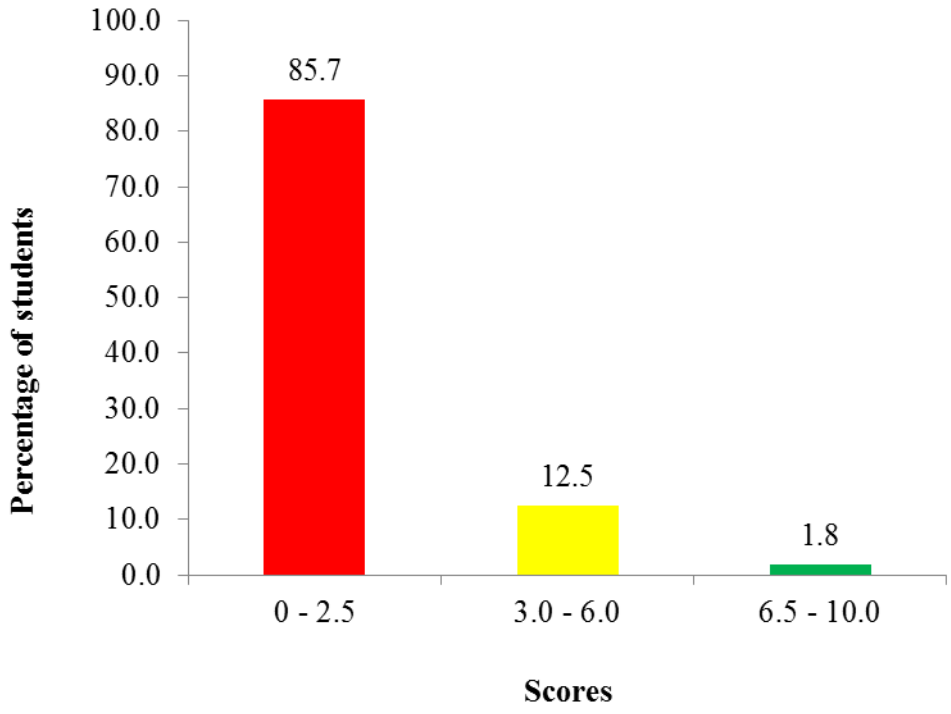
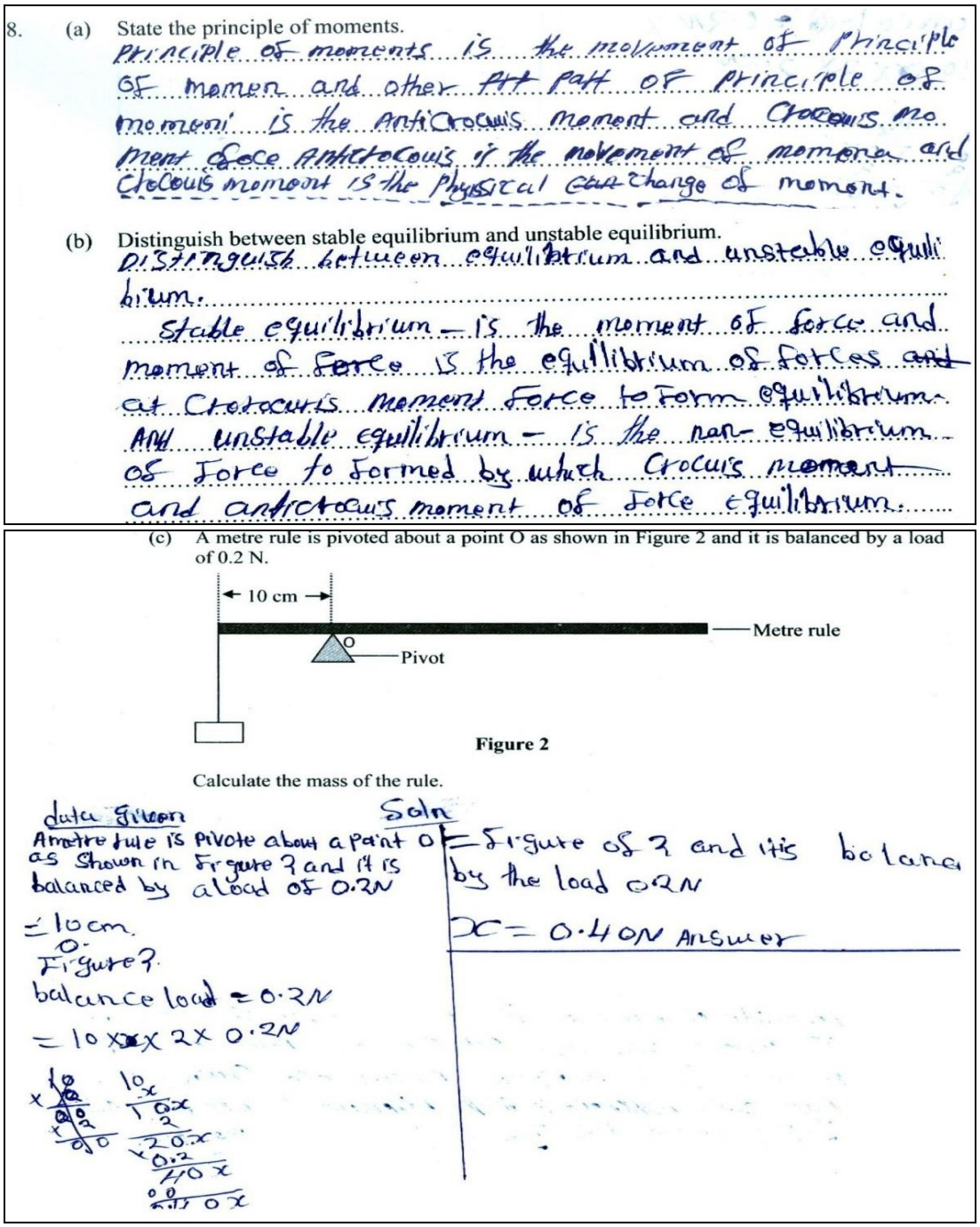


Figure 8: *Distribution of scores of students' performance in Question 8*

The students who performed poorly in this part failed to recall clearly the principle of moments. These students were supposed to understand that for a system to be in equilibrium, the sum of clockwise moments must be equal to the sum of anti-clockwise moments. Also, some of them failed to distinguish between stable and unstable equilibrium in part (b) due to poor knowledge. In this part students were to bear in mind that for a slightly displaced object, the object attains its stable equilibrium if it returns to its original position, otherwise it becomes unstable if it moves further away from its original position. In part (c) most of them failed to

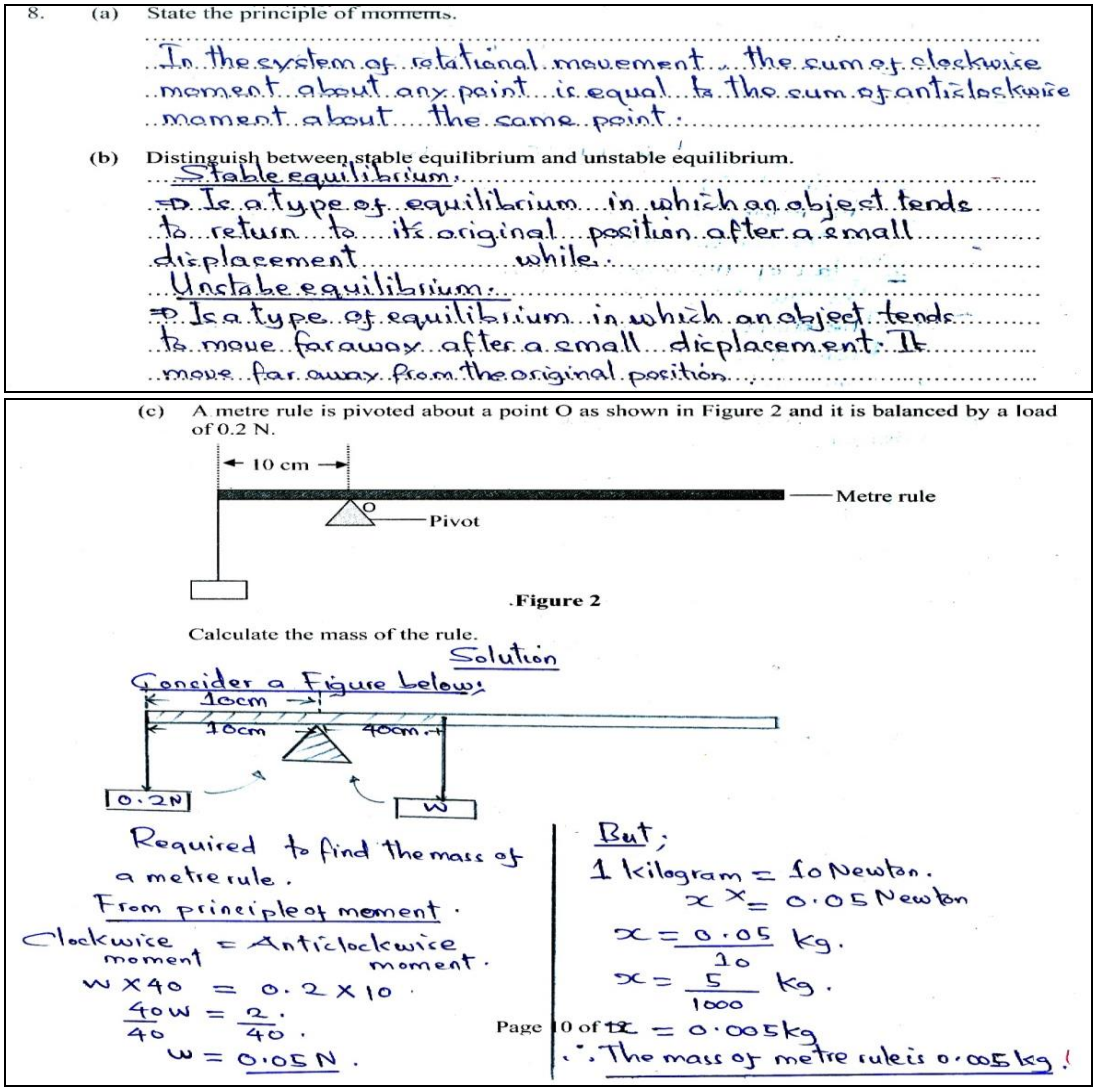
apply the principle of moments to calculate the mass of the metre rule. Again the problem of Mathematical skills becomes an obstacle towards their performance. Extract 8.1 shows a sample of the work of one of the students with poor responses.



Extract 8.1: A sample of the student's poor responses in Question 8

Extract 8.1 shows the challenges that the student encountered as he/she failed absolutely to use proper English Language to state the principle of moments and also failed to give the distinctive features between stable and unstable equilibrium. Similarly, the student used no formulae to compute the value of the mass of a meter rule.

On the other hand, some of the students stated correctly the principle of moments and provided clear differences between stable and unstable equilibrium. In addition, they interpreted correctly the diagram provided in part (c) and applied a suitable principle of moments to find the mass of the metre rule. Extract 8.2 shows the sample of the student's work with correct responses.



Extract 8.2: A sample of students' good responses in Question 8

Extract 8.2 shows the work of the student who provided correct responses in all parts of the question.

2.3 Section C: Short Answer Questions

2.3.1 Question 9: Pressure

The question had three parts namely (a), (b) and (c). In part (a) the students were required to write the uses of (i) Manometer (ii) Hares apparatus (inverted U-tube) (iii) U-tube and (iv) Barometer. In part (b) they were required to explain why a big elephant manage to walk comfortably on mad soil without sinking while human being may sink easily. Part (c) required the students to draw a well labelled diagram which demonstrates that liquid pressure depends on depth.

The question was performed by 568,299 (100%) students, out of which 88.4 percent scored from 0 to 2.5 marks, 10.3 percent scored from 3.0 to 6.0 marks and 1.3 percent scored 6.5 to 10.0 marks. From this analysis, the general performance in this question was 11.6 percent which suggests poor performance. Figure 9 shows the performance of students in this question.

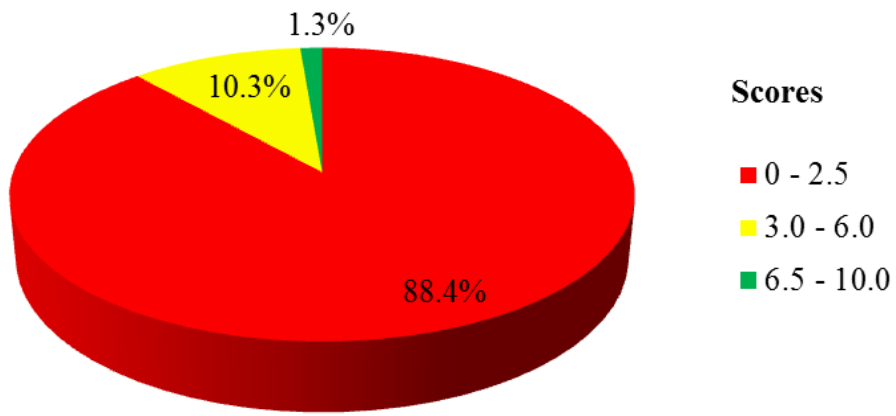
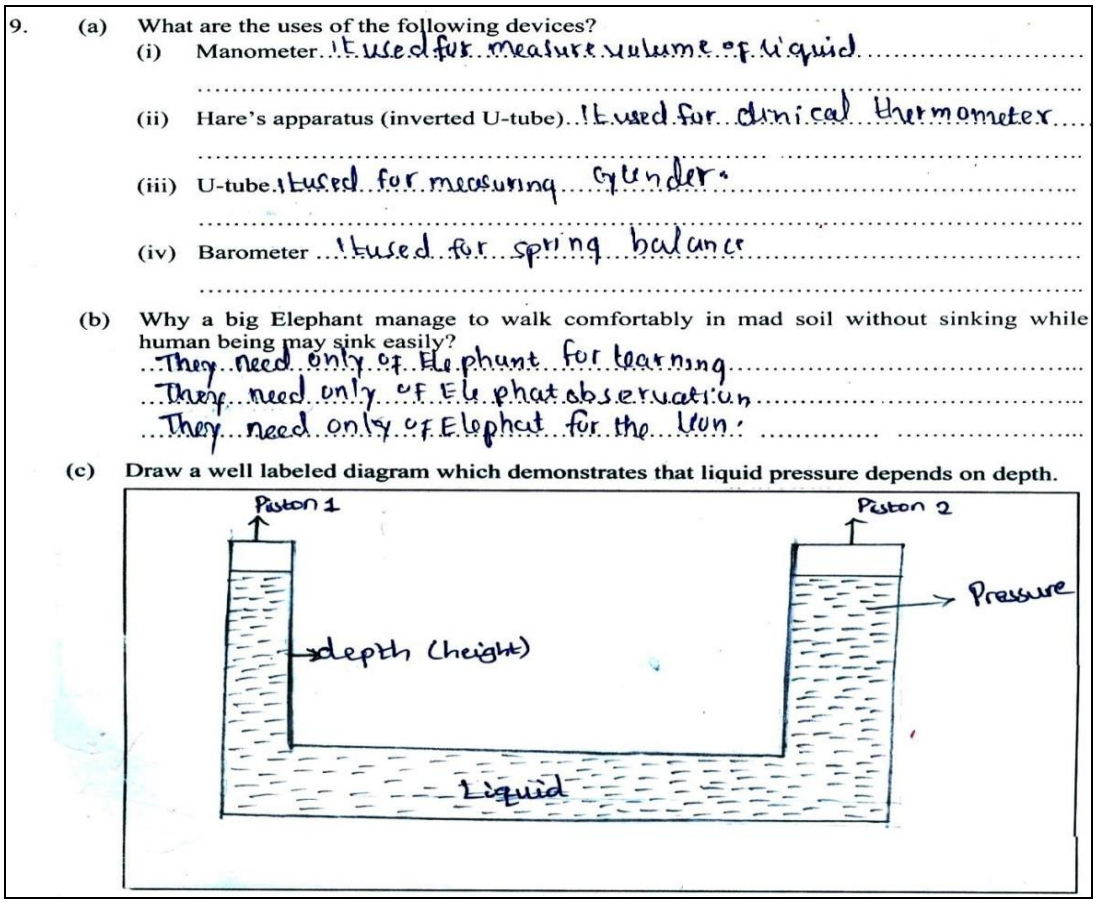


Figure 9: *Percentage of students' performance in Question 9*

The majority of students performed poorly in this question. The major factor towards this poor performance was observed to be insufficient knowledge about pressure especially on the instruments or devices used in pressure, conceptual questions regarding to applications of pressure in daily life situations and the parameters affecting pressure in liquids. Poor diagrams drawing skills was contributed by lack of content knowledge on the subject matter. These students were supposed to recall that manometer is a scientific instrument used to measure gas

pressure and that Hare's apparatus is a device for comparing densities of different liquids. Consequently, U-tube is a device used to compare densities of two liquids which do not mix, whilst a barometer is a scientific instrument that is used to measure air pressure in a certain environment. Moreover, in part (b) most of them failed to use the concept of pressure, that is *Pressure is the force acting normally per unit area,* i.e $P = \frac{F}{A}$. To deduce that *the area of the elephant foot is large and hence it exerts small (minimum) pressure compared to the area of human being foot which is small hence exerts high (maximum) pressure.* Therefore, because of this Elephant manage to walk comfortably in mad soil without sinking since Elephant feet are wide which help to minimize pressure. On the other hand, human feet exert a higher pressure because have smaller area. In part (c) majority of the students drew irrelevant diagrams and failed to explain how the liquid pressure depends on depth. Extract 9.1 shows poor responses from one of the students.



Extract 9.1: A sample of the students' poor responses in Question 9

Extract 9.1 shows the responses from a student who attempted poorly in each part of the question. For example, in part (c) he/she drew Hydraulic press instead of the diagram for demonstrating variation of pressure with depth of the liquid.

A few students who scored high marks in this question had shown a good mastery of the topic of pressure as they responded clearly the uses of the given devices as well as giving reasonable explanation on why a big elephant manages to walk comfortably in mad soil without sinking while human being may sink easily. In addition, they were able to draw and label clear diagram illustrating the variation of pressure with depth. Extract 9.2 shows the correct responses of one of students who performed this question correctly.

9. (a) What are the uses of the following devices?

(i) Manometer..it's used to measure gas pressure.....
.....

(ii) Hare's apparatus (inverted U-tube).measure the density of.....
Miscible liquids.....

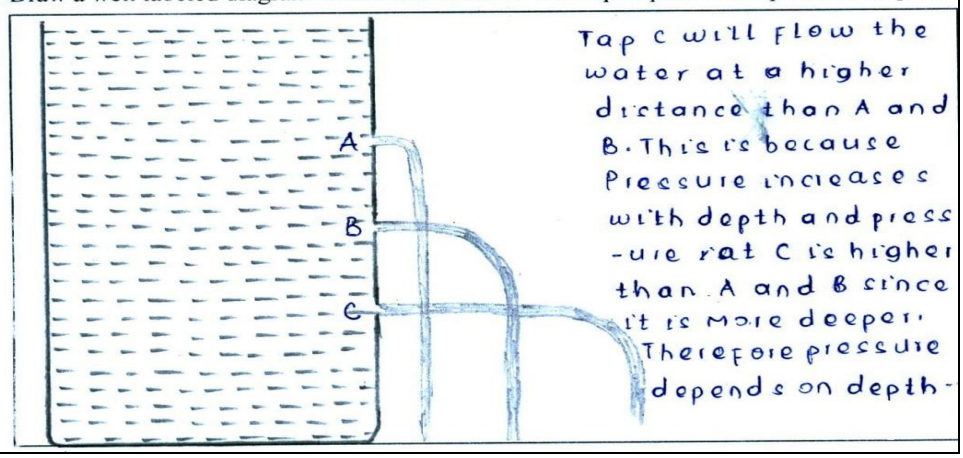
(iii) U-tube..it's used to measure the density of immiscible liquids:.....

(iv) Barometer .used to measure atmospheric pressure:.....
.....

(b) Why a big Elephant manage to walk comfortably in mad soil without sinking while human being may sink easily?

This implies to the concept of pressure that the larger the surface area in contact, the smaller the pressure and vice versa. Elephant foot has a larger surface area compared to human being's hence the pressure between it's foot and the ground is low enabling it to walk comfortably.

(c) Draw a well labeled diagram which demonstrates that liquid pressure depends on depth.



Extract 9.2: A sample of the students' good responses in Question 9

Extract 9.2 indicates the work of the student who had adequate knowledge on the concept of pressure as he/she provided precise and correct answers to each part of the question.

2.3.2 Question 10: Current Electricity

The question had three parts (a), (b) and (c). In part (a), students were required to mention the uses of current electricity, and (b) they were required to explain why it is advised to connect bulb in parallel arrangement during installation of electricity in most buildings. Part (c) required them to draw a well labelled circuit to show series connection of resistor R, a battery B of two cells, a switch K, an ammeter A and rheostat S as well as a voltmeter V across the resistor R to verify Ohms law in the laboratory.

The question was performed by 568,195 (100%) students out of which 84.1 percent scored from 0 to 2.5 marks, 12.4 percent scored from 3.0 to 6.0 marks, and 3.5 scored from 6.5 to 10.0 marks. This shows that the performance in this question was poor as 15.9 percent of the students scored from 3.0 to 10.0 marks as summarized in Figure 10.

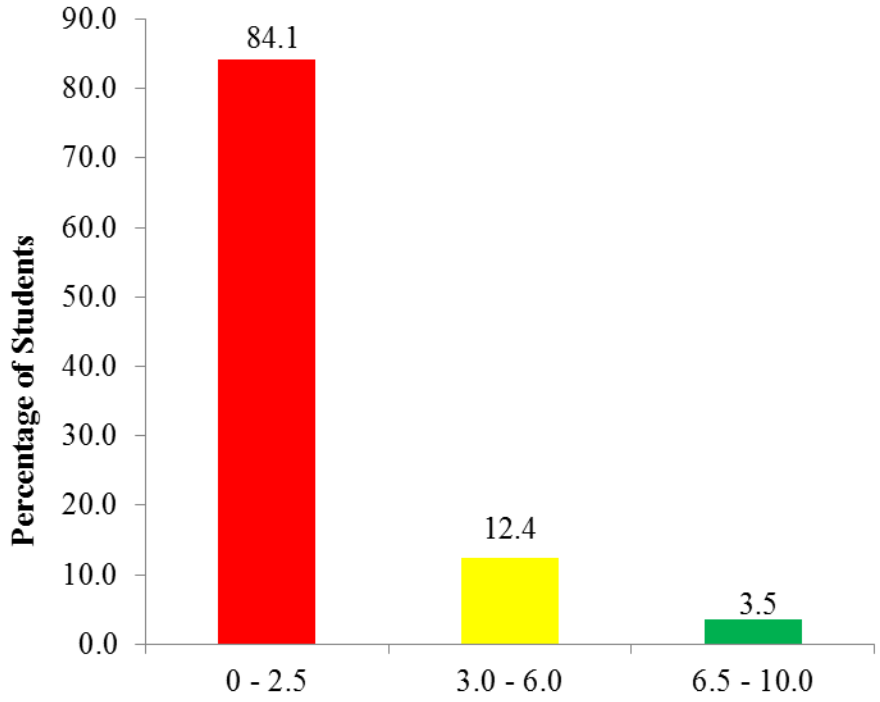
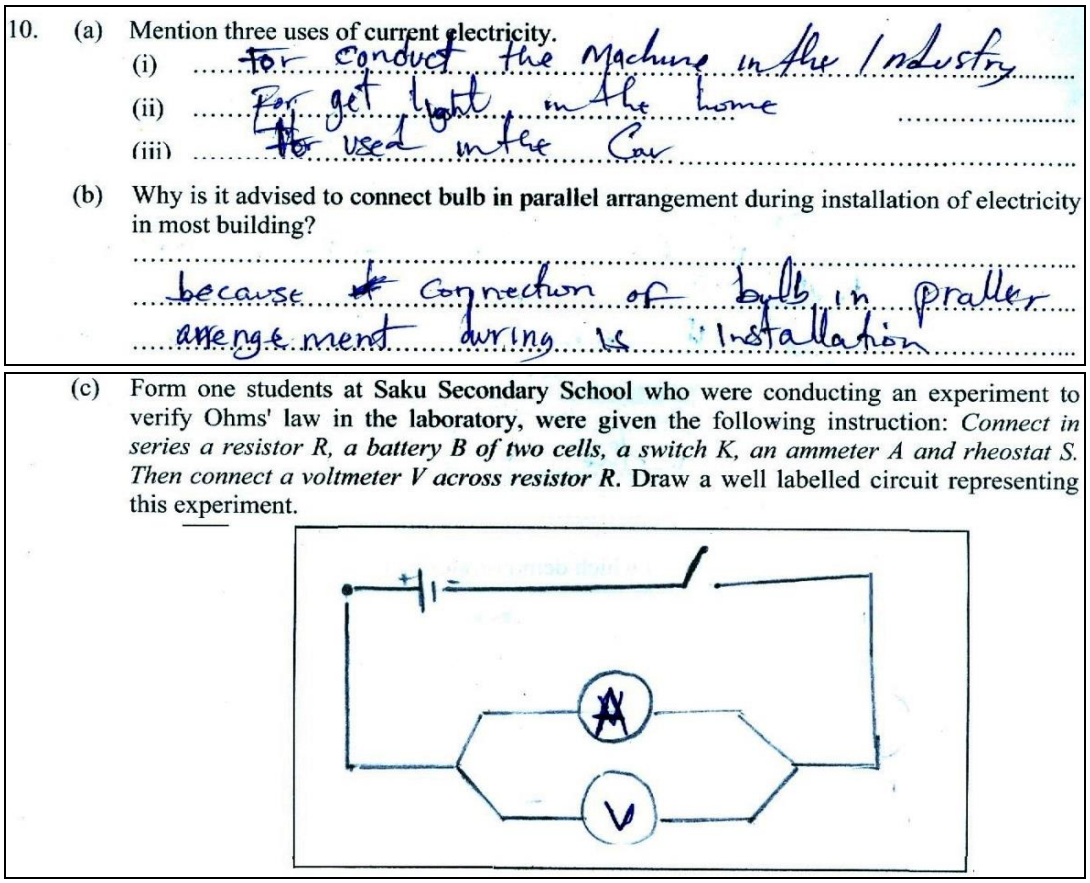


Figure 10: *Distribution of students' scores in Question 10*

The students who performed poorly in this question were unable to list specific uses of current electricity. They provided general applications of current electricity like *used to run machines or used in industries, used for domestic purposes, in steady of specific ones like used for lighting, communication, cooking, heating, and ironing.* In part (b), most of them failed to explain that parallel arrangement of bulbs is preferred because *the same potential difference of the source is applied across the bulb regardless of the number of bulbs. Also even if one bulb has defect it does not affect others.* In part (c), majority of the students drew poor circuit and failed to use required electrical symbols. Extract 10.1 shows the sample responses from one of the students who provided incorrect responses in this question.

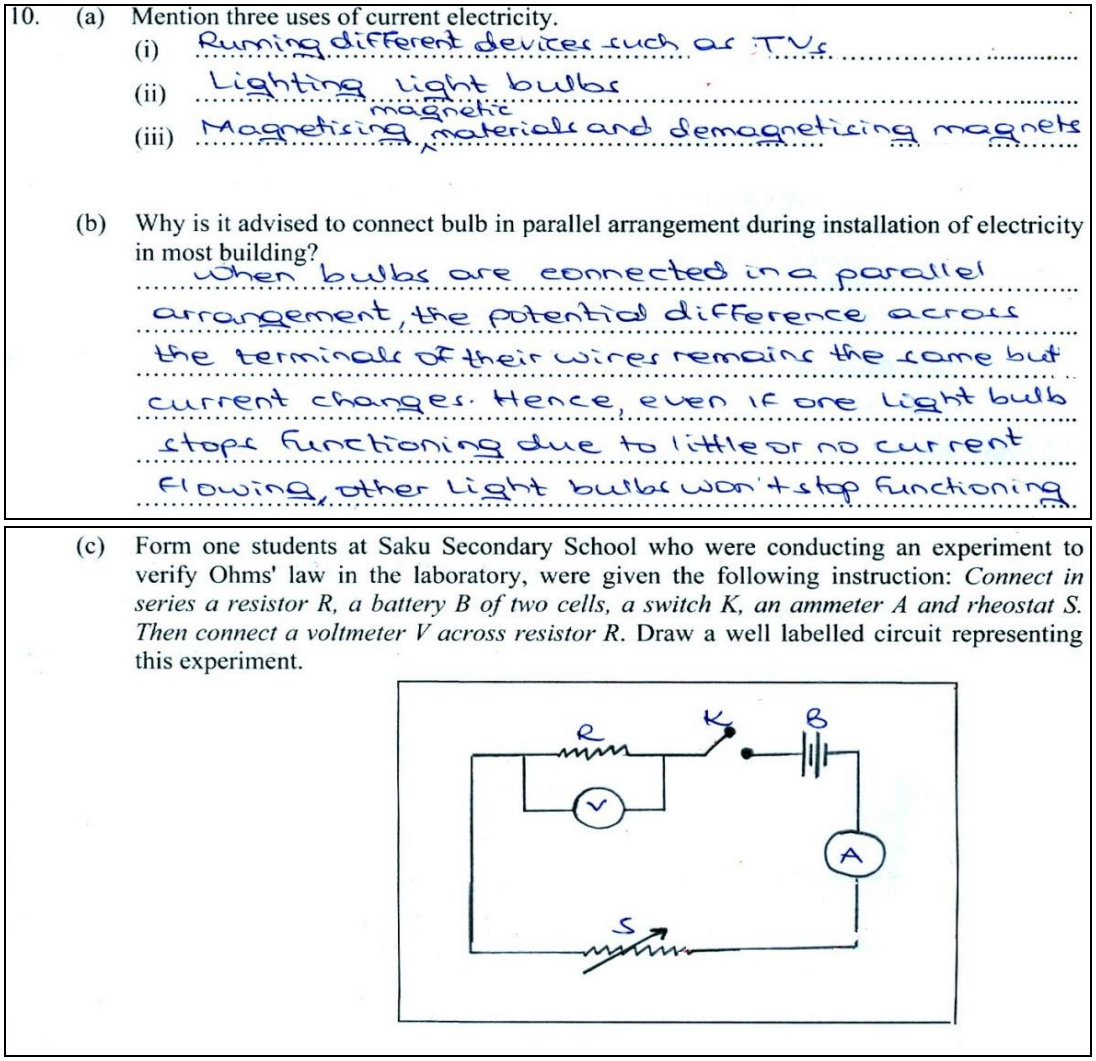


Extract 10.1: A sample of students' poor responses in question 10

Extract 10.1 shows that the student provided incorrect responses including poor circuit diagram showing parallel connection of ammeter and voltmeter instead of series connection of the given devices.

Nevertheless, a few students were able to state the specific uses of current electricity, explained correctly the reasons why parallel arrangement of bulbs is

preferred than series arrangement during installation of electricity. In explaining this, one candidate wrote *because when you switch one bulb on or off does not affect other bulbs. Similarly, the full potential difference of the source is applied across each bulb regardless of the number of the bulbs and loss of power is minimum*. Also they were able to use correct electrical symbols of given devices to draw the required circuit in part (c). Extract 10.2 shows a sample of good responses in this question.



Extract 10.2: A sample of student's good responses in Question 10

In extract 10.2, the student stated correctly the uses of current electricity, provided clear reasons in part (b), and drew a neat and well labelled circuit to verify Ohm's law.

3.0 ANALYSIS OF STUDENT'S PERFORMANCE

3.1 Student's Performance in each Topic

The Physics paper had ten (10) questions extracted from various topics of form I and form II basing on the Form Two National Assessment Format issued in 2017. The analysis of performance shows that the students' performance for Questions 1 and 2 was good since the percentage of the students who passed were 75.3 and 75.6 respectively. Question 1 was set from the various topics of *Introduction to Physics*, *Introduction to Laboratory Practice*, *Measurement, Work, Energy* and *Power*, *Light*, *Static electricity*, *Current electricity*, *Magnetism, Forces in Equilibrium, Simple Machines, Motion in a Straight Line, Newton's Laws of Motion*, *Temperature* and *Sustainable Energy Sources*. Question 2 was a homogeneous matching item that was composed from the topic of *Measurement*.

Question 4 constructed from the topic of *Work, Energy and Power* was the only one done at a standard of average performance.

Furthermore, the analysis shows that, seven (7) questions had poor performance, as majority of the students scored marks below 30 percent in each question. These questions were Question 3 which required the students to fill in the blank space items constructed from the topics of *Measurement*, *Simple Machines*, *Newton's Laws of Motion*, *Light* and *Structure and Properties of Matter*. Others were Question 5 composed from the topics of *Motion in a Straight Line* and *Newton's laws of Motion*, Question 6 which was constructed from the topic of Pressure, Question 7 from the topic of *Light*, Question 8 set from the topic of *Forces in Equilibrium* and Question 9 from the topic of *Pressure* and Question 10 extracted from the topic of *Current Electricity*. Appendix 1 summarizes the students' performance in each topic indicated by red, yellow and green colours to represent weak, average and good performance respectively as shown in Appendix 1.

3.2 Comparison of Students' Performance between 2018 and 2019 in Terms of Topics

The comparison of students' performance in terms of topics tested in FTNA 2018 with that of 2019 reveals that there was a drop in performance to most of the topics tested. The multiple choice question set from various topics in Question 1 shows an incredible drop in performance from 89.1 percent in 2018 to 75.2 percent in 2019.

Likewise, the significant drop in performance was observed in the topic of *Work, Energy* and *Power* in which the students' performance in 2018 was 71.4 percent (good) compared to 49.0 percent (average) in 2019. This rapid drop of performance

in this topic is an indicator that teachers and students need to take deliberate measures to improve the performance. Further analysis reveals that most of the topics tested in 2018 and 2019 still need to be thoroughly reviewed in terms of teaching and learning techniques to improve the students' performance. These topics include: *Pressure* whose performance was 14.4 percent in 2018 as compared to 18.6 percent in 2019; *Current Electricity* whose performance was 18.1 percent in 2018 but dropped to 15.9 percent in 2019; *Forces in Equilibrium* whose performance was 14.0 percent in 2018 and 14.3 percent in 2019 showing an insignificant improvement; *Motion in a Straight Line* whose performance was 20.9 percent in 2018 but dropped in performance to 12.5 percent in 2019.

Another discouraging poor performance was observed in Question 3 constructed from various topics whose performance was 5.6 percent in 2018 and 9.8 percent in 2019. The topics composed in this question were: *Measurement, Newton's Laws of Motion, Light* and *Structure and Properties of Matter*. See Appendix 2.

Further analysis shows that 13,662 (2.7%) students scored an A in 2018 as compared to 26,738 (4.7%) students who scored an A in 2019, being a significant rise of 2.0 percent in performance. However, 15,298 (3.0%) students scored a B grade in 2018 while in 2019, 21,307 (3.8%) students scored the same grade. Further, in 2018, 61,233 (12.2%) scored a C grade whilst in 2019, 70,227 (12.4%) attained a C grade showing a slight increase in performance. Moreover, the analysis in terms of grade portrays that 150,822 (30.0%) students scored a D grade in 2018 as compared to 167,263 (29.5%) scored the same grade in 2019. Finally, 160,991 (52.0%) students scored an F grade in 2018 whereas in 2019, 282,349 (49.7%) scored the same grade showing a significant improvement by 2.3 percent.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

The analysis of students' responses reveals that, the general performance of the students was average. This shows that various challenges affected the performance of the students in this paper. One of them was inadequate knowledge on the concepts of different topics as a result; most of students failed to answer some items or provided irrelevant responses. For example, they showed inadequate knowledge on the topics of Motion in a Straight Line and Newton's Laws of Motion, Pressure, Light, Current Electricity and Forces in Equilibrium. In these topics, the students lacked the anticipated knowledge which could have helped them to attempt the questions correctly. Most of them did only some parts of the questions at the same time skipping others.

Another obstacle was Poor English Language Proficiency in understanding the demands of the questions in conjunction with responding to questions which required brief or detailed explanations. Majority of students deemed to fail explaining the concepts that demanded justification due to poor English language command. This caused most of students fail to organize their answers and ended up with lack of logical flow of statements or mixed tenses hence, their responses lacked coherence of important ideas. This was observed in Question 5, 9 and 10.

Further analysis reveals that lack of numerical skills affected the performance of most of students in items which required calculations. Majority of students were found to lack Mathematics skills as they failed to establish formulae which comply with a given task in the question. This problem caused the students fail to manipulate the information given hence, came up with incorrect calculations using erroneous formulae. This shortcoming was observed in Question 4, 5, 6, 7 and 8.

In addition, lack of drawing skills was also a great challenge to some students as they failed to design and draw the diagrams relating to the required concepts. Some students drew the diagrams which are not relating to the topics given in the questions or drew poor diagrams with unwanted labelling. This drawback was found in Question 9 and 10, where the students were asked to draw well labelled diagrams for demonstrating that liquid pressure depends on depth and a circuit representing an experiment to verify Ohm's law respectively, instead they drew irrelevant diagrams and labelling.

This report has provided feedback and recommendations that will help to overcome the observed challenges. It is expected that, teachers, students and stake-holders will take necessary measures to improve the students' performance in future Physics' Form Two National Assessment.

4.2 Recommendations

In order to improve the students' performance in the future, the following recommendations should be taken into account:

(a) Taking into reference to the topics which the students have performed poorly such as: Motion in a Straight Line and Newton's Laws of Motion, Pressure, Light, Forces in Equilibrium and Current Electricity, the following teaching and learning strategies should be adhered to:

(i) The teacher should stimulate the students through questions and answers, group discussions and gallery walk presentations to

brainstorm the different types of Simple Machines such as Levers, Pulleys, Incline planes, screw-jacks, Bicycle wheel-and-axle and Model of hydraulic press.

(ii) The teacher should guide students through demonstrations, think-pair share, reciprocal-teaching and questions and answers techniques to discuss the motion under gravity and all the parameters in the topic of Motion in a Straight Line by using Balls, Stones, Trolleys, Ticker-tape timer and velocity-time graph.

(iii) The teacher should guide students through investigation, group discussion and gallery walk presentation to apply the principle of moments and describe the states of equilibrium in the topic of Forces in Equilibrium.

(iv) The teacher through inquiry deductive, demonstrations and question and answer techniques. He/she should assist students to perform an experiment to verify Ohm's law by using bulbs, bulb holders, Connecting wires, Ammeter, Voltmeter, Battery, Switch and Resistor in the topic of Current Electricity.

(v) The teacher should lead students to carry out an experiment to investigate the laws of reflection of light and describe the images formed by plane mirrors using Rays box, Plane mirror, Protractor, Ruler, Soft board, Optical pins, Source of light and Plane paper.

(vi) The teacher should also support students to examine the variation of pressure with depth in liquids and derive the formulae $P = h\rho g$ by using cans with holes punched at different depths, water and buckets in the topic of pressure.

(b) Practicals should be part and parcel of teaching and learning Physics in order to develop their learning interests and improve students' understanding.

(c) Students should be provided with enough learning tasks and exercises in order to build their skills and competences on the subject matter.

(d) Students should work hard on attaining Mathematical skills so as to solve problems involving Mathematical concepts.

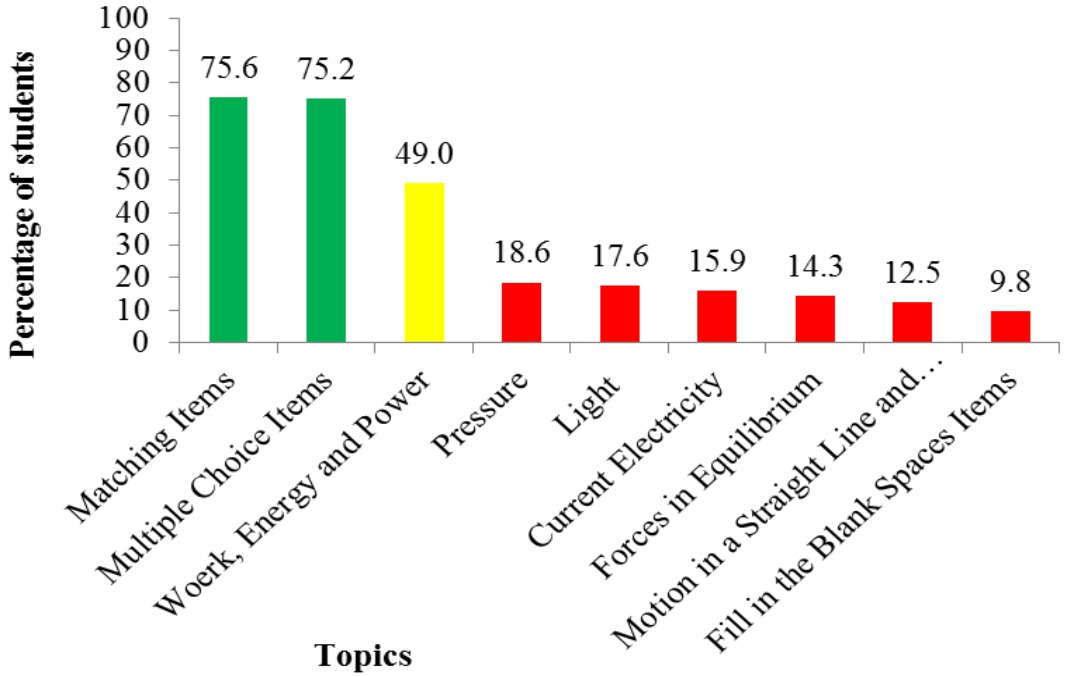
(e) Teachers should guide students towards mastering of English language in both writing and speaking through various techniques including checking and correcting grammatical error in their note books.

(f) The government and other official administrators should make sure that in schools teaching and learning materials, resources and teachers are available in a reasonable standard in order to improve the implementation of the curriculum.

Appendices

Appendix 1

STUDENTS' PERFORMANCE IN EACH TOPIC



Appendix 2

COMPARISON OF THE STUDENTS' PERFORMANCE IN EACH TOPIC BETWEEN 2018 AND 2019

S/n.	Topic	2018 ASSESSMENT PAPER			2019 ASSESSMENT PAPER		
		Question Number	Percentage of Students Who Scored an Average of 30 Percentage or Above	Remarks	Question Number	Percentage of Students Who Scored an Average of 30 Percentage or Above	Remarks
1	Measurement				2	75.6	Good
2	Introduction to Physics, Introduction to Laboratory Practice, Measurement, Work, Energy and Power, Light, Static electricity, Current electricity, Magnetism, Forces in Equilibrium, Simple Machines, Motion in a Straight Line, Newton's Laws of Motion, Temperature and Sustainable Energy Sources.	1	89.1	Good	1	75.2	Good
3	Work, Energy and	5	71.4	Average	4	49.0	Average

S/n.	Topic	2018 ASSESSMENT PAPER			2019 ASSESSMENT PAPER		
		Question Number	Percentage of Students Who Scored an Average of 30 Percentage or Above	Remarks	Question Number	Percentage of Students Who Scored an Average of 30 Percentage or Above	Remarks
	Power						
4	Pressure	6 &9	14.4	Weak	6 & 9	18.6	Weak
5	Light				7	17.6	Weak
6	Current Electricity	10	18.1	Weak	10	15.9	Weak
7	Forces in Equilibrium	4	14.0	Weak	8	14.3	Weak
8	Motion in a Straight Line	7	20.9	Weak	5	12.5	Weak
9	Measurement, Simple Machines, Newton's Laws of Motion, Light and Structure and Properties of Materials	3	5.6	Weak	3	9.8	Weak

Appendix 3

COMPARISON OF STUDENTS' PERFORMANCE BETWEEN 2018 AND 2019 IN TERMS OF GRADES