

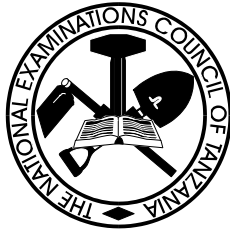
THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



**PRIMARY SCHOOL LEAVING EXAMINATION (PSLE)
ITEMS RESPONSE ANALYSIS BOOKLET FOR THE
YEAR 2015**

SCIENCE

THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



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PREFACE

This report on analysis of Examinees' responses to the Primary School Leaving Examination (PSLE 2015) questions in Science subject has been prepared to give feedback to students, teachers, policy makers, curriculum developers and other education stakeholders on how examinees responded to examination items. Candidates' responses in the examination items is one of the indicators of what the students were able to attain and what they did not manage to learn successfully in the seven-year period of primary education.

In this report, various factors which led to the candidates' inability to answer the examination questions correctly are identified. The analysis indicates that, the following factors contributed to the candidates' failure to provide correct answers: inability to identify the demands of the questions; inadequate knowledge in the respective topics; inability to relate the respective topics to everyday life situations. An analysis of each item was conducted and the weaknesses observed in answering question were identified.

The Examinations Council believes that, the feedback provided will enable the different stakeholders in education to take the necessary steps in improving the teaching and learning process, for the purpose of eliminating the shortcomings identified in this report. In addition, the Council is of the opinion that if the recommendations given in this report are thoroughly implemented the knowledge and skills acquired by the students completing primary education will be enhanced, and eventually, the pass rate in the future primary school leaving examination will increase.

Finally, the National Examinations Council of Tanzania would like to express sincere gratitude to the Examination Officers and all others who contributed to the preparation of this report. The Council will appreciate any fruitful comments and recommendations from teachers, students and other education stakeholders aiming at improving the quality of future reports.



Dr. Charles E. Msonde
EXECUTIVE SECRETARY

1.0 INTRODUCTION

The Science Examination Paper in the Primary School Leaving Examination (PSLE) was held on the 9th September 2015. The number of candidates who sat for the examination was 763,417 equivalent to 98.47 percent of those who were registered. Analysis of candidates' performance in the Science subject indicates that 550,486 (72.11%) candidates passed the examination. This performance indicates an increase of 29.99 per cent when compared with PSLE 2014.

The Primary School Leaving Examination (PSLE) for the year 2015, for Science subject consisted of 50 questions from various topics and candidates were required to answer all questions. The candidates were instructed to choose the correct answer and shade the respective letter on the answer sheet provided. Candidates' answers for each item are analyzed based on the options A, B, C, D, E and possible reasons for the choice of each option are provided. The letter of the correct answer has been marked with an asterisk (*). Furthermore, the number and percentage of candidates who either chose more than one option or did not attempt the respective question has been presented in this analysis under the heading 'others' as indicated in the respective tables and figures.

2.0 ANALYSIS OF CANDIDATES' ANSWERS

Question 1: Which of the following groups represent characteristics of living organisms?

- A Dying, feeding and seeing.
- B Dying, reproducing and changing colour.
- C To respire, to respond and hearing.
- D To respire, to reproduce and walking.
- E To move, to respire and reproduce.

Table 1: Number and Percentage of Candidates in each Option

Option	A	B	C	D	E*	Others
No. of candidates	46,684	35,712	102,147	72,488	504,419	1,969
% of candidates	6.12	4.68	13.38	9.50	66.07	0.26

The question intended to test candidates' understanding of the various characteristics of living things. **Table 1** shows that, the candidates' performance in this question was good.

A total of 504,419 (66.07%) candidates chose E "To move, to respire and reproduce" which was the correct answer. This is an indication that, candidates had enough understanding of the various characteristics of living things. A total of 257,031 candidates (33.68%) chose among distractors A "Dying, feeding and seeing", B "Dying, reproducing and changing colour", C "To respire, to respond and hearing" and D "To respire, to reproduce and walking". Those candidates were attracted by the distractors because they a mixture of mixtures of characteristics of all living things and non living things. For example seeing, change of colour, hearing and walking are characteristics of some living things and not characteristics of all

living things. Furthermore 1,969 candidates (0.26%) either did not answer the question or chose multiple answers.

Question 2: Why hybrid species of both animals and plants are better?

- A They elongate and do not need fertilizers.
- B They produce quality product and resist diseases.
- C They mature early and yield strong production.
- D They do not need nutrients and resist diseases.
- E They mature early and do not need medicine.

Table 2: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
No. of candidates	111,668	292,318	205,389	69,453	81,020	3,571
% of candidates	14.63	38.29	26.90	9.10	10.61	0.47

The question tested the candidates' understanding on the importance of applying hybrid seeds in animals and plants. The general performance of candidates in this question was weak as shown in **Table 2**.

A total of 292,318 candidates (38.29%) chose the correct answer B "They produce quality product and resist diseases" because they remembered the major aim of using hybrid seeds which is to get more produces capable of resisting diseases. A total of 262,141 candidates (34.34%) chose among distractors A "They elongate and do not need fertilizers", D "They do not need nutrients and resist diseases" and E "They mature early and do not need medicine". Those candidates' failed to recognize that even hybrid seeds require

fertilizer, nutrients together with chemical treatment in order to grow and give quality yields. Those candidates were attracted by such distractors due to the fact that hybrid seeds resist diseases and mature early if they are prepared for the harsh conditions. The 26.90 percent of the candidates, who chose C “They mature early and yield strong production” were attracted by this distractor because maturing early, yielding heavy strong produces are among the characteristics of certain types of hybrid seeds. Those candidates forgot that such a fact is not the major objective of using hybrid seeds. However 3,571 candidates (0.47%) chose no option or indicated multiple answers.

Question 3: Which of the following groups are the characteristics used to identify animals that belong to reptiles?

- A Laying eggs, cold blood and living in water.
- B Laying eggs, living in water and terrestrial life.
- C Laying eggs, warm blood and terrestrial life.
- D Laying eggs, cold blood and respire by use of fins.
- E Laying eggs, respire by use of skin and living in water

Table 3: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
No. of candidates	178,276	274,060	153,900	96,435	56,539	4,209
% of candidates	23.35	35.90	20.16	12.63	7.41	0.55

The question intended to measure the candidates' ability in applying the knowledge of classification in various animal groups. **Table 3**

shows that, the general performance of candidates in this question was weak.

About 35.90 percent of the candidates managed to choose the correct answer B “Laying eggs, living in water and terrestrial life”. Those candidates had enough knowledge on the characteristics of the various animal groups. The remained candidates (63.55%) chose among distractors A “Laying eggs, cold blood and living in water”, C “Laying eggs, warm blood and terrestrial life”, D “Laying eggs, cold blood and respire by use of fins” and E “Laying eggs, respire by use of skin and living in water”. Those candidates lacked knowledge that there are species of reptiles which inhabit in water and those inhabiting in land. Furthermore, not all reptiles respire by use of gills or skin. Other candidates, 4,209 (0.55%) either did not answer this question or chose more than one answer.

Question 4: Blood takes in oxygen and gives out carbon dioxide through

- A Airsac
- B Walls of the lungs
- C Epiglottis
- D Capillaries
- E Nose.

Table 4: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
No. of candidates	250,860	194,406	40,277	149,295	124,699	2,882
% of candidates	32.86	25.47	5.28	19.56	16.33	0.51

The question intended to assess candidates' understanding on the functions of blood in the human body. **Table 4** shows that the general performance of candidates in this question was weak.

A total of 250,860 candidates (32.86%) chose the correct answer A "Airsac". Those candidates understood that the function of airsac is to allow exchange oxygen and carbon dioxide to occur. Many candidates 508,677 (66.64%) were attracted by among distractors B "Walls of the lungs", C "Epiglottis", D "Capillaries" and E "Nose" because all these parts are found in the respiratory system. Such candidates failed to understand that those parts are not involved in the transport of oxygen or carbon dioxide in the human body. Besides, 2,882 candidates (0.51%) either did not answer this question or chose more than one option.

- Question 5:** The absence of chlorophyll in a plant may lead to
- A lack of iodine in the plant
 - B failure of the plant to synthesize food
 - C drying of the plant leaves
 - D plant leaves becoming yellow
 - E shading off the plant leaves.

Table 5: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
No. of candidates	71,891	415,352	85,112	120,838	65,791	4,4356
% of candidates	9.42	54.41	11.15	15.83	8.62	0.58

The question tested candidates' understanding on the importance of chlorophyll in plants. **Table 5** shows that, the general performance of candidates in this question was average.

More than a half of the candidates (415,352) equivalent to 54.41 percent chose the correct answer B “failure of the plant to synthesize food”. Those, candidates had enough understanding that chlorophyll is the part which is responsible for the synthesis or manufacture of plant food. On the other hand, 343,632 candidates (45.02%) chose among distractors D “plant leaves becoming yellow”, C “drying of the plant leaves”, A “lack of iodine in the plant” and E “shading off the plant leaves” due to the fact that, they had no enough knowledge on the functions of chlorophyll in plants. Furthermore, of the 4,435 candidates (0.58%), some chose no answer and others chose more than one option.

Question 6: Phototropism is a process whereby a plant grow towards

- A Light
- B Gravitational force
- C Water
- D Darkness
- E Chemicals.

Table 6: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
No. of candidates	565,181	56,001	75,350	27,093	36,455	3,339
% of candidates	74.03	7.34	9.87	3.55	4.78	0.44

The question tested candidates’ knowledge on the concept of movements in plants. Candidates were required to identify the correct meaning of phototropism. The general performance in this question was good as shown in **Table 6**.

Statistics in Table 6 indicates that (74.03%) chose A “Light” which was correct answer. This shows that those candidates had enough knowledge on the types of movements in plants. This performance suggests that candidates learned by doing relevant activities in this topic. For example, candidates grow maize, beans or cow peas in given tins placed in dark area and a hole is made to allow light to penetrate and observe the behavior of the movement of growth of the plants. The results of the plants growing towards the hole which allow light to penetrate is known as phototropism. Furthermore, a total of 194,899 (25.54%) candidates chose among the distractors B “Gravitational force”, C “Water”, D “Darkness” and E “Chemicals” because, they failed to differentiate between various movements exhibited by plants. However, 3,339 candidates (0.44%) either did not answer this question or chose more than one answer.

Question 7: Part of a cell responsible for coordinating all cell activities is called

- A Cytoplasm
- B Vacuole
- C Chloroplast
- D Cell membrane
- E Nucleus.

Table 7: Number and Percentage of Candidates in each Option

Option	A	B	C	D	E*	Others
No. of candidates	158,224	63,233	61,899	161,747	313,760	4,556
% of candidates	20.73	8.28	8.11	21.19	41.10	0.6

The question tested candidates' understanding of the structure and functions of the various parts of a cell. **Table 7** shows that the general performance of candidates in this question was average.

The number of candidates who chose the correct answer E "Nucleus" was 313,760 (41.10%). Those candidates had good understanding structure and functions of different parts of the cell. Furthermore, they understood that the nucleus controls all functions of the cell. Statistics shows that 21.19 percent of the candidates chose distractor D "Cell membrane" because they did not understand its functions. The cell membrane allows water, air and foods to enter into the cell and waste products to get out of the cell. The 158,224 candidates (20.73%) chose A "Cytoplasm" due to the fact that because it is a part where chemical changes occur. Other candidates, 63,233 (8.28%) chose B "Vacuole" because they did not understand that some of the functions of vacuole is to store food and body wastes. Besides, 61,899 (8.11%) who chose C "Chloroplast" did not understand that chloroplast is a part of plant cell where synthesis or manufacture of plant food occurs. In addition, 4,556 candidates (0.6%) either did not answer this question or chose more than one answer.

Question 8: The following figure shows living things which are poisonous **except**:

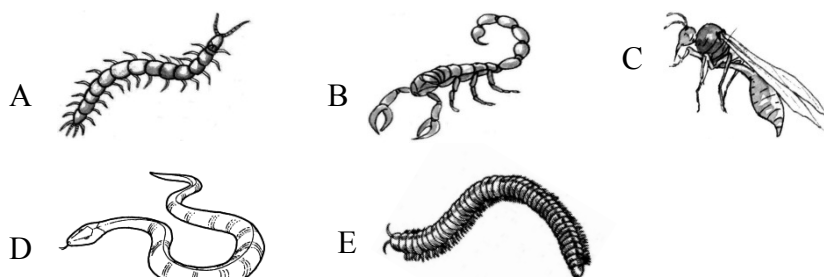


Table 8: Number and Percentage of Candidates in each Option.

No. of candidates	A	B	C	D	E*	Others
% of candidates	26,994	20,664	127,156	50,086	534,879	3,640
No. of candidates	3.54	2.71	16.66	6.56	70.06	0.47

The question tested the ability of the candidates to identify an organism which is poisonous among the group of animals given. **Table 8** shows that, the general performance of candidates in this question was good.

The majority of candidates (534,879) chose the correct answer E (Millipede) because they understood that among the living things mentioned only millipede has no poison. On the other hand, a total of 224,900 candidates (29.47%) chose among distractors A (Centipede), B (Scorpion), C (Wasp) and D (Snake). Those candidates did not understand the demand of the question; hence they chose the answer with poisonous organisms. Besides, 3,640 candidates (0.47%) either did not answer this question or chose more than one answer.

Question 9: The action of plants to transport water from roots to the leaves is known as

- A Osmosis
- B Diffusion
- C Push
- D Pressure
- E Movement.

Table 9: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
No. of candidates	472,767	104,104	71,148	32,833	78,640	3,927
% of candidates	61.93	13.64	9.32	4.30	10.30	0.51

The question intended to test candidates' understanding on absorption and movement of water in plants. **Table 9** shows that, the general performance of candidates in this question was good.

The majority of the candidates 472,767 (61.93%) chose the correct answer A "Osmosis". Those candidates had enough understanding on osmosis which is the action of transport of water due to difference in salt solution from the roots to the leaves. The 104,104 candidates (13.64%) chose B "Diffussion" due to the fact that they did not know that, diffusion is the movement molecule from an area of high molecular concentration to low molecular concentration. On the other hand, 78,640 candidates (10.30%) chose E "Movement" due to the fact that; they failed to differentiate osmosis from movement. However a total of 103,981 candidates (13.62%) chose among distractors C "Push" and D "Pressure" without understanding that those were not the ways by which water is transported by plants. Either, few candidates (0.51%) chose no answer or chose more than one answer.

Question 10: Which among the following glands control the activity of other glands in the human body?

- A Pancreas.
- B Pituitary.
- C Thyroid.
- D Adrenaline.
- E Parathyroid.

Table 10: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
No. of candidates	106,375	483,479	45,428	79,798	44,405	3,934
% of candidates	13.93	63.33	5.95	10.45	5.82	0.51

The question intended to assess the ability of candidates in analyzing the types and functions of glands in the human body. The general performance of candidates in this question was good as shown in **Table 10**.

According to the data shown, majority of candidates, 483,479 (63.33%) managed to choose the correct answer B “Pituitary” indicating that, they understood the functions of pituitary in the human body. The functions include to release various hormones which stimulate other glands to produce hormones needed in the various body functions. Other candidates 106,375 (13.93%) chose A “Pancreas” as a result of not understanding that the function of pancreas is to produce insulin hormone that is responsible for regulation of sugar in a body. Data show further that, 169,631 candidates (22.22%) who chose among distractors C “Thyroid”, D “Adrenaline” and E “Parathyroid” did not understand the demand of the question which asked about the gland that coordinates the functions of other glands, hence chose the option C, D and E. Furthermore, few candidates 3,934 (0.51%) either did not answer this question or chose more than one option.

Question 11: The female part of flower which is responsible for reproduction is

- A Stamen
- B Style
- C Ovary
- D Petal
- E Sepal.

Table 11: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
No. of candidates	49,641	67,182	565,099	43,505	34,710	3,282
% of candidates	6.5	8.8	74.02	5.7	4.55	0.43

The question intended to measure the knowledge of the candidates on the parts of plant responsible for reproduction. **Table 11** shows that, the general performance of candidates in this question was good.

The majority of the candidates (74.02%) chose the correct response C “Ovary”, suggesting that they were knowledgeable on parts of the flower responsible for reproduction. The proportion of candidates who chose among distractors A “Stamen” and B “Style” was 15.3 percent. Such candidates failed to recognize that stamen and style are both male parts of the flower. Few candidates (10.25%) who chose among the distractors D “Petal” and E “Sepal” did not understand all the parts mentioned are parts of flower which are not responsible for reproduction. The remained, (0.43%) candidates either did not answer the question or chose multiple answers.

Question 12: The difference between a fruit and seed is

- A Seed has a fruit
- B A fruit can germinate
- C A fruit has two cotyledons
- D A seed can germinate
- E Seeds are not eaten.

Table 12: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
No. of candidates	55,906	36,306	190,765	359,121	116,646	4,675
% of candidates	7.32	4.76	24.99	47.04	15.28	0.61

The question tested candidates' ability in differentiating fruit from seeds in plants. The general performance of candidates in this question was average as shown in **Table 12**.

From the statistics, 47.04 percent of the candidates chose D "A seed can germinate" which was correct answer. This shows that, candidates had enough knowledge on the characteristics of fruit and seeds. The 24.99% candidates who chose C "A fruit has two cotyledons" were attracted by this option because they forgot that cotyledons are found in the seeds and not in the fruits. Moreover, 27.36% of the candidates who chose among the distractors A "Seed has a fruit", B "A fruit can germinate" and E "Seeds are not eaten" did not think throughly on the answers they chose. The few candidates (0.61%) either did not answer the question or chose multiple answers.

- Question 13:** Things which are important for health and life are
- A playing football, bathing, washing clothes, over feeding.
 - B eating, being clean, resting, playing.
 - C doing exercise, eating balanced meal, resting and being clean.
 - D eating eggs, recreation, sleeping, cleaning the environment.
 - E taking bath, eating, sleeping.

The question intended to measure candidates' ability on understanding the important things for the health and life of human being. The general performance of candidates in this question was good as shown in **Figure 1**.

A total of 622,937 candidates (81.6%) chose the correct answer C "doing exercise, eating balanced meal, resting and being clean". The 42,803 candidates (5.61%) who chose distractor B "eating, being clean, resting, playing" failed to recognize that eating is important, but the type of food and its quality are the important criteria. Those 28,934 candidates (3.79%) who chose distractor A "playing football, bathing, washing clothes and over feeding" did not understand that, too much eating and playing football do not make the body healthy. Such candidates did not understand that sports and proper eating habits depending on the needs of the person is more important for the health and life of human being. Few candidates (8.59%) who chose among distractors D "eating eggs, recreation, sleeping, cleaning the environment" and E "taking bath, eating, sleeping" failed to identify the essential aspects for health and life of human being. However, 3,183

candidates (0.42%) either did not answer the question or chose multiple options.

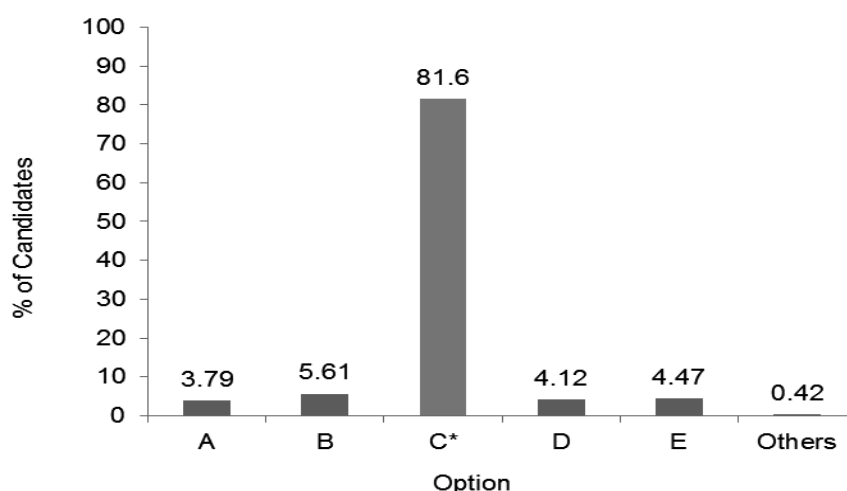


Figure 1: The response pattern shows that the performance in this question was good as many (81.6%) candidates chose the correct answer.

Question 14: Food rich in carbohydrate enable the body to

- A withstand diseases
- B become warm
- C grow rapidly
- D become energetic
- E become soft.

Table 13: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
No. of candidates	98,142	173,208	62,418	394,442	31,107	4,102
% of candidates	12.86	22.69	8.18	51.67	4.07	0.54

This question intended to measure candidates' understanding on the functions of various foods in the body. **Table 13** shows that, the general performance of candidates in this question was average.

Candidates who chose the correct answer D “become energetic” were 394,442 (51.67%). These candidates understood the functions of different types of food, hence identified carbohydrates as the one providing energy in human body. The 173,208 candidates (22.69%) who chose B “become warm” failed to understand that the type of food which gives heat to the human body is fat. Moreover, distractor A “withstand diseases” was chosen by 98,142 candidates (12.86%) who did not know that vitamins are types of foods which enhance body immunity. The 62,418 candidates (8.18%) who chose distractor C “grow rapidly” failed to understand that, the type of food which helps the body to grow is not carbohydrate but protein. Few candidates (31,107), equivalent to 4.07 percent chose distractor E “become soft” due to the fact that, they did not have enough knowledge on the functions of various types of foods in the human body. Lastly 4,102 candidates (0.54%) did not follow the instructions in answering this question hence left the question unanswered or chose more than one respons.

Question 15: Which of the following are non infectious diseases?

- A Malaria, colds and diabetes.
- B Asthma, diabetes and cholera.
- C Bilharzias, hookworm and rickets.
- D Diarrhea, typhoid fever and asthma.
- E Asthma, epilepsy and fowl pox.

Table 14: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
No. of candidates	124,709	105,074	280,413	174,028	74,970	4,225
% of candidates	16.34	13.76	36.73	22.80	9.82	0.55

The question intended to measure candidates' understanding of the different types of diseases. The candidates were required to identify non-infectious among the given list of diseases. The general performance of candidates in this question was weak as shown in **Table 14**.

The correct answer C “Bilharzias, hookworm and rickets” which was chosen by 36.73 percent of the candidates. These few candidates had enough knowledge on infectious and non infectious diseases. Those 62.72 candidates who chose A “Malaria, colds and diabetes” B “Asthma, diabetes and cholera” D “Diarrhea, typhoid fever and asthma” and E “Asthma, epilepsy and fowl pox” had inadequate knowledge about the types of diseases, hence failed to recognize that colds, diarrhea, typhoid fever and fowl pox are infectious diseases. Furthermore, few candidates (0.55%) either did not answer this question or chose more than one option.

Question 16: Why is it important to rest after work ?

- A The body cools.
- B The body experience comfort.
- C The body regains energy.
- D The body to perform other activities
- E The person is allowed to sleep.

Table 15: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
No. of candidates	98,684	187,830	321,838	94,344	56,884	3,839
% of candidates	12.93	24.60	42.16	12.36	7.45	0.50

The question tested candidates' ability to understand the importance of resting after doing work. **Table 15** shows that, the general performance of candidates in this question was average.

Many candidates (321,838) (42.16%) chose a correct answer C "The body regains energy". Such candidates had enough knowledge about the importance of resting after work. The 437,742 candidates (57.34%) who chose distractors A "The body cools", B "The body experience comfort" D "The body to perform other activities" and E "The person is allowed to sleep" lacked knowledge about the concept of "rest after work" since the purpose of resting after work is not to cool, experience comfort, perform other activities or sleep. Few, 3,839 candidates either did not answer this question or chose more than one option.

Question 17: Diseases which can be prevented by vaccination are

- A Asthma, whooping cough, malaria and cholera
- B Tuberculosis, malaria, asthma and measles
- C Measles, diphtheria, tuberculosis and whooping cough
- D Malaria, measles, tuberculosis and cholera
- E Diphtheria, tuberculosis, AIDS and measles.

Table 16: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
No. of candidates	109,128	84,539	361,413	120,302	84,507	3,530
% of candidates	14.29	11.07	47.34	15.76	11.07	0.47

The question tested candidates' knowledge on diseases prevented by vaccine. As shown in **Table 16**, the general candidates' performance in this question was average.

The correct option C “measles, diphtheria, tuberculosis and whooping cough” was chosen by 361,413 (47.34%). Such candidates had enough knowledge on different methods of preventing diseases. A total of 398,476 (52.19%) candidates chose distractors A “asthma, whooping cough, malaria and cholera”, B “tuberculosis, malaria, asthma and measles, D “malaria, measles, tuberculosis and cholera” and E “diphtheria, tuberculosis, AIDS and measles” because they lacked knowledge that asthma, malaria cholera and AIDS can be prevented in other ways contrary to vaccination. Besides, 3,530 (0.47%) candidates either did not answer this question or chose more than one option.

Question 18: Residents of Mlalo eat beans, meat and rice. For better health, they need to add

- A Fish
- B Green vegetables
- C Chicken
- D Bread
- E Cowpea.

This question tested candidates' knowledge on various types of foods and their function in the human body. **Figure 2** shows that, the general performance of candidates in this question was good.

Most candidates (621,019) equivalent to 81.35 percent chose the correct answer B "Green vegetables". These candidates had enough knowledge on balanced diet because they knew that, the diet mentioned in the question can not be balanced without vegetables. Vegetables produce vitamins whose function is to produce body with immunity. Other candidates, 140,212 (18.37%) chose distractors A "fish", C "chicken", D "bread" and E "cowpea". These candidates did not understand that, fish, chicken and cow pea have common nutrients, that is protein, and bread has same nutrients as rice. Few candidates 2,180 (0.29%) chose no option or indicated multiple answers.

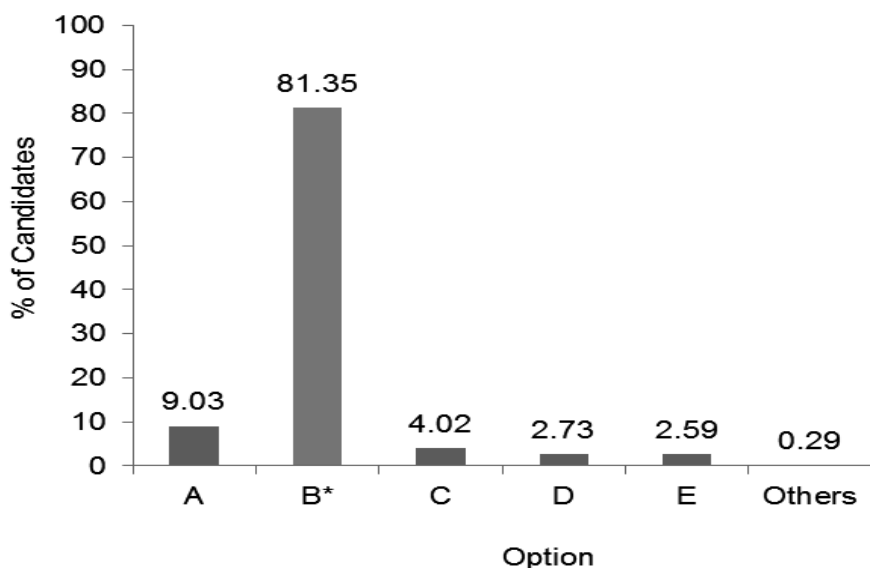


Figure 2: The figure shows that the performance in this question was good as many (81.35%) candidates chose the correct answer.

Question 19: Which among the following can be reduced from the body through participating in sports and exercises?

- A Sugar
- B Proteins
- C Poisons
- D Dirtiness
- E Fats.

This question tested knowledge from candidates on benefits of participating on sports and exercises. **Figure 3** shows that, the general performance of candidates in this question was weak.

A total of 211,227 (27.67%) candidates were able to choose the correct answer E “fats”. These candidates had knowledge on benefits of participating on sports and exercises this include, reducing accumulation of fats in the human body. Other candidates, 547,571 (71.73%) chose distracters A “sugar”, B “protein”, C “poisons” and D “dirtiness”. Such candidates lacked knowledge on things or foods which can be removed from the body through exercises. Few candidates 4,621 (0.61%) candidates did not follow the instruction in attempting this question, hence left it unanswered or chose more than one response.

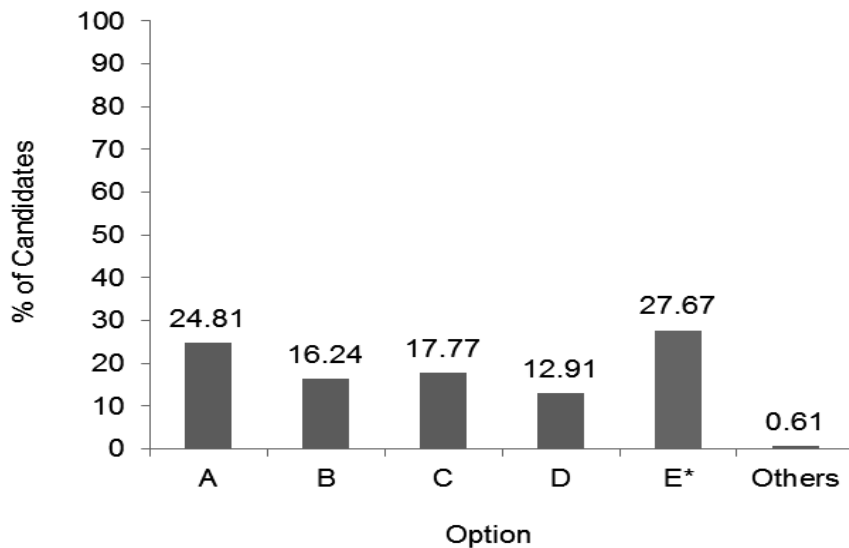


Figure 3: The figure shows that the performance in this question was weak as few (27.67%) chose the correct answer.

Question 20: Which of the following is **not** a proper way of preventing malaria disease?

- A Cutting grasses
- B Covering water swamp
- C Using mosquito nets
- D Spraying insecticides
- E Burning wastes.

Table 17: Number and Percentage of Candidates in each Option

Option	A	B	C	D	E*	Others
No. of candidates	122,106	93,699	83,183	120,186	339,102	5,143
% of candidates	15.99	12.27	10.9	15.74	44.42	0.67

This question measured the candidate's understanding on correct methods of preventing malaria disease. **Table 17** shows that, the general candidates' performance in this question was average.

A total of 339,102 (44.42%) candidates selected the correct answer E “burning wastes”. Such candidates had understanding on correct methods of preventing malaria disease, thus indicated that, burning wastes is not the correct methods of preventing malaria disease. Besides, 419,174 (54.90%) candidates selected distractors A “cutting grasses”, B “covering water swamp”, C “using mosquito nets” and D “spraying insecticides”. This shows that, such candidates did not understand the demand of the question; hence they chose the correct methods of preventing malaria disease instead of choosing improper method. Furthermore, 0.67 percent of the candidates chose no option or indicated multiple answers.

Question 21: Exercise is one of the methods of reducing

- A vomiting
- B fainting
- C muscle contraction
- D diarrhoea
- E nosebleeding.

Table 18: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
No. of candidates	34,976	78,993	559,657	27,952	57,756	4,085
% of candidates	4.58	10.35	73.31	3.66	7.57	0.54

This question intended to measure the candidate’s understanding on the provision of First Aid by using exercise methods. **Table 18** shows that, the general candidates’ performance in this question was good.

According to the statistics most of the candidates 559,657 (73.31%) were able to choose the correct answer which was C “muscle contraction”. This implies that, such candidates had appropriate knowledge of different methods of providing First Aid. On the other hand, a total of 199,677 (26.16%) candidates selected distractors A “vomiting”, B “fainting”, D “diarrhoea” and E “nose bleeding” because they had no understanding on importance of exercise on suppressing the problem of muscle contraction. In addition, those candidates did not understand that, all answers in distractors A, B, D and E are the problems which can not be solved through exercise. Few candidates (0.54%) either did not answer this question or chose more than one option.

Question 22: A child with rickets lack vitamin

A *K*

B *D*

C *A*

D *B*

E *C*.

Table 19: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
No. of candidates	160,471	359,321	86,243	70,745	82,054	4,585
% of candidates	21.02	47.07	11.30	9.27	10.75	0.6

This question measured the candidate's understanding on identifying the effects resulted from deficiency of vitamin in children. **Table 19** shows that, the general candidates' performance in this question was average.

Statistics indicated that 47.07 percent of the candidates chose correct option B “*D*”. These candidates had enough understanding on the importance of different vitamins, hence identified that, rickets is caused by lack of vitamin D. The candidates who selected distractor A “*K*” were 21.02 percent. These candidates lacked understanding on the functions of vitamin *K* which helps blood clotting when a person get injure and makes wound to heal quickly. Some candidates 86,243 (11.30%) were attracted by distractor C “*A*” failed to remember that, the function of vitamin *A* is to protect malnutrition and strengthen the ability of eye to see. Few candidates (9.27%) selected distractor D “*B*” due to lack of clear understanding that deficiency of vitamin B causes lack of energy in muscles, tiredness, and loss of memory and body weakness. Furthermore, 10.75 percent of the candidates selected E “*C*” due to lack of understanding that the function of vitamin *C* in the human body is to protect infection by reproducing white blood cell, protect heart infection and help the growth of cells. Furthermore, few candidates (0.6%) either did not answer this question or chose more than one option.

Question 23: Lack of vitamin B, lead to a disease called

- A Menengitis
- B Ulcers
- C Measles
- D Trachoma
- E Beriberi.

Table 20: Number and Percentage of Candidates in each Option

Option	A	B	C	D	E*	Others
No. of candidates	56,505	102,568	62,657	119,445	417,000	5,244
% of candidates	7.40	13.44	8.21	15.65	54.62	0.69

This question measured the candidates' understanding on the effects resulted from deficiency of vitamin and use the knowledge gained to identify the effects resulted from deficiency of vitamin B in the human body. **Table 20** shows that, the general candidates' performance in this question was average.

The correct option E “beriberi” was chosen by 417,000 (54.62%) candidates. These candidates had an understanding that beriberi is among the diseases caused by deficiency of vitamin B. Other candidates 119,445 (15.65%) selected distractor D “trachoma” due to lack of knowledge that, trachoma is a disease which affects eyes and is not caused by deficiency of vitamin B. Further, a total of 165,225 (21.65%) candidates selected distractors B “ulcers” and C “measles” due to lack of enough understanding on causative agent of ulcers and measles. Other candidates 56,505 (7.40%) selected incorrect option A “meningitis” due to lack of understanding on the effects resulted from deficiency of vitamin B in the human body. Few candidates 5,244 (0.69%) chose no option or indicated multiple answers.

Question 24: One of the advantages of protein foods in our bodies is

- A to protect against diseases
- B for the growth and repair cells
- C to provide energy
- D to increase weight

E to provide heat.

Table 21: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
No. of candidates	219,374	201,919	198,637	53,687	85,109	4,693
% of candidates	28.74	26.45	26.02	7.03	11.15	0.62

This question tested the candidates' understanding on the benefits of foods in the human body. **Table 21** shows that, the general candidates' performance in this question was weak.

A total of 201,919 (26.45%) candidates selected the correct answer B “for the growth and repair cells”. This shows that, the candidates had understanding on importance of protein in the human body. Other candidates, 219,374 (28.74%) were attracted by distractor A “to protect against diseases” due to the failure to understand that the benefits of protein. Furthermore, they failed to understand that, the types of foods which increase immunity against diseases is vitamin. The candidates who selected distractors C “to provide energy”, D “to increase weight” and E “to provide heat” were 337,433 (44.20%). These candidates failed to recall that, carbohydrates and fats provide energy, increase weight and increases heat in the body. Furthermore, 4,693 (0.62%) of the candidates chose no option or indicated multiple answers.

Question 25: What is first aid?

- A An emergency service given to a patient by a doctor.
- B Prior service given to a patient before being sent to hospital.
- C A service given for a person suffering from fire wound.
- D A service given to a person with bitten by snake.
- E A service given to a person with broken bones.

This question intended to measure the candidates' understand on the meaning of First Aid. **Figure 4** shows that, the general performance of candidates in this question was good.

The correct option B "prior service given to a patient before being sent to hospital" was selected by 86.39 percent of the candidates. This shows that, the candidates had enough understanding on the meaning of First Aid. The candidates who selected distractor A "an emergency service given to a patient by a doctor" were 4.25 percent. These candidates were attracted by this answer due to the presence of the word doctor, because he/she is the key person in handling patients. They failed to know that, First Aid is provided to a victim by any person who has knowledge on First Aid. The candidates who selected distractors C "a service given for a person suffering from fire wound", D "a service given to a person with bitten by snake and E "a service given to a person with broken bones" were 8.26 percent. These candidates lacked understanding that those responses did not reflect the meaning of First Aid. Rather, they were the accidents which require First Aid once they occur. Furthermore, 0.37 percent of the candidates chose no option or indicated multiple answers.

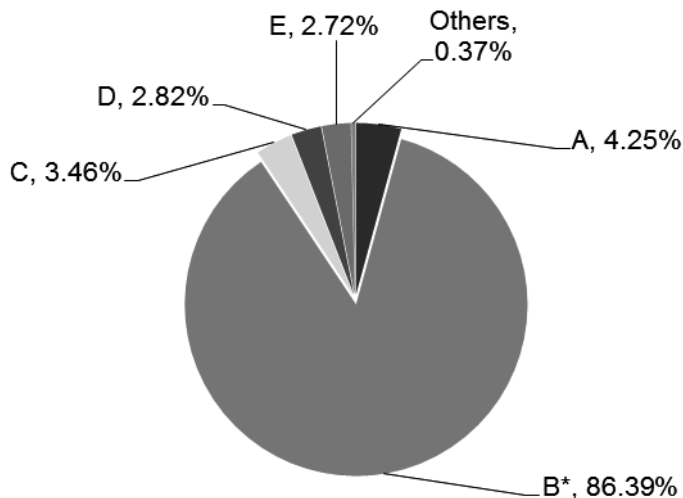


Figure 4: The figure shows that the performance in this question was good as many candidates (86.39%) chose correct answer.

Question 26: One of the important aid given to a person who suffered fire burn is

- A pouring water
- B covering with clothes
- C pouring acid
- D covering with a blanket
- E smearing honey.

Table 22: Number and Percentage of Candidates in each Option

Option	A	B	C	D	E*	Others
No. of candidates	74,454	43,048	23,610	329,176	279,390	4,741
% of candidates	9.75	5.64	4.27	43.12	36.60	0.62

This question assessed the ability of the candidates on applying the knowledge of First to a person who suffered fire burn. **Table 22** shows that, the general candidates' performance in this question was weak.

The correct option E “smearing honey” was selected by 36.60 percent of the candidates. These candidates were able to apply the knowledge they have to identify that, honey is among of the important aid given to a person who suffered fire burn. A total of 446,678 (58.51%) candidates chose distractors A “pouring water”, B “covering with clothes” and D “covering with a blanket”. These candidates were attracted with these answers because they involve in provision of aid in different stages to a victim of accident including dispensary and hospital. The candidates 23,610 (4.27%). who selected incorrect option C “pouring acid” failed to understand that, an acid is among the corrosive liquids, thus it is impossible to use it as an aid to a person who suffered fire burn. Furthermore, 0.62 percent of the candidates did not follow the instructions in answering this question hence left the question unanswered or chose more than one responses.

Question 27: One of the effects of applying oil on a wound caused by fire is to

- A increase temperature on the wound
- B increase pain on the wound
- C allow air to penetrate the wound
- D causes germs to enter the wound
- E increase swollen blisters.

Table 23: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
No. of candidates	351,263	96,384	121,591	108,576	80,729	4,876
% of candidates	46.01	12.63	15.93	14.22	10.57	0.64

This question measured the understanding of the candidates on using the knowledge obtained in First Aid provision to a person who suffered fire burn. **Table 23** shows that, the general candidates' performance in this question was average.

The correct option A "increase temperature on the wound" was chosen by 46.01 percent of the candidates. This shows that, the candidates had enough understanding that, applying oil on the wound raises heat on the wound. The candidates who selected distractors C "allow air to penetrate the wound", D "cause germs to enter the wound" and E "increase swollen blisters" were 53.35 percent. These candidates lacked understanding that; one of the effects of applying oil on the burn wound is to increase heat on the smeared place. Few candidates (0.64%) did not follow the instructions in answering this question hence left the question unanswered or chose more than one respons.

Question 28: Which of the following statements is correct about HIV and AIDS?

- A Having HIV is the same as having AIDS.
- B The source of HIV and AIDS is venereal diseases.
- C It is easy to prevent AIDS than HIV.
- D Avoiding transmission of HIV will also avoid AIDS.
- E A person with HIV has no white blood cells.

Table 24: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
No. of candidates	133,658	192,725	41,351	326,473	64,396	4,816
% of candidates	17.51	25.24	5.42	42.76	8.44	0.63

This question tested the ability of the candidates on using the knowledge obtained in classroom on the concept of HIV and AIDS.

Table 24 shows that, the general candidates' performance in this question was average.

The correct option D “avoiding transmission of HIV will also avoid AIDS” was chosen by 326,473 (42.76) candidates. The choice of this option by the majority of the candidates is an indication that they had enough understanding on different ideas about HIV and AIDS. Some candidates, 133,658 (17.51%) who chose option A “having HIV is the same as having AIDS” had no enough knowledge on HIV and AIDS. The incorrect option B “the source of HIV and AIDS is venereal diseases” was chosen by 192,725 (25.24%) candidates who failed to understand that, the sources of HIV and AIDS is not venereal diseases alone. They forgot other sources like blood transfusion and sharing of sharp objects like of needles. Distractor C “it is easy to prevent AIDS than HIV” was opted by 41,351 (5.42%) of candidates indicating that, such candidates lacked understanding on HIV and AIDS. Some candidates 64,396 (8.44%) who selected distractor E “a person with HIV has no white blood cells” were attracted by this answer because, HIV attacks white blood cell. However, it is not true that, a person with HIV has no white blood cell but they are being reduced in number. Furthermore, 0.63 percent of the candidates either did not answer this question or chose more than one option.

Question 29: One of the germs which destroy the white blood cells is

- A Bacteria
- B HIV
- C Plasmodium
- D Amoeba
- E Fungus.

Table 25: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
No. of candidates	194,206	423,985	71,692	48,835	20,576	4,125
% of candidates	25.44	55.54	9.39	6.40	2.70	0.54

This question intended to assess understanding of the candidates on the effects of HIV. **Table 25** shows that, the general performance of candidates in this question was average.

A total of 423,985 (55.54%) candidates selected the correct answer B “HIV”. Those candidates had an understanding that HIV is among the germs which destroy white blood cells. Some candidates 335,309 (43.93%) who selected distractors A “bacteria”, C “plasmodium”, D “amoeba” and E “fungus” they were attracted by those answers because, these germs are found in the human body. However, those candidates did not understand that germs do not destroy white blood cells. Some candidates 4,125 (0.54%) either did not answer this question or chose more than one answer.

Question 30: Which of the following is common to the spread of HIV in the society?

- A Sharing of needles, toothbrushes, blood and unsafe sex.
- B Video cassettes, songs, music and plays.
- C Television, newspapers and leaflets concerning HIV.
- D Condoms, health experts, seminars and AIDS Institutions.
- E Circumcision of men and women.

This question intended to test the candidate's ability to apply knowledge they have to identify behaviours or things which contribute to the transimission of HIV in the society. **Figure 5** shows that, the general performance of candidates in this question was good.

The majority of caandidates 652,981 (85.53%) chose the correct answer A "Sharing of needles, toothbrushes, blood and unsafe sex". These candidates demonstrated high knowledge on the concept of HIV and AIDS, particularly on things which contribute to the transimission of HIV in the society. This high performance suggests that candidates learn properly in the classroom or during campaign conducted by government or non gorvenment organisations involved in the provision of education on HIV and AIDS. The incorrect option B "video cassettes, songs, music and plays" was selected by 4.01 percent of the candidates. These candidates did not understand that, video cassettes, songs, music and plays have no direct relationship in HIV transimission in the society. In addition, they were required to know that, video cassettes, songs, music and plays are the

techniques used to educate the society on the issue of transimission of HIV and AIDS.

Some candidates (3.3%) selected option C “television, newspapers and leaflets concerning HIV” which is incorrect because there is no scientific evidence that, the mentioned things in the answers can contribute to the transimission of HIV. The incorrect option D “condoms, health experts, seminars and AIDS Institutions” were selected by 3.33 percent of the candidates. This response shows that, the candidates had no enough knowledge on things which contribute to the transimission of HIV and AIDS because explanations which are found in this answer are things which reduce the speed of transimission of HIV. The incorrect option E “circumcision of men and women” were selected by 3.34 percent of the candidates. These candidates failed to do a critical analysis because circumcision of women is being discourage due to its effects on transimission of HIV; however, the circumcision of men is very much encouraged as it is among the means of reducing transimission of HIV in the society. Furthermore, 3,638 (0.47%) candidates either did not answer this question or chose more than one option.

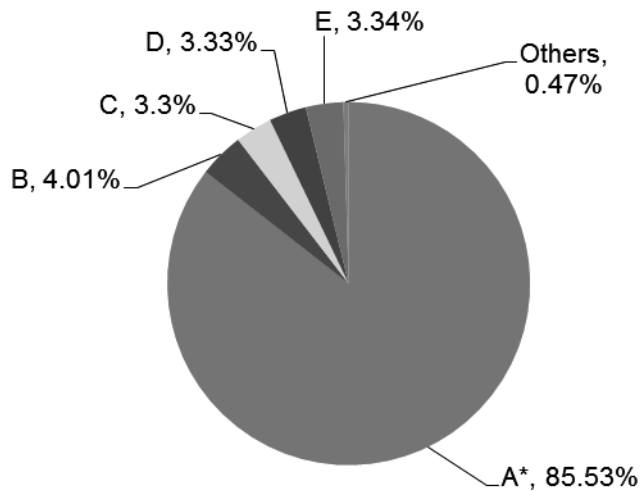


Figure 5: The figure shows that the performance in this question was good as 85.53 percent chose the correct answer.

Question 31: Which blood cells are attacked by HIV?

- A Platelete cell
- B White blood cells
- C Red blood cells
- D Hemoglobin.
- E Plasma.

Table 26: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
No. of candidates	47,846	528,947	132,633	27,074	23,263	3,656
% of candidates	6.27	69.29	17.37	3.55	3.05	0.48

This question intended to assess the candidates' knowledge on source of AIDS. **Table 26** shows that, the general candidates' performance in this question was good.

A total of 528,947 (69.29%) candidates chose the correct answer B “white blood cells”. Such candidates had enough understanding on cells which are being attacked by HIV. The candidates who selected distractors A “platelet cell”, C “red blood cells”, D “hemoglobin” and E “plasma” were 230,816 (30.24%). These candidates were attracted by these distractors because all indicated components of blood but they forgot that HIV attacks only white blood cells. Few candidates (0.48%), some chose no answer and others chose more than one option.

Question 32: One can get sugar from sugar cane solution by

- A boiling and filtration
- B boiling and cooling
- C cooling and freezing
- D boiling up to vaporization
- E putting on sunlight.

This question tested the candidates’ understanding on separation of mixture. The candidates were required to identify suitable method of separating sugar from sugar cane solution. **Figure 6** shows that, the general performance of candidates in this question was weak.

The correct option D “boiling up to vaporization” was selected by 24.41 percent of the candidates. This shows that, the candidates had good understanding on separation of mixtures. Distractor A “boiling and filtration” was chosen by 19.73 percent of the candidates because, they did not understand different technique used in separation of mixtures. They did not understand that, the process of separating sugar from sugar cane solution is done by boiling up to

vaporization in order to leave sugar in the vessel without doing filtration. Some candidates 419,941 (55.01%) who selected distractors B “boiling and cooling”, C “cooling and freezing” and E “putting on sunlight” they lacked knowledge on separation of mixtures especially sugar from sugar cane solution. Few candidates (0.85%) some chose no answer and others chose multiple option.

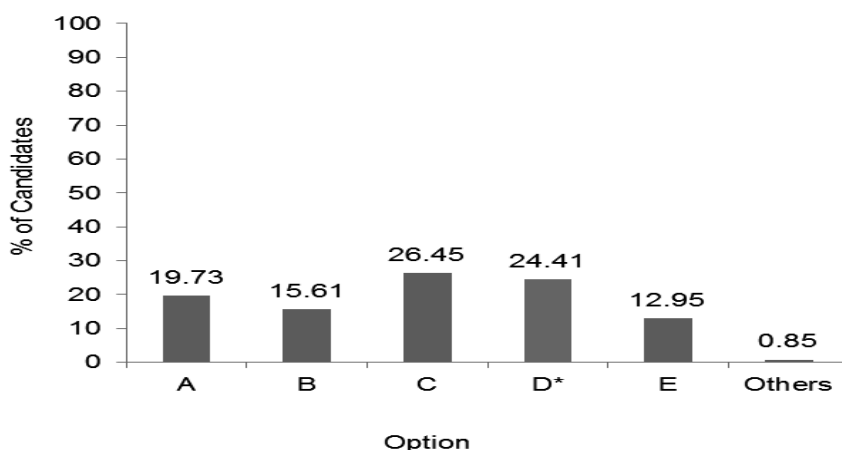


Figure 6: The candidates' answers shows that the performance in this question was weak as many (75.50%) chose incorrect answers.

- Question 33:** When observing a person cutting a tree from a distant, you can see an axe hitting the tree before hearing the sound. This shows that
- A Light travels in a straight line
 - B Sound travels slower than light
 - C Light travels slower than sound
 - D Sound travels faster than light
 - E Sound travels on straight line.

Table 27: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
No. of candidates	103,489	335,755	61,634	174,296	83,814	4,431
% of candidates	13.56	43.98	8.07	22.83	10.98	0.58

The question tested candidates' understanding on the properties of sound as compared to light. The general candidates' performance in this question was average as shown in **Table 27**.

About 43.98 percent of the candidates were able to choose the correct answer B "Sound travels slower than light". This indicates that the candidates had enough knowledge on the properties of sound and light. The 13.56 percent of the candidates who selected A "Light travels in a straight line" had understanding of the properties of light, hence could differentiate the said properties and that of light. Moreover, 41.88 percent of the candidates chose distractors C "Light travels slower than sound", D "Sound travels faster than light" and E "Sound travels on straight line" because they had no enough knowledge on the properties of sound and light. In addition, 0.58 percent of the candidates, some chose no answer and others chose more than one option.

Question 34: What is the difference between ice and water?

- A Water is heavier than ice.
- B Water is more cohesive than ice.
- C Water is less coloured than ice.
- D Water occupies space but ice does not.
- E Ice is soft than water.

The question tested candidates' understanding about the properties of matter. The general candidates' performance in this question was weak. **Figure 7** shows the summary of analysis of performance of candidates in this question.

The number of candidates who chose the correct answer A "Water is heavier than ice" was 99,682 (13.06%). Those candidates had enough knowledge about the differences in properties of water when in liquid and when in solid form. In addition 175,595 (23.00%) candidates chose distractor B "Water is more cohesive than ice". These candidates failed to understand that the ice, which is water in solid state, its particles are closely packed together as compared to liquid water. A total of 482,262 (63.18%) who chose distractor C "Water is less coloured than ice", D "Water occupies space but ice does not" and E "Ice is soft than water" lacked enough knowledge about the properties of water in different physical states, hence failed to identify the difference between them. On the other hand, few candidates (0.77%) were not able to follow the instructions in answering the question, hence some chose no answer and others chose more than one answer.

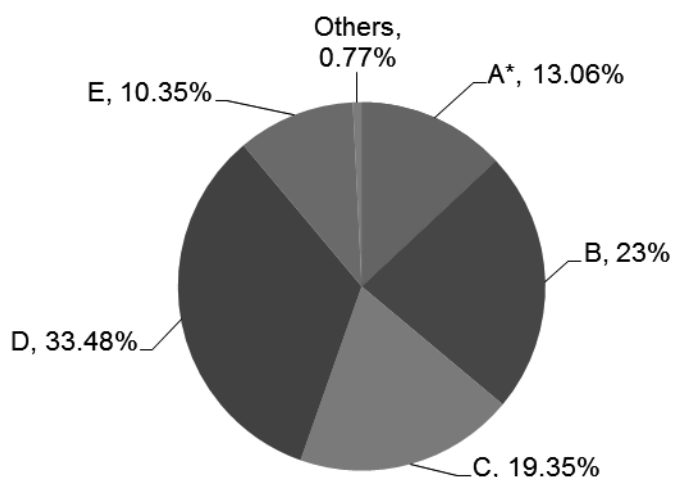


Figure 7: Response pattern which shows the weak performance in this question as many (86.18%) candidates chose incorrect answers.

- Question 35:** Change of matter that does not lead to change in mass is known as
- A Chemical change
 - B Physical change
 - C Change in density
 - D Change of state
 - E Natural change.

Table 28: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
No. of candidates	232,901	366,446	54,328	58,724	47,575	3,445
% of candidates	30.51	48.00	7.12	7.69	6.23	0.46

The question tested the candidates' understanding about the changes of state of matter. **Table 28** shows that, the overall performance of candidates in this question was average.

A total of 366,446 (48.00%) of the candidates chose the correct option B "Physical change". These candidates had understood that the some of the characteristics of physical changes is to cause no change in weight. On the other hand, 232,901 (30.51%) candidates chose distractor A "Chemical change" because they failed to understand that chemical change is always associated with an increase or decrease in weight. Moreover, 160,627 (21.04%) chose distractor C "Change in density", D "Change of state" and E "Natural change" because they had no enough knowledge about the changes of state of matter. Few candidates 3,445 (0.46%) chose no answer and others chose multiple option.

- Question 36:** Dissolved ash from lemon leaves changes litmus paper from
- A Blue to white
 - B Red to blue
 - C Blue to red
 - D Blue to green
 - E Red to yellow.

The question tested candidates' high level of understanding on the properties of acid and base. The overall performance of candidates in this question was weak. **Figure 8** shows the summary of analysis of performance of candidates in this question.

The number of candidates who chose the correct answer B “Red to blue” was 165,118 (21.63%). Those candidates had enough knowledge, that any ashes’ solution has basic properties. On the other hand, a total of 265,408 (34.77%) candidates who chose distractor C “Blue to red” failed to differentiate the properties of lemon juice they usually referred as an example of acid; and ashes’ solution from lemons’ leaves which is actually a base. Other candidates 327,740 (42.93%) who chose distractor A “blue to white”, D “blue to green” na E “red to yellow” had no enough knowledge about the properties of ash solution. However, few candidates (0.67%) were not able to follow the instructions in answering the question and hence some chose no answer and others chose multiple answer.

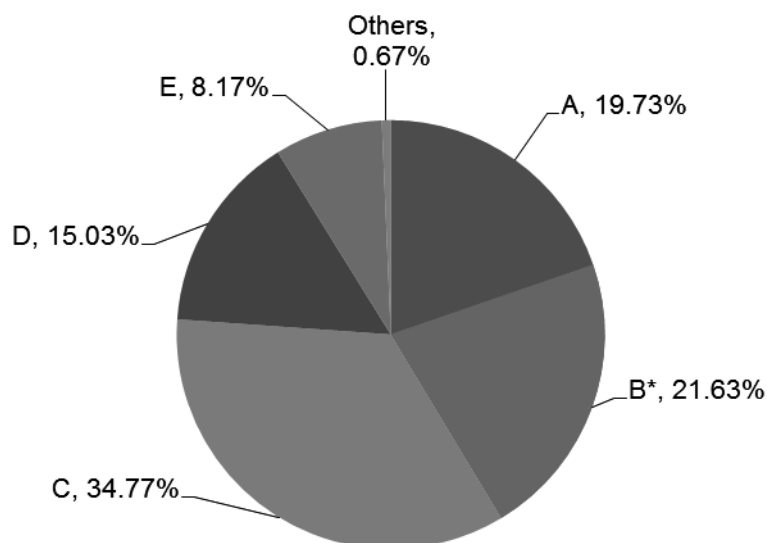


Figure 8: Response pattern which shows the weak performance in this question as few (21.63%) candidates chose the correct answer.

Question 37: A mixture of different gases is known as

- A Oxygen
- B Hydrogen
- C Air
- D Nitrogen
- E Matter.

Table 29: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
No. of candidates	76,054	59,251	406,241	58,313	158,287	5,273
% of candidates	9.96	7.76	53.21	7.64	20.73	0.69

This question assessed candidates' knowledge on the concept of air. The general performance in this question was average as shown in **Table 29**.

Statistics in Table 29 show that 53.21 percent of the candidates chose the correct answer C "Air". Those candidates had adequate knowledge on the concept of air. Besides, 193,618 (25.36%) who chose distractors A "oxygen", B "hydrogen" and D "nitrogen" were attracted by these options because they are among the gases which constitute air. The 158,287 (20.73%) candidates who chose distractor E "matter" had no adequate knowledge about the composition of air. However, 5,273 (0.69%) candidates chose no option or indicated multiple answers.

Question 38: Which of the following is **not** a chemical change?

- A Decomposition of garbage
- B Souring of milk
- C Burning of charcoal
- D Dissolution of sugar
- E Rusting of iron.

Table 30: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
No. of candidates	113,883	126,910	112,787	268,130	136,369	5,340
% of candidates	14.92	16.62	14.77	35.12	17.86	0.70

This question tested candidates' understanding about the change in states of matter. **Table 30** shows that, the overall performance of candidates in this question was weak.

A total of 268,130 (35.12%) candidates who chose the correct answer D "Dissolution of sugar" had adequate knowledge about the change in states of matter, hence recognized that dissolution of sugar is not a chemical change but a physical change. The candidates who chose distractors A "Decomposition of garbage", B "Souring of milk", C "Burning of charcoal" and E "Rusting of iron" were 489,949 (64.17%). Those candidates failed to recognize that the changes stated in those distractors were chemical changes. Few 5,340 (0.70%) chose no option or indicated multiple answers.

Question 39: Which of the following pairs is correct about lens?

- A Convex lens \longrightarrow diverges light rays.
- B Concave lens \longrightarrow correct long sightedness.
- C Convex lens \longrightarrow correct short sightedness.
- D Concave lens \longrightarrow correct short sightedness.
- E Concave lens \longrightarrow converge light rays.

Table 31: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
No. of candidates	162,582	114,389	128,611	230,108	120,832	6,897
% of candidates	21.30	14.98	16.85	30.14	15.83	0.90

This question intended to examine the candidates' knowledge on the uses lens. The performance of candidates in this question was weak as shown in **Table 31**.

A total of 230,108 (30.14%) chose the correct answer D "Concave lens \longrightarrow correct short sightedness". Such candidates had adequate knowledge on the properties of lens, hence they recognized that the suitable lens to correct short sightedness is the one which diverges light rays. The 162,582 (21.30%) candidates who chose A "Convex lens \longrightarrow diverges light rays" failed to realize that convex lens always converge light rays and not vice versa. Some 120,832 (15.83%) candidates who chose E "Concave lens \longrightarrow converge light rays" as they failed to recall that this lens does not converge light rays. Furthermore, 114,389 (14.98%) who chose B "Concave lens \longrightarrow correct long sightedness" they failed to recognize that, this lens diverges light rays hence correct short

sightedness and not long sightedness. Moreover, 128,611 (16.85%) candidates chose C “Convex lens —→correct short sightedness” as they failed to recognize that the lens is used to correct long sightedness and not short sightedness. Few candidates 6,897 (0.90%) chose no option or indicated more than one answers.

Question 40: The function of pulleys in our daily life is

- A to lift heavy load
- B to open bottle tops
- C to wrap objects
- D to reduce the slope
- E to simplify fire wood chopping.

Table 32: Number and Percentage of Candidates in each Option

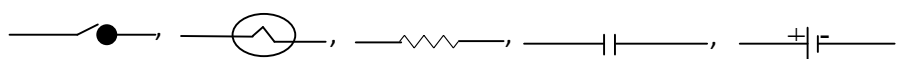
Option	A*	B	C	D	E	Others
No. of candidates	526,065	65,137	58,024	50,935	57,829	5,429
% of candidates	68.91	8.53	7.60	6.67	7.58	0.72

The question assessed the candidates’ knowledge on the uses of simple machines particularly pulleys in our daily life. As shown in **Table 32** the general performance of candidates in this question was good as 526,065 (68.91%) of candidates were able to chose the correct answer A “to lift heavy load”. Those candidates had adequate knowledge on the uses of pulleys.

Some 65,137 (8.53%) candidates were able to choose B “to open bottle tops”. Those candidates were attracted by this distractor because openning bottle tops is done using bottle opener which is also a simple machine. The difference between this response and

the correct one is that bottle opener is a simple machine in first class lever while a pulley is third class lever. Moreover, 166,788 (21.85%) candidates who chose distractors C “to wrap objects”, D “to reduce the slope” na E “to simplify fire wood chopping” had inadequate on the concept of simple machine. Few candidates 5,429 (0.72%) chose no option or indicated multiple answers.

Question 41: Observe the signs in the following figure and name them according to their arrangement from left side.



- A Capacitor, dynamo, dry cell, switch, battery
- B Switch, bulb, resistor, capacitor, dry cell
- C Bulb, capacitor, dry cell, resistor, battery
- D Resistor, bulb, switch, dry cell, capacitor
- E Switch, resistor, bulb, dry cell, capacitor.

Table 33: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
No. of candidates	64,112	492,586	91,507	46,377	63,676	5,161
% of candidates	8.40	64.52	11.99	6.07	8.34	0.68

The question tested the candidates’ understanding on the signs used in electric circuit. The general performance of candidates in this question was good as shown in **Table 33**.

From such statistics, 492,586 (64.52%) candidates chose the B “Switch, bulb, resistor, capacitor, dry cell” which was the correct. Such candidates had enough knowledge about signs used in electric circuit. On the othe hand, a total of 265,672 (34.8%) candidates

chose A “Capacitor, dynamo, dry cell, switch, battery”, C “Bulb, capacitor, dry cell, resistor, battery”, D “Resistor, bulb, switch, dry cell, capacitor” na E “Switch, resistor, bulb, dry cell, capacitor”. These candidates confused the names of sign indicated by dry cell and capacitor because they have elements of similarity, the only difference being presence of charge signs in dry cell. However, few 5,161 (0.68%) candidates did not follow the instruction in attempting this question, hence left unanswered or chose more than one response.

Question 42: Which device is used to magnify the image of very small objects?

- A Telescope.
- B Microscope.
- C Periscope.
- D Prism.
- E Lens.

Table 34: Number and Percentage of Candidates in each Option

Option	A	B*	C	D	E	Others
No. of candidates	155,334	399,506	54,313	34,597	114,517	5,152
% of candidates	20.35	52.33	7.11	4.53	15.00	0.67

The question intended to test candidates’ knowledge about the different devices which use light. The candidates were required to identify the device which magnifies the images of very small objects. The general candidates’ performance in this question was average as shown in **Table 34**.

Many candidates 399,506 (52.33%) managed to choose B “Microscope” which was the correct answer. These candidates understood that, of the devices given, a microscope is the one which magnifies the images of very small objects. On the other hand, the candidates who chose distractor A “Telescope” were 155,334 (20.35%). These candidates were attracted by this distractor because telescope is used to view distant objects.

Moreover, some candidates 203,427 (26.64%) chose distractors C “Periscope”, D “Prism” and E “Lens” failed to understand that periscope is used to view objects through the obstacle; and prism is used to spread light rays into different colours. On the other hand, lens is used to change the converging point of the light rays or to correct the eyes defects. Few 5,152 (0.67%) candidates left the question unanswered or chose more than one response.

Question 43: An electric current of 0.8 amperes is passing through a wire which has a resistance of 24 ohms. What is the voltage of the electricity in the circuit?

- A 30.
- B 192.
- C 24.
- D 19.
- E 19.2.

Table 35: Number and Percentage of Candidates in each Option

Option	A	B	C	D	E*	Others
No. of candidates	161,643	99,851	104,227	53,271	336,990	7,437
% of candidates	21.17	13.08	13.65	6.98	44.14	0.98

The question tested candidates' ability to apply a suitable formula in calculating the potential difference across the circuit. **Table 35** shows the overall performance of candidates in this question was average.

A total of 336,990 (44.14%) candidates managed to choose the correct answer E "19.2". Those candidates were able to calculate the voltage across the circuit by using the formula, voltage = amperage x resistance. Some 161,643 (21.17%) candidates chose distractor A "30" as they used wrong formula, voltage = $\frac{\text{resistance}}{\text{amperage}}$ in their calculation. Furthermore, 257,349 (33.71%) candidates who chose distractors B "192", C "24" and D "19" did not know the required formula of calculating the electrical voltage across the circuit. Few 7,437 (0.98%) candidates chose no option or indicated more than one answers.

- Question 44:** Which among the following does not conduct electricity?
- A Rubber.
 - B Tin.
 - C Copper.
 - D Iron.
 - E Mercury.

Table 36: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
No. of candidates	461,941	56,965	65,274	62,822	110,907	5,510
% of candidates	60.51	7.46	8.55	5.23	14.63	0.73

The question intended to test candidates' understanding about electricity. The candidates were required to identify the non conductor among the given materials. The overall performance of candidates in this question was average as indicated in **Table 36**.

The number of candidates who chose the correct answer A "Rubber" was 461,941 (60.51%). Those candidates had required knowledge of non conducting materials. Some 295,968 (35.87%) candidates who chose among the distractors B "Tin", C "Copper", D "Iron" and E "Mercury" failed to understand that tin, copper, iron and mercury are metals, hence good conductors of electricity. Furthermore, few 5,510 (0.73%) candidates chose no option or indicated more than one answers.

Question 45: A device which is made up of magnet and used by seamen in order to locate direction while travelling in the sea is known as

- A Bell
- B Telephone
- C Horn
- D Compass
- E Speaker.

Table 37: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
No. of candidates	48,990	54,817	59,438	510,181	84,351	5,642
% of candidates	6.42	7.18	7.79	66.83	11.05	0.74

The question intended to test candidates' understanding about the application of magnets. Candidates were required to identify the device made of magnets used by seamen to locate direction while travelling in the sea. **Table 37** shows the general candidates' performance in this question was good.

A total of 510,181 (66.83%) chose the correct answer D "Compass". These candidates had adequate knowledge that of the listed devices, compass is the one which is used to locate the direction. Many 247,596 (32.44%) candidates who chose distractors A "Bell", B "Telephone", C "Horn" and E "Speaker" failed to identify the device in question. They were attracted by these distractors because all are made up of magnets, though each had different uses. Few, 5,642 (0.74%) candidates chose no option or indicated more than one option.

Question 46: Alarm The following symbols are used in an electric circuit. Which symbol represents a resistor?

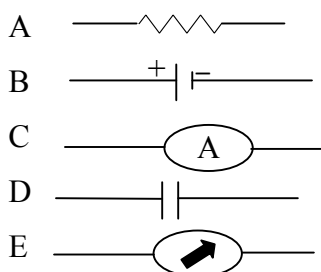
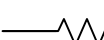






Table 38: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
No. of candidates	494,867	67,992	70,314	49,393	75,580	5,273
% of candidates	64.82	8.91	9.21	6.47	9.90	0.69

The question tested candidates' understanding on the symbols used in electric circuits. The general candidates' performance in this question was good as indicated in **Table 38**.

In this question, 494,867 (64.82%) candidates who chose the correct answer A “  ”, had enough knowledge about the symbols used in electric circuits. A total of 263,279 (34.49%) who chose distractors

B “  ”, C “  ”, D “  ”, E “  ”.

had inadequate knowledge about symbols used in electric circuits. Furthermore, 5,273 (0.69%) candidates either did not answer the question or chose multiple answers.

Question 47: The correct formula of finding the work done is

A Workdone = Force x weight

B Work done = $\frac{\text{distance}}{\text{time}}$

C Work done = $\frac{\text{Force}}{\text{Time}}$

D Workdone = Force x distance

E Work done = $\frac{\text{distance}}{\text{force}}$.

Table 39: Number and Percentage of Candidates in each Option

Option	A	B	C	D*	E	Others
No. of candidates	94,858	244,169	100,797	264,590	53,356	5,649
% of candidates	12.43	31.98	13.20	34.66	6.99	0.74

The question tested the candidates' understanding about the formula used to find the workdone. The overall performance of candidates in this question was weak as represented in **Table 39**.

From data in Table 2.47 a total of 264,590 (34.66%) candidates who chose the correct answer D “Workdone = Force x distance” were able to apply correct formula to calculate the workdone. On the other hand, 94,858 (12.43%) candidates who chose distractor A “Workdone = Force x weight” failed to recognize that weight is also a force. This indicates that, the candidates had inadequate knowledge of the formula for calculating the amount of workdone. Moreover, 398,322 (52.17%) candidates who opted for distractors B “Workdone= $\frac{\text{distance}}{\text{time}}$ ”, C “Workdone= $\frac{\text{Force}}{\text{Time}}$ ” and E “Workdone= $\frac{\text{distance}}{\text{force}}$ ” failed to understand that workdone is the product of force and distance moved in the direction of a force. Nevertheless, 5,649 (0.74%) candidates either did not answer the question or chose multiple answers.

Question 48: Our images can be seen clearly when we use

- A Concave mirror
- B Convex mirror
- C Plane mirror
- D Concave lens
- E Convexlens.

Table 40: Number and Percentage of Candidates in each Option

Option	A	B	C*	D	E	Others
No. of candidates	63,219	59,412	500,432	79,929	55,733	4,694
% of candidates	8.28	7.78	65.55	10.47	7.30	0.61

The question intended to test candidates' knowledge about types of optical devices and their uses. The general candidates' performance in this question was good as shown in **Table 40**.

From the statistics, candidates who chose C "Plane mirror" were 500,432 (65.55%) indicating that they understood the uses of different types of optical devices and their uses. Besides, a total of 135,662 (17.77%) candidates who chose among distractors D "Concave lens" and E "Convex lens" did not understand that such devices make the images different from reality. Other candidates, 122,631 (16.06%) who chose among distractors A "Concave mirror" and B "Convex mirror" had inadequate knowledge about the properties of images formed by the mirror. Few 4,694 (0.61%) candidates either did not answer this question or chose more than one option.

Question 49: It is important to keep records of the experiment done in order

- A use as reference
- B publish the efficiency of the person who did the experiment
- C draw the table of results
- D be used to correct different data
- E facilitate development.

Table 41: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
No. of candidates	235,952	116,333	108,682	212,113	85,179	4,694
% of candidates	30.91	15.24	14.24	27.78	11.16	0.61

The question intended to assess candidates' understanding on the concept of scientific procedure. **Table 41** shows that, the general candidates' performance in this question was weak.

A total of 235,952 (30.91%) candidates were able to choose the correct answer A “use as reference”. These candidates had adequate knowledge about the concept, hence identified the importance of keeping experimental records. Some 212,113 (27.78%) who chose distractor D “be used to correct different data” were attracted by this option because some of experimental records are used to correct the existed data or information. The distractor B “publish the efficiency of the person who did the experiment” was chosen by 116,333 (15.24%) such candidates failed to understand that the purpose of experiment is to find the solution to the problem and not for show off. A total of 193,861 (25.40%) candidates who were attracted by distractor C “draw the table of results” and E “facilitates development” failed to understand that, it is not necessary for experimental records to be used in drawing table of results. Moreover, the experimental records reserved for reference and not relates direct in bringing development although can be used to solve the problems in the society. Few, 4,694 (0.61%) candidates chose no option or indicated multiple answers.

Question 50: The researched and analysed data can be represented by

- A Graph
- B Report
- C Calculations
- D Interpretation
- E Drawing.

Table 42: Number and Percentage of Candidates in each Option

Option	A*	B	C	D	E	Others
No. of candidates	254,193	242,987	81,069	143,140	38,088	5,160
% of candidates	33.30	31.83	10.62	18.75	4.99	0.68

This question intended to measure candidates' understanding on how to present the researched and analysed data. The general performance of candidates in this question was weak as shown in **Table 42**.

A total of 254,193 (33.30%) candidates chose the correct answer A "Graph" because they had enough knowledge on how to presents the researched and analysed data. These candidates understood that graphs help to indicate comparison of objects or events and can be used to predict some of events. About 242,987 (31.83%) candidates who chose B "Report" were attracted by this option becuse in writng researched report data can be used. The 143,140 (18.75%) candidates chose D "Interpretation" because they failed to understand that, even use of graphs facilitates easy presentation of data. Furthermore, 81,069 (10.62%) candidates who chose C "Calculations" failed to understand that calculation and drawing are parts of the process which facilitates presentation of research data

or information in researched report. Some 38,088 (4.99%) candidates who chose E “Drawing” lacked knowledge on the steps in conducting scientific investigation. Few, 5,160 (0.68%) candidates chose no option or indicated multiple answers.

3.0 EVALUATION OF CANDIDATES’ PERFORMANCE IN EACH TOPIC

The analysis of the candidates overall performance in the Science examination in PSLE 2015 indicates that there is a general improvement in the performance. Topics in which candidates had good performance were HIV/AIDS (63.29%) and Essential Needs for Health and Living (64.94%). The performance in HIV/AIDS has decreased by 16.90 percent as compared to PSLE 2014 in which its performance was (80.19%). The topic on Essential Needs for Health and Living had an average performance (51.67%) in the PSLE 2014, thus, the performance in this topic in PSLE 2015 has increased by 13.27 percent.

The topics which had average performance in PSLE 2015 include Living Things (54.92%), First Aid (56.33%) and Energy, Machine and Work (54.21%). In PSLE 2014 the topic on Living Things had an average performance (42.39%) and the topic on Energy, Machine and Work had an average performance (40.68%).

This analysis has revealed that the topics from which the candidates had weak performance were Changes of Objects, States and Events (32.56%), Health, Health Services and Methods of Preventing Diseases (37.46%) and Methods and Procedures in Science (32.11%). Further analysis has revealed that, performance in the topic on

Changes of Objects, States and Events has decreased by 8.98 percent; and the performance in the topic on Health, Health Services and Methods of Preventing Diseases has decreased by 4.84 percent when compared with performance in PSLE 2014.

The weak performance on the topic of Health, Health Services and Methods of Preventing Diseases has been attributed by low performance in question 15 (36.73%), 19 (27.67%) and 24 (26.45%). From the topic, Changes of Objects, States and Events the questions that rendered the performance low was questions 32 (24.40%), 34 (13.06%), 36 (21.63%) and 38 (35.10%). Also, the low performance on the topic of Methods and Procedures in Science was attributed by low performance in question 49 (30.91%) and question 50 (33.30%).

Although the performance of the topic Methods and Procedures in Science was weak in 2014 and 2015, this weak performance has decreased by 2.59 when compared to performance in PSLE 2014. Comparison in performance of candidates in PSLE 2015 and 2014 in the respective topics has been presented in the **Appendix**.

The overall increase in performance in Science subject in PSLE 2015 indicates presence of effort by educational stakeholders and teachers on emphasizing in strengthening teaching and learning of different topics as stipulated in the syllabus.

4.0 CONCLUSION

The analysis conducted on the items, pointed out challenges emanated from limited understanding of questions or the various concepts in the

Science subject in the Primary School Leaving Examination (PSLE) 2015. Although, there are some topics which are taught in more than one subject, candidates failed to transfer the knowledge from such subjects to perform well in the Science examination. For example, candidates failed to answer questions that required knowledge from such subjects like Home Economics, especially in “nutrition” and “health”. Others were from Geography, topics on the environment, natural catastrophes and astronomy. This implies that candidates did not have adequate knowledge on the topics and failed to transfer the knowledge acquired from respective subjects.

Further analysis on each item from the examined topics has revealed that the topics on HIV/AIDS and Essential Needs for Health and Living still have good performance and the topic on Changes of Objects, States and Events Health, and Health Services and Methods of Preventing Diseases dropped to poor performance while Methods and Procedures in Science remained with poor performance.

5.0 RECOMMENDATIONS

In order to improve the pass rate of the Science subject primary schools, it is recommended that the following things be adhered to:

- 5.1 Ensure that all the topics indicated in the Science syllabus are taught adequately. The teaching methodology should be considering experts who can be available to facilitate teaching of the topics/areas where teachers have no adequate knowledge or skills.
- 5.2 Analysis should be made on topics which are taught in Science and in other subjects like Home Economics, Geography and

Mathematics, so that teachers can come up with effective teaching methods on those topics.

- 5.3 Teachers should read different books that have topics indicated in the science syllabus in order to widen the understanding of the topics and thus be able to teach them effectively.
- 5.4 Neighbouring schools should establish subject cooperation among students and teachers. For example teachers should meet to discuss ways of improving the learning.
- 5.5 Students should be given questions on the various topics to assess the skills and ability on the knowledge they gained in the classroom which are related to their daily learning environment. In addition, the pupils should be given feedback so that they can discover reason why some distractors look similar to the correct answer.
- 5.6 Students should be encouraged to study all topics thoroughly by conducting discussion in groups and clubs which will help them and their teachers to learn about various topics. This will also help them to perform some practical instead of relying on learning theoretically.
- 5.7 Science subject teachers should be given in-service training which will help them to be creative and innovative in the teaching of various topics in the syllabus.
- 5.8 The Department of Education-PMOLG in collaboration with District Councils should see the possibility of increasing the

number of existing Teachers' Resource Centres (TRCs) so that they are used as meeting place for teachers with the aim of discussing new or alternative methods.

5.9 The TRCs should be used as mini – libraries which will be stocked with a variety of books to be used by both teachers and students within the ward.

5.10 Tanzania Institute of Education (TIE) should be directed to identify topics which cut across different subjects with the view to harmonize them in order to avoid repetition in more than one subject.

APPENDIX

COMPARISON OF CANDIDATES PERFORMANCE BY TOPIC IN PSLE 2014 AND PSLE 2015 SCIENCE SUBJECT

S/N	TOPIC	PSLE 2014				PSLE 2015			
		NO. OF QUESTION	PERFORMANCE (%)	AVERAGE PERFORMANCE (%)	REMARKS	NO. OF QUESTION	PERFORMANCE (%)	AVERAGE PERFORMANCE (%)	REMARKS
1.	HIV/AIDS	3	80.19	80.19	Good	28	42.80	63.29	Good
						29	55.54		
						30	85.53		
						31	69.29		
2.	Living Things	10	68.02	42.39	Average	1	66.07	54.92	Average
		11	42.79			2	38.29		
		12	72.78			3	35.90		
		17	45.12			4	32.86		
		29	67.24			5	54.41		
		33	43.19			6	74.03		
		36	42.70			7	41.10		
		37	18.97			8	70.06		
		47	32.63			9	61.93		
		48	28.76			10	63.33		
		50	45.31			11	74.02		
						12	47.00		
3	Changes of Objects, States and Events	8	69.73	41.54	Average	32	24.40	32.56	Weak
		23	15.26			34	13.06		
		30	34.53			35	48.00		
		31	27.00			36	21.63		
		38	42.68			37	53.21		
		39	60.03			38	35.10		
4	First Aid	-	-	-	-	25	86.39	56.33	Average
						26	36.60		
						27	46.01		
5	Energy, Machine and Work	15	55.73	40.68	Average	33	43.98	54.21	Average
		16	14.87			39	30.10		
		18	45.5			40	68.91		
		19	52.27			41	64.52		
		20	40.40			42	52.33		
		25	59.89			43	44.14		
		26	33.40			44	60.51		
		27	29.44			45	66.80		
		28	40.68			46	64.82		
		43	42.12			47	34.70		
		46	33.22			48	65.55		

S/N	TOPIC	PSLE 2014				PSLE 2015			
		NO. OF QUESTION	PERFORMANCE (%)	AVERAGE PERFORMANCE (%)	REMARKS	NO. OF QUESTION	PERFORMANCE (%)	AVERAGE PERFORMANCE (%)	REMARKS
6	Health, Health Services and Methods of Preventing Diseases	1	48.14	42.30	Average	15	36.73	37.46	Weak
		5	40.57			16	42.16		
		40	28.56			19	27.67		
		44	20.69			20	44.42		
		45	57.48			24	26.45		
		13	40.67						
		14	60.01						
7	Essential Needs for Health and Living	4	86.54	51.67	Average	13	81.60	64.94	Good
		9	76.95			14	51.70		
		32	44.13			18	81.35		
		34	37.67			21	73.31		
		35	37.73			22	47.07		
		41	30.13			23	54.62		
		42	48.51						
8.	Methods and Procedures in Science	21	41.53	34.7	Weak	49	30.91	32.11	Weak
		22	27.78			50	33.30		
		24	20.56						
		49	48.93						

A SUMMARY OF COMPARISON OF CANDIDATES PERFORMANCE BY TOPIC IN PSLE 2014 AND PSLE 2015 SCIENCE SUBJECT

