THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

# REPORT ON THE ANALYSIS OF CANDIDATES' RESPONSES FOR PRIMARY SCHOOL LEAVING EXAMINATION (PSLE) 2017

# SCIENCE

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## PREFACE

This analysis of candidates' item responses to the Primary School Leaving Examination (PSLE 2017) in Science subject has been prepared to solve challenges facing candidates in attempting various questions in local and national examinations. It gives feedback to all education stakeholders (students, teachers, policy makers, curriculum developers and quality assurance officers) on how candidates respond to examination items. The analysis indicate the number or percentage of candidates who chose each of the given options, those who were unable to answer correctly, those who did not answer according to instructions and those who omitted some items or gave more than one answer for the item. Moreover, possible reasons that could have led the candidates to choose incorrect answers are provided for each item.

In general, the analysis shows that there are various areas in the listed topics where the candidates learned effectively and gained enough knowledge in their seven-years of primary education. Likewise, there are areas where they did not aquire the expected knowledge.

This report also identified challenges which lead to the candidates' failure to respond to the examination questions correctly. The identified challenges include candidates' inability to identify the demands of the questions; inadequate knowledge in the respective topics; inability to relate topics to everyday life situations; and inability to folweak instructions given in examinations. Lack of frequent tests in science subject was also a reason for failure in the examinations.

The Examinations Council expect that the feedback provided will enable education stakeholders to take necessary steps in improving the teaching and learning process, for the purpose of eliminating the shortcomings identified in the report. In addition, the Council expects that recommendations given in this report will be enhance the performance in the Primary School Leaving Examination if implemented.

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 would to appreciate any fruitfull comments and recommendations from teachers, students and other education stakeholders for improving the quality of future reports.

Dr. Charles E. Msonde

**EXECUTIVE SECRETARY**

## 1.0 INTRODUCTION

The Primary School Leaving Examination (PSLE) of Science subject was held on 7th September 2017. The number of candidates registered were 916,885 out of which 909,897 (99.23%) sat for the examination. Analysis of the candidates' performance in the Science subject examination indicates that 660,640 (72.61**%**) candidates passed the examination. This performance represents a decrease of 3.56% when compared to the PSLE of 2016, in which, 601,124 (76.17%) candidates passed.

The Science examination of PSLE 2017 consisted of 50 questions from various topics. Candidates were required to answer all questions by choosing the correct answer by shading its respective letter on special answer sheets (OMR) provided. Candidates' answers for each question were analyzed according to their choices of A, B, C, D or E. the analysis also considered projecting possible reasons for choices made in each question. The letter of the correct answer has been marked with a star (*) in tables or charts. Furthermore, the percentage of candidates who did not folweak instructions on how to answer the questions has been included in this analysis under the heading 'others' as indicated in the respective tables and figures. Such candidates either chose more than one option or did not answer the respective question.

## 2.0 ANALYSIS OF CANDIDATES' ANSWERS

**Question 1**: Which of the following characteristics enable birds to fly in the air?

A Soft bones with feathers.

B Slim bones with a hollow inside.

C Jointed bones.

D Have many bones.

E Wing bones are stronger.

**Table 1**: Number and Percentage of the Candidates in Each Option.

| Option | A | B* | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 181,055 | 271,531 | 49,581 | 30,344 | 374,081 | 10,495 |
| **% of candidates** | 19.74 | 29.61 | 5.41 | 3.31 | 40.79 | 1.14 |

The question was derived from the topic of *Living Things* and it intended to measure candidates' understanding of the characteristics which enable birds to fly. **Table 1** shows that the level of performance of the candidates' in this question was weak.

A total of 374,081 (40.81%) candidates chose the distractor E, *wing bones are stronger*. They were attracted by the word '*wings*', an organ which is used by birds to fly. On the other hand 271,531 (29.61%), of the candidates chose B, *Slim bones with a hollow inside* which was the correct answer. This indicates that the candidates had enough understanding of the characteristics which enable birds to fly. However, 181,055 (19.74%) of the candidates chose the distractor A, *Soft bones with feathers* because they were attracted by word 'feathers'. This suggests that they did not understand that not all birds with feathers can fly.

A total of 79,925 (8.72%) candidates chose either the distractor C, *Jointed bones* or D, *have many bones*. These candidates failed to understand that these are not the characteristics which enable birds to fly. They did not know that many animals have jointed bones just to help them to flex their muscles when moving. They did not understand that slim and hollow bones reduce the weights of birds for easy flying. Besides, 10,495 (1.01%) comprise of the candidates who chose more than one option, for they failed to adhere to the instructions or those who did not answer this question.

**Question 2**: The main groups of living things are

A plants and birds
B plants and lizards
C animals and leaves
D plants and animals
E animals and bacteria

The question was derived from the topic of *Living Things* and it intended to measure the candidates' ability in classifying major groups of living things. **Figure 1** shows that the level of performance of the candidates in this question was good.

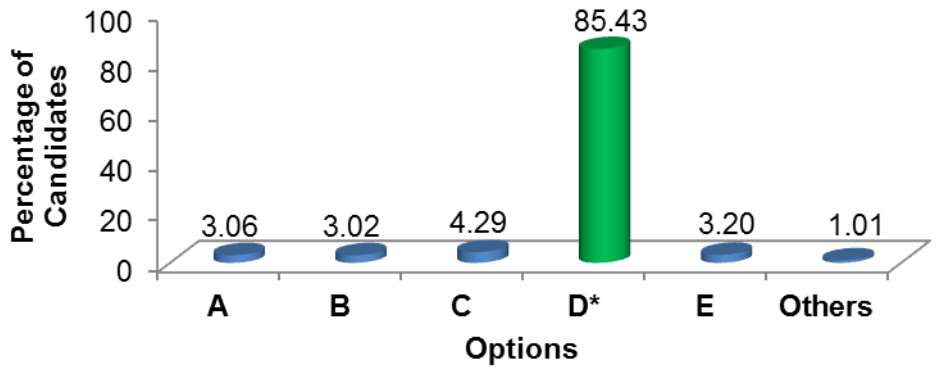


***Figure 1:*** *The Percentage of the Candidates' choices in Each Option*.

A total of 783,455 (85.43%) candidates chose the correct answer D, *plants and animals* because they had understanding of the major groups of living things. 55,776 (6.08%) candidates chose either A, *plants and birds* or B, *plants and lizards*, because plants are the major group of living things. They however did not understand that lizards and birds are in sub-group of living things, not the major group. 68,614 (7.48%) of the candidates who chose either distractor C, *animals and leaves* and E, *animals and bacteria* were attracted by the word *animals* which represents a major group of living things. However, they failed to understand that leaves and bacteria are not part of the major group of living things. Besides, 9242 (1.01%) of the candidates were those who chose more than one option for failing to adhere to the instructions or were those who did not answer the question.

**Question 3**: Which of the following are the types of seed which are self- dispersing?

A Coconut and cotton

B Cowpea and pigeon pea

C Cowpea and pawpaw

D Mango and guava

E Orange and pigeon pea

**Table 2**: Number and Percentage of the Candidates in Each Option.

| **Option** | **A** | **B*** | **C** | **D** | **E** | **Others** |
|---|---|---|---|---|---|---|
| **No. of candidates** | 183,702 | 468,169 | 75,713 | 149,219 | 29,810 | 10,444 |
| **% of candidates** | 20.03 | 51.05 | 8.26 | 16.27 | 3.25 | 1.14 |

The question was from the topic of *Living Things* and intended to measure the candidates' understanding of different ways of seed dispersal. **Table 2** shows that the level of performance of the candidates in this question was average.

A total of 468,199 (51.05%) candidates chose the correct answer B, *cowpea and pigeon pea*. Those candidates had enough understanding of different ways of seed dispersal.

289,225 (31.54%) of the candidates chose either distractor A, *coconut and cotton*, distractor C, *cowpea and pawpaw*, or distractor E, *Orange and pigeon pea*. Those candidates were attracted by these options because in each option there is at least one seed which is self–dispersed. For example, in the option A, there was cotton seed and in option C, cowpea.

49,219 (16.27%) of the candidates who chose distractor D, *mango and guava* lacked knowledge of the different ways of seed dispersal. Besides, 10,444 (1.14%) of the candidates either chose more than

one option for failing to adhere to the examination instructions or did not answer the question.

**Question 4**: Observe Figure Number 1, and then choose the answer which has the correct arrangement of the indicated parts A – D

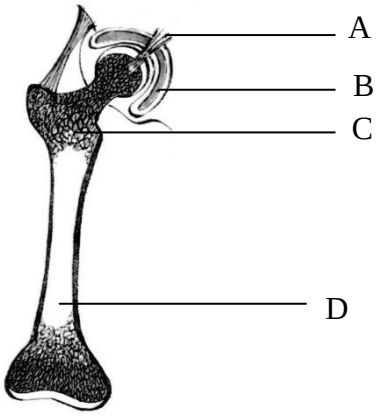


**Figure 1**

A Fibres, yellow bone marrow, red bone marrow, cartilage
B Red bone marrow, cartilage, yellow bone marrow, tendons
C Tendons, cartilage, red bone marrow, yellow bone marrow
D Cartilage, tendons, yellow bone marrow, red bone marrow
E Yellow bone marrow, cartilage, tendons, red bone marrow.

**Table 3**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C* | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 247,999 | 123,835 | 286,432 | 169,836 | 75,699 | 13,699 |
| **% of candidates** | 27.04 | 13.50 | 31.23 | 18.52 | 8.25 | 1.45 |

This question was prepared from the topic of Living Things and intended to measure the candidates' understanding of the parts of bone and their names. Data in **Table 3** shows that the performance of the candidates in this question was weak.

A total of 369,370 (40.27%) candidates chose either distractor B, *Red bone marrow, cartilage, yellow bone marrow, tendons*, D, *Cartilage, tendons, yellow bone marrow, red bone marrow*, or E, *Yellow bone marrow, cartilage, tendons, red bone marrow* because all the named parts though are the correct parts of bone, are not in the correct order. 286,432 (31.23%) candidates chose the correct option C, *Tendons, cartilage, yellow bone marrow, red bone marrow*. Those candidates had adequate knowledge of the parts of bone and their names. 247,999 (27.04%) candidates who chose distractor A, *Fibres, yellow bone marrow,red bone marrow, cartilage* had inadequate knowledge about the parts of bone and their names. Furthermore, 13,286 (1.45%) consisted of the candidates who chose more than one option for failing to adhere to the given instructions or those who did not answer the question.

**Question 5**: Observe Figure Number 2 and then answer the question which follows.

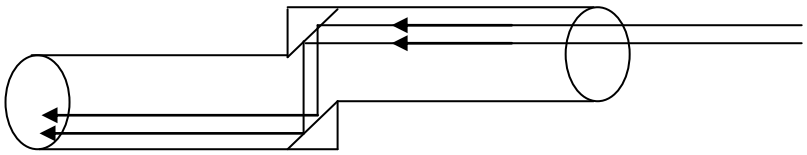

**Figure 2**

The device in Figure Na. 2 uses which characteristic of light?

A Reflection

B Penetration

C Diversion

D Converging

E Dispersion

**Table 4**: Number and Percentage of the Candidates in Each Option.

| Option | A* | B | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 402,555 | 209,046 | 119,908 | 108,964 | 64,410 | 12,404 |
| **% of candidates** | 43.87 | 22.79 | 13.07 | 11.88 | 7.02 | 1.35 |

The question was set from the topic of Energy, Machine and Work and it intended to test the candidates' understanding of characteristics which light display when it falls and passes through a glass. Data in **Table 4** shows that the performance of the candidates in this question was average.

A total of 502,328 (54.76%) candidates chose either the distractor B *penetration* C, *diversion*, D, *converging* and E, *dispersion*. Such candidates completely lacked knowledge of the characteristics of light when falls and pass through different media. 402,555 (43.87%) of the candidates chose the correct answer A, *reflection*. This shows that the candidates understood the characteristics of light when it falls and passes through different media for example, glass. Furthermore, 12,404 (1.35%) composed by those who chose more than one response contrary to the given instructons or those who left the question unanswered.

**Question 6**: Which diseases are prevented by vaccination?

A Measles and whooping cough

B Bilharziasis and malaria

C Diarrhea and diphtheria

D AIDS and diabetes

E Tuberculosis and chicken pox

**Table 5**: Number and Percentage of the Candidates in Each Option.

| Option | A* | B | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 562,740 | 145,097 | 42,086 | 69,973 | 86,054 | 11,137 |
| **% of candidates** | 61.36 | 15.82 | 4.59 | 7.63 | 9.38 | 1.21 |

The question was set from the topic of Health, Health Services and Methods of Preventing Diseases. The question intended to measure the candidates' knowledge about diseases which are prevented by vaccination. **Table 5** shows that the performance of the candidates in this question was good.

A total 562,740 of the candidates equal to 61.36 percent who chose the correct aption A, *Measles and whooping cough* had enough knowledge of the diseases that are prevented by vaccination. This good performance of tha candidates in this question can be contributed to education provided by public health workers through different media in school and home. 343,210 (37.42%) of the candidates who chose either the distractor B, *Bilharziasis and malaria*, C, *Diarrhea and diphtheria*, D, *AIDS and diabetes* or E, *Tuberculosis and chicken pox* failed to understand that those diseases have no vaccination, but are prevented by different methods; for example, malaria is prevented by sleeping under mosquito net whereas, AIDS is prevented by avoiding unprotected sexual intercorcouse. Contrarily, 11,137 (1.21%) of the candidates consists of those who chose more than one option for failing to

adhere to the instructions or those who did not answer the question at all.

**Question 7**: What is an important thing a pregnant woman should observe?

A Eat a lot of starch when she is approaching the expected day

B Perform tough tasks in order to be strong

C Attend clinic and eat balanced diet

D Sleep frequently

E Use perfumed soaps always

The question was from the topic of Health, Health Services and Methods of Preventig Diseases. It was intended to measure the candidates' understanding of the important things that a pregnant woman should observe. **Figure 2** shows that the performance of candidates in this question was good.

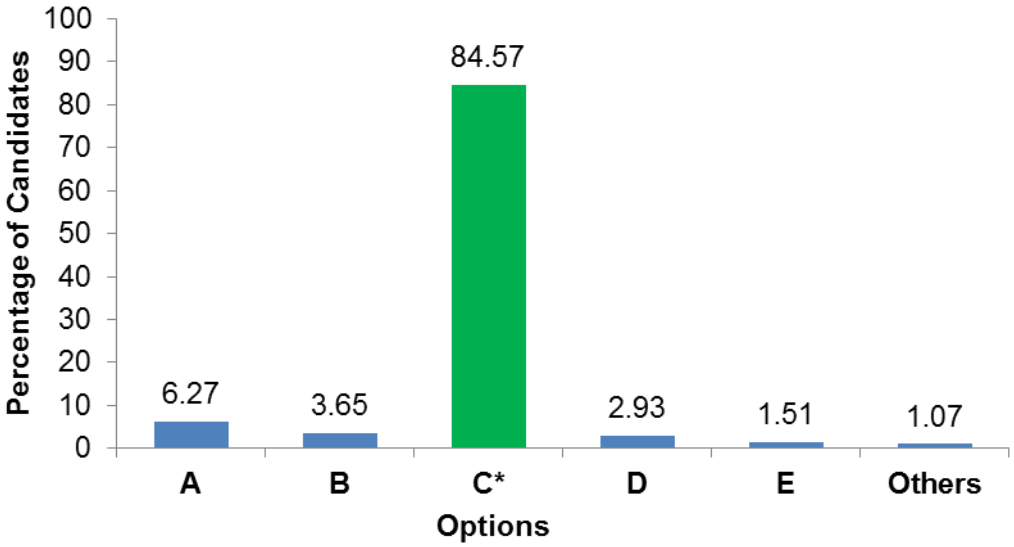


***Figure 2:*** *The Percentage of the Candidates' choices in Each Option*.

In this question, 775,541 (84.57%) candidates chose the correct answer C, *Attend clinic and eat balanced diet* because they had enough understanding of the important things a pregnant woman should observe. They understood that a pregnant woman should not only attend clinic but also eat balanced diet for proper development of a foetus. The good understanding by those candidates was enhanced by the knowledge obtained from their teacher at school and from advertisements by the government and health stakeholders through different media.

On the other hand, 57,522 (6.27%) of the candidates wrongly chose A *Eat a lot of starch when she is approaching the expected day*. This is because they had a concept that the starch gives the body energy, thus, as the act of giving birth requires a lot of energy, they were tempted to consider this as an answer. 33,500 of the candidates, equal to 3.65 percent, chose the distractor B, *Perform tough tasks in order to be strong*. Those candidates wrongly related doing hard jobs and doing light exercises, which is normally recommended for pregnant (woman as a way to help them to deliver safely). 26,832 (2.93%) of the candidates chose the distractor D, *Sleep frequently* because they used to hear and see some of pregnant women especially those with birth complications, recommended to have bed rest in order to avoid miscarriage. The concept led them to choose this wrong option. 13,852 (1.51%) of the candidates who chose the distractor E, *Use perfumed soaps always* lacked knowledge of the important things a pregnant woman should observe. Furthermore, 9,840 (1.07%) of the candidates either chose more than one option for failing to adhere to the instructions or did not answer the question at all.

**Question 8**: A disease which resulted from respiratory system problem is

A Asthma

B severe malaria

C fainting

D epilepsy

E diabetes.

**Table 6**: Number and Percentage of the Candidates in Each Option.

| **No. of candidates** | **A*** | **B** | **C** | **D** | **E** | **Others** |
|---|---|---|---|---|---|---|
| **% of candidates** | 655,000 | 37,199 | 94,022 | 83,920 | 36,073 | 10,873 |
| **No. of candidates** | 71.42 | 4.06 | 10.25 | 9.15 | 3.93 | 1.19 |

The question was set from the topic of Health, Health Services and Methods of Preventing Diseases. It was intended to test the candidate's knowledge about diseases which resulted from the respiratory system problem. **Table 6** shows that the performance of the candidates in this question was good.

According to the statistics, 655,000 (71.42%) of the candidates chose the correct answer A, *Asthma*. This implies that they had enough knowledge of the diseases which resulted from the respiratory system problems. On the other hand, 177,942 (19.40%) of the candidates who chose distractors C, *fainting* and D, *epilepsy* failed to realize that, fainting and epilepsy result from the failure of the nervous system, not the respiratory system.

37,199 (4.06%) of the candidates who chose B, *severe malaria* failed to understand that malaria is a disease caused by a protozoan called plasmodium and that it affects various body systems. 36,073

(3.93%) candidates who chose E, *diabetes* failed to understand that diabetes is a disease which results from the failure of the pancrease to produce enough insulin. On the other hand, 10,873 (1.19%) was comprised by the candidates who either chose more than one option for failing to adhere to the examination instructions or did not answer the question.

**Question 9**: What will happen if the nervous system stops functioning?

A A person will start shivering.

B A person will feel weak.

C A person will feel severe body pains.

D There will be no communication within the body.

E A person will start loosing weight.

**Table 7**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C | D* | E | Others |
|---|---|---|---|---|---|---|
| No. of candidates | 40,471 | 87,238 | 100,415 | 639,495 | 38,510 | 10,958 |
| % of candidates | 4.41 | 9.51 | 10.95 | 69.73 | 4.20 | 1.19 |

The question was prepared from the topic of Health, Health Services and Methods of Preventing Diseases. The question intended to measure the candidates understanding of the symptoms of the nervous system's failure. Data in **Table 7** shows that the performance of the candidates in the question was good.

A total of 639,495 (69.73%) candidates chose the correct answer D, *There will be no communication within the body*. Those candidates had enough understanding of thet nervous system. 125,748 (13.71%) of the candidates chose either the distractor B, *A person*

*will feel weak* or the distractor E, *A person will start loosing weight*. Those candidates failed to understand that loosing weight and feeling weak is a symptom of the lack of balanced diet or encroachment of a disease not a problem in the nervous system. 100,415 (10.95%) of the candidates chose the distractor C, *A person will feel severe body pains* because they failed to understand that the nervous system transfers infortiomation from one part of ythe body to another. Thus, when it fails, the body will not respond to pain stimuls. 40,471 (4.41%) of the candidates chose the distractor A, *A person will start shivering* because they failed to understand that shivering is a rhythmic contraction and relaxation of body muscles, which is caused by cold weather or severe malaria. Furthermore, 10,958 (1.19%) of the candidates were those who chose more than one option for failing to adhere to the instructions or those who did not answer this question entirely.

**Question 10**: One of the symptoms of kwashiorkor is

A the face resembles that of an old man
B white eyes and flue
C neck gland enlargement
D feeling cold and vomiting
E big stomach and swelling of legs.

**Table 8**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C | D | E* | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 177,757 | 89,598 | 244,836 | 78,797 | 313,908 | 12,191 |
| **% of candidates** | 19.38 | 9.77 | 26.70 | 8.59 | 34.23 | 1.33 |

This question was derived from the topic of *Health, Health Services and Methods of preventing Diseases*. It intended to test the

candidates' understanding of the symptoms of kwashiorkor. Data in **Table 8** shows that the candidates' performance in the question was weak. That is only (34.23%) of them were able to choose the correct option.

The analysis indicates that 501,390 (54.70%) of the candidates either chose the distractor A *the face resembles that of an old man*, C, *neck gland enlargement*, D, *feeling cold and vomiting*. These candidates failed to distinguish between the symptoms of kwashiorkor and the symptoms of other diseases. For example, distractor D, *feeling cold and vomiting* is a symptom of malaria rather than the kwashiorkor. Those candidates who chose the distractor C, *neck gland enlargement* failed to understand that this is a symptom of the lack of iodine in human body, which causes a goiter. A total of 89,598 (9.77%) candidates chose the incorrect option B, *white eyes and flue*. Those candidates did not understand symptoms seen in a person suffering from kwashiorkor.

On the other hand, 313,908 (34.23%) candidates chose the option E, *big stomach and swelling of legs* which was the correct answer. This is because they had enough understanding of the symptoms of kwashiorkor. Furthermore, 12,191 (1.33%) of the candidates either chose more than one option, contrary to the instructions given in the examination or did not answer this question entirely.

**Question 11**: Family planning methods which are safer for the health of the mother are

A loops and injection

B natural methods

C injection and pills

D pills and condom

E condom and injection.

**Table 9**: Number and Percentage of the Candidates in Each Option.

| Option | A | B* | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 124,568 | 374,002 | 163,155 | 135,066 | 108,682 | 11,614 |
| **% of candidates** | 13.58 | 40.78 | 17.79 | 14.73 | 11.85 | 1.27 |

The question was set from the topic of Health, Health Services and Methods of Preventing Diseases. The question intended to measure the candidates' knowledge of the family planning methods. **Table 9** shows that, the the performance of the candidates in this question was average.

A total of 374,002 (40.78%) candidates chose the correct answer B *natural methods* because they had enough understanding of the best and healthier family planning methods.

A total of 287,723 (31.37%) candidates chose either the distractor A, *loops and injection* or C, *injection and pills.* Those candidates were attracted by distractors because they knew that loops and pills are the family planning methods. That is, they failed to understand that they cause overweight, heart problems and interfere menstrual cycle. 243,748 (26.58%) of the candidates chose either the

distractor D, Pills and condom or the distractor E, *condom and injection*. Those candidates were attracted to those options because they both carry the word *condom* which prevents pregnancy and spread of sexually transmitted diseases. However, those candidates failed to understand that condom causes virgina problems such as itching and swelling. Further, 11,614 (1.27%) of the candidates either chose more than one option after failing to adhere to the instructions of the examination or they did not answer the question completely.

**Question 12**: The best way to avoid malnutrition is

A to use preventive medicine frequently
B to educate the society on the use of balanced diet
C to eat green vegetables in plenty
D to use drugs which increase nutrients in the body
E to increase the number of meals per day.

**Table 10**: Number and Percentage of the Candidates in Each Option.

| Option | A | B* | C | D | E | Others |
|---|---|---|---|---|---|---|
| No. of candidates | 65,454 | 590,566 | 137,775 | 59,322 | 52,531 | 11,439 |
| % of candidates | 7.14 | 64.40 | 15.02 | 6.47 | 5.73 | 1.25 |

The question was based on the topic of Health, Health Services and Methods of Preventing Diseases. The question was set to measure the candidates' understanding of the balanced diet. The performance of the candidates in this question was good as shown in **Table 10**.

A total of 590,566 (64.40%) candidates chose B, *to educate the society on the use of balanced diet* because they were knowledgeable about how to avoid malnutrition.

A total of 137,775 (15.02%) candidates chose the distractor C, *to eat green vegetables in plenty* because they failed to understand that malnutrition is caused by the lack of the balance diet, not green vegetables only. 124,776 (13.61%) of the candidates chose either the distractor A, *to use preventive medicine frequently* or D, *to use drugs which increase nutrients in the body*. Those candidates completely lacked the knowledge of the ways to prevent malnutrition. 52,531 (5.73%) of the candidates chose the distractor E, *to increase the number of meals per day*. Those failed to understand that eating too much might cause malnutrition diseses such as the obesity, which results due to eating much carbohydrate. Besides, 11,439 (1.25%) of the candidates either chose more than one option for failing to adhere to the instructions of the examination or did not answer the question.

**Question 13**: A person who suffered an electric shock can be assisted by the use of

A legs
B iron bar
C dry wood
D hands
E wet wood.

**Table 11**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C* | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 14,513 | 30,684 | 751,292 | 23,670 | 86,545 | 10,383 |
| **% of candidates** | 1.58 | 3.35 | 81.92 | 2.58 | 9.44 | 1.13 |

The question originated from the topic of First Aid. It intended to measure the candidate's understanding of rescure procedure for a person who suffered from an electric shock. Candidates' performance in this question was good as shown in **Table 11** gives the details.

A total of 751,292 (81.92%) candidates chose the correct answer C, *dry wood* because they had enough understanding of rescure procedure for a person who has suffered from an electric shock. They also understood tha dry wood is a bad conductor of electricity; hence it does not pose denger to the rescuer.

155,412 (16.95%) of the candidates chose either the distractor A *legs*, B *iron bar*, D, *hands* or E, *wet wood*. Those candidates failed to understand that all the mentioned things in the options are good conductors of electricity and if used, they could cause risk to the rescuer. Furthermore, 10,383 (1.13%) of the candidates consisted of those who either chose more than one option after failing to adhere to the instructions of the examination or those who did not answer this question entirely.

**Question 14**: Two clean pieces of wood wrapped on the part of broken bone help to

A prevent bleeding
B give heat to the wound
C support the broken part
D cure the broken part
E join the broken part.

**Table 12**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C* | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 75,623 | 47,632 | 375,818 | 48,627 | 357,157 | 12,230 |
| **% of candidates** | 8.25 | 5.19 | 40.98 | 5.30 | 38.94 | 1.33 |

The question originated from the topic of First Aid and it intended to measure the candidate's knowledge in giving First Aid to a person with a bone fracture. Data analysis in **Table 12** reveals that the performance of the candidates in this question was average.

That is, a total of 375,818 candidates, equal to 40.98 percent chose the correct answer C, *support the broken part*. Those candidates had enough understanding of the provision of First Aid to a victim of bone fracture. They understood that supporting the broken part with clean pieces of wood enables the broken part to align and it prevents it from dislocation which might cause more pain to the injured person. 357,157 of the candidates, equivalent to 38.94 percent, chose the distractor E, *join the broken part*. Those candidates failed to understand that wrapping the broken bone with two pieces of wood can not join the broken part, rather, it is a First Aid provided before a victim is sent to hospital. 75,623 of the candidates, equal to 8.25 percent, chose the distractor A, *prevent bleeding*. Those candidates failed to understand that the aim of wrapping the broken bone with pieces of wood is to support the broken part, not to stop bleeding. 48,627 of the candidates, equal to 5.30 percent, chose the distractor D, *cure the broken part*. Those candidates failed to understand that curing the broken part is not a First Aid rather, it is a treatment provided at the health center.

47,632 of the candidates, equal to 5.19 percent, chose the distractor B, *give heat to the wound*. Those lacked knowledge of the provision of First Aid. A total of 12,230 candidates equal to 1.33 percent, were those who either chose more than one option for failing to adhere to the instructions of the examination or did not answer the question.

**Question 15**: The gas used to extinguish fire is

A hydrogen
B carbon dioxide
C nitrogen
D carbon
E oxygen

**Table 13**: Number and Percentage of the Candidates in Each Option.

| Option | A | B* | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 66,668 | 567,224 | 86,081 | 48,866 | 136,275 | 11,973 |
| **% of candidates** | 7.27 | 61.85 | 9.39 | 5.33 | 14.86 | 1.31 |

The question was set from the topic of First Aid and it intended to measure the candidates' understanding of the gas used to extinguish fire. The performance of the candidates in this question was good as shown in **Table 13**.

A total of 567,224 (61.85%) candidates chose the correct answer B, *Carbon dioxide*. Those candidates had adequate understanding of the gas used to extinguish fire.

On the other hand, 48,866 (5.33%) of the candidates chose the distractor D, *Carbon*. Those were seemingly attracted to this option because the two words 'carbon' and 'carbon dioxide' are closely related. They however failed to realize that carbon is an element in

solid state, whereas, carbon dioxide is gas. 289,024 (31.52%) of the candidates chose either the distractor A *hydrogen* C, *nitrogen* or the distractor E, *Oxygen*. They appear to have inadequate knowledge of the gas used to extinguish fire. They failed to understand that those gases are denser than the air and therefore can not be used to extinguish fire. Furthermore, a total of 11,973 (1.31%) candidates either chose more than one option contrary to the instructions given in the examinations or did not attempt the question entirely.

**Question 16**: HIV is **not** transmitted by

A sexual intercourse

B sharing needle

C mosquito bite

D sharing razor blade

E blood transfusion.

**Table 14**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C* | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 181,834 | 34,371 | 623,799 | 28,184 | 38,593 | 10,306 |
| **% of candidates** | 19.83 | 3.75 | 68.02 | 3.07 | 4.21 | 1.12 |

The question was from the topic of Health, Health Services and Methods of Preventing Diseases. It was set to measure the candidates' understanding of the different ways of transmiting HIV (AIDS). **Table 14** shows that the performance of the candidates in this question was good.

A total of 623,799 (68.02%) candidates chose the correct answer C, *mosquito bite*. Those candidates had enough understanding of the ways of HIV transmission. Thus, they successfully identified the the

way through which HIV is not transmited. Good understanding of the candidates in this question was caused by the education offered in the class room, through advertisements given by the government and other stakeholders through different media. In addition, seminars, conferences and workshops conducted in towns and in villages might have increased the candidates' understanding of HIV and AIDS. A total of 282,982 candidates, equal to 30.86 percent, chose either the distractor A *sexual intercourses*, B, *sharing needles,* D, *sharing razor blade* or E, *blood transfusion*. All these distractors are ways in which HIV (AIDS) is transmitted Hence, these candidates did not undrestand the requirement of the question. This led them to choosing options which indicate ways in which HIV/AIDS is transmitted instead of the ways in which HIV/ AIDS is not transmitted. Besides, 10,792 (1.12%) candidates either chose more than one option for failing to adhere to the examination instructions or did not answer the question completely.

**Question 17**: The relationship between sexually transmitted diseases and AIDS is that

A it is easy to get HIV infection if you have sexually transmitted diseases

B sexually transmitted diseases are the same as AIDS

C drugs that cure sexually transmitted diseases are also used to cure HIV

D sexually transmitted diseases and AIDS are transmitted through sexual intercourse only

E sexually transmitted diseases and AIDS can be cured.

**Table 15**: Number and Percentage of the Candidates in Each Option.

| Option | A* | B | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 414,100 | 133,036 | 41,796 | 287,649 | 29,714 | 10792 |
| **% of candidates** | 45.15 | 14.51 | 4.56 | 31.37 | 3.24 | 1.18 |

The question was set from the topic of Health, Health Services and Methods of Preventig Disease. It intended to measure the candidate's knowledge of the relationship between sexually transmitted diseases and AIDS. **Table 15** shows that the candidates' performance in this question was average.

A total of 414,100 (45.15%) candidates chose A it is easy to get HIV infection if you have sexually transmitted diseases. Those candidates had enough knowledge about the relationship between sexually transmited diseases and the AIDS.

287,649 (31.37%) of the candidates chose the distractor D, *sexually transmitted diseases and AIDS are transmitted through sexual intercourse only*. Those candidates failed to understand that AIDS is not transmitted by sexual intercourse only but also transmitted through sharing razor blade and receiving blood from an affected person.

133,036 (14.51%) of the candidates chose the distractor B, *sexually transmitted diseases are the same as AIDS*. Those candidates failed to understand that sexual diseases, like syphilis and gonorrhea, are different from AIDS. That is, they are transmitted by sexual intercourse only. Contrarily but AIDS can be transmitted by means other than the sexual intercouse. 71,510 (7.80%) of the candidates chose either the distractor C, *drugs that cure sexually transmitted diseases are also used to cure HIV* or E, *sexually transmitted*

*diseases and AIDS can be cured*. Those candidates were not aware that AIDS has no cure. Furthermore, 10,792 (1.18%) of the candidates was composed by those who chose more than one option after failing to adhere to the examination instructions or those who did not answer this question.

**Question 18**: Which of the following sentences has the correct meaning of AIDS?

A Loss of body immunity.

B High body immunity.

C Absence of body immunity.

D Defficiency of body immunity.

E Ability of body immunity.

**Table 16**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C | D* | E | Others |
|---|---|---|---|---|---|---|
| No. of candidates | 41,802 | 29,937 | 208,724 | 608,776 | 18,498 | 9,350 |
| %of candidates | 4.56 | 3.26 | 22.76 | 66.38 | 2.02 | 1.02 |

The question was prepared from the topic of HIV/AIDS and it intended to measure the candidates' understanding of the meaning of AIDS. **Table 16** shows that the performance of the candidates in this question was good.

A total of 608,776 candidates, equal to 66.38 percent chose the correct answer D, *deficiency of body immunity*. Those candidates understood that the acronym AIDS refers to Aquired Immune Defficiency Syndrome and that it has to do with deficiency of body immunity. 208,724 of the candidates, equal to 22.76 percent, chose the distractor C, *absence of body immunity*. Those candidates failed

to understand that absence of body immunity is a condition whereby the immunity is not present at all, whereas the deficiency of body immunity is a condition where by the immunity is weak. 41,802 (4.56%) of the candidates, equivalent to 4.56 percent chose the distractor A *Loss of body immunity*. Those candidates failed to understand that if the immunity of the body is lost, the body becomes weak, which is a symptom of AIDS, not the meaning of AIDS. 29,937 of the candidates, which is equivalent to 3.26 percent, chose the distractor B, *high body immunity* because they failed to understand that AIDS does not raise body immunity, but rather weakens the immunity. 18,498 of the candidates, equal to 2.02 percent, chose the distractor E, *Ability of body immunity*. Those candidates failed to understand that AIDS weakens the ability of body to resist attacks by the diseases. Furthermore, 9,350 of the candidates, equal to 1.02 percent, either chose more than one option for failing to adhere to the instructions of the examination or did not answer this question completely.

**Question 19**: One of the methods of reducing HIV transmission is

A to reserve area for people living with HIV
B to avoid sharing food utensils with people living with HIV
C to eat balanced diet and drink safe water
D to change behaviors and avoid unprotected sex
E to perform physical exercises.

This question was from the topic of HIV/AIDS and was set to test the candidate's knowledge of the methods of reducing HIV transmission. **Figure 3** shows that the performance of the candidates in the question was good.

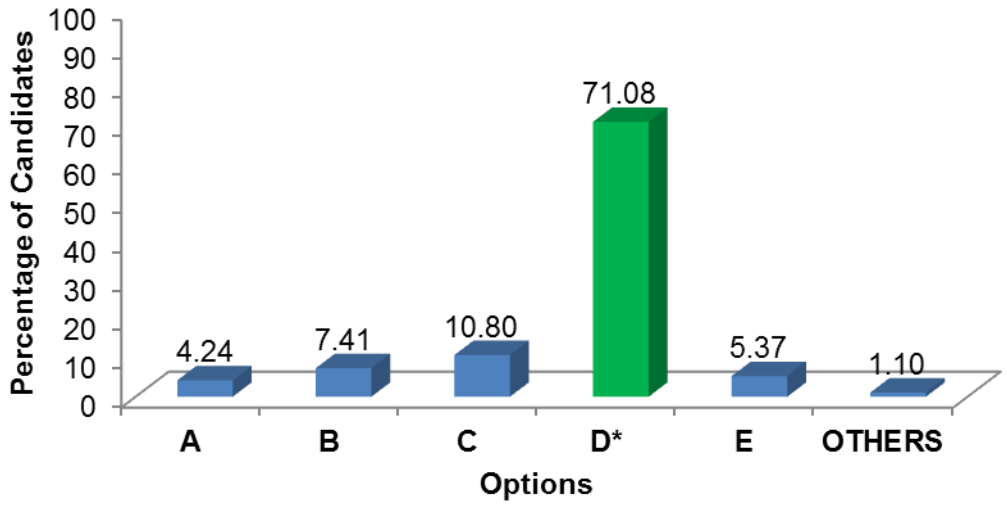


***Figure 3:*** *The Percentage of the Candidates' choices in Each Option*.

Data analysis indicates that 651,824 of the candidates, equal to 71.08 percent, chose the correct answer D, *to change behaviors and avoid unprotected sex*. Those had enough knowledge of the methods of reducing HIV transmission. A total of 148,350 (16.08%) of the candidates chose either the distractor, C, *to eat balanced diet and drink safe water* or E, *to perform physical exercises*. Those candidates lacked adequate knowledge of the methods of reducing HIV transmission. They failed to differentiate between the methods of reducing HIV transmission and the ways HIV/AIDS victims should live. 106,832 (11.65%) of the candidates chose either the distractor, A, *to reserve area for people living with HIV* or B, *to avoid sharing food utensils with people living with HIV*. Such candidates were attracted to those distractors because of stigmatization that some people show against HIV/AIDS victims. Besides, 10,081 (1.10%) of the candidates either chose more than one option contrary to

instructions given in the examinations or did not attempt this question entirely.

**Question 20**: Why things thrown in the air fall down?

A Because of weight

B Because of force of friction

C Because of force of air

D Because of force of planets

E Because of force of gravity

**Table 17**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C | D | E* | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 118,386 | 90,232 | 103,699 | 39,801 | 553,112 | 11,857 |
| **% of candidates** | 12.91 | 9.84 | 11.31 | 4.34 | 60.31 | 1.29 |

This question was set from the topic of Methods and Procedures in Science. It intended to measure the candidates' understanding of force of gravity. **Table 17** shows that the candidate's performance in the question was good.

A total of 553,112 (60.31%) candidates chose the correct answer E, *because of force of gravity*. Those candidates had an understanding that the gravitational force originates from the center of the earth. They also understood that gravitational force always pulls objects toward the earth's surface. 118,386 (12.91%) of the candidates chose the distractor A, *because of weight*. Those candidates failed to understand that weight of the substance is a product of mass and gravitational force, and does not relate to pulling things down. 103,699 (11.31%) of the candidates chose the distractor C, *because*

*of force of air* for failing to understand that, force is a product of mass and acceleration. They failed to know that force resists the motion of objects in air, whereas, the gravitational force pulls objects towards the earth's surface.

A total of 90,232 (9.84%) candidates chose the distractor B, *because of force of friction*. Those candidates lacked the knowledge which could enable them to differentiate between the friction force and the gravitational force. 39,801 (4.34%) of the candidates chose the distractor D, *because of force of planets*. Those candidates used the terms gravitational force and force of planets interchangeably, thus considered them as gravitational forces which attracts things towards the surface of the earth. Furthermore, 1.29 percent (11,857) were those who chose more than one option for failing to adhere to the instructions of the examination or were those who did not answer the question completely.

**Question 21**: The relationship between magnet and electricity is

A the source of magnet is atomic energy

B electricity resist magnetism

C wherever there is magnet, there is electricity

D wherever there is electricity, there is magnetism

E magnetism resist electricity.

**Table 18**: Number and Percentage of the Candidates in Each Option.

| **Option** | **A** | **B** | **C** | **D*** | **E** | **Others** |
|---|---|---|---|---|---|---|
| **No. of candidates** | 214,187 | 92,686 | 191,501 | 271,314 | 134,527 | 12,872 |
| **% of candidates** | 23.36 | 10.11 | 20.88 | 29.58 | 14.67 | 1.40 |

This question was set from the topic of Energy, Machine and Work, and it intended to measure the candidate's understanding of the relationship between the magnet and electricity. **Table 18** shows that the performance of the candidates in this question was weak.

A total of 418,714 (45.66%) of the candidates selected either the distractor B *Electricity resist magnetism*, *C*, *wherever there is a magnet, there is electricity*, or the distractor E *magnetism resist electricity*.Those candidates were attracted to these distractors because the magnet and electricity were mentioned in the each options. Moreover, they failed to understand that wherever there is electricity, there is magnetism but wherever there is magnetism, there is not necessarily electricity.

A total of 271,314 (29.58%) candidates chose the correct answer D, *wherever there is electricity, there is magnetism*. This shows that the candidates had adequate knowledge of the relationship between the uses of the magnetism and electricity.

214,187 (23.36%) candidates chose the distractor A, *The source of magnet is atomic energy*. Those candidates had inadequate knowledge of the relationship between the magnetism and the electricity. Further, 12,872 (1.40%) of the candidates either chose more than one option after failing to adhere to the instructions or did not answer this question entirely.

**Question 22**: Figure Number 3 shows an example of a simple machine.

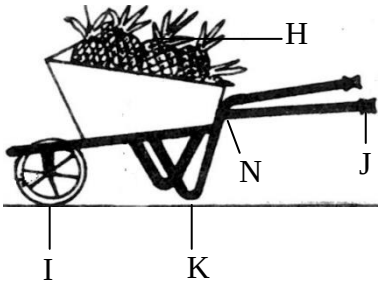


**Figure 3**

What is the position of the fulcrum when it is performing work?

A *K*.

B *I.*

C *J.*

D *H.*

E *N*.

**Table 19**: Number and Percentage of the Candidates in Each Option.

| Option | A | B* | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 296,520 | 414,999 | 85,664 | 49,105 | 59,433 | 11,366 |
| **% of candidates** | 32.33 | 45.25 | 9.34 | 5.35 | 6.48 | 1.24 |

This question was prepared from the topic of Energy, Machine and Work. It intended to measure the candidate's ability to identify the classes of lever and their examples. **Table 19** shows that the candidates' performance in the question was average.

The data analysis shows that 490,722 (53.51%) of the candidates chose either the distractor A, *K C, J D, H* or E, *N.* Those candidates did not understand that the wheelbarrow is an example of the second class lever, whereby, the load is between the fulcrum and the Effort.

On other hand, 414,999 (45.25%) of the candidates chose the correct answer B, *I*. Those candidates recognized that, Figure 3 is a wheelbarrow with a load in it which is an example of the second class lever, where *I* represent a position of fulcrum. Furthermore, 11,366 (1.24%) candidates either chose more than one option, indicating that they failed to folweak the instructions of the examination or they did not answer this question completely.

**Question 23**: The unit measure of force is

A Metre

B Kilogramme

C Joule

D Kilometre

E Newton.

**Table 20**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C | D | E* | Others |
|---|---|---|---|---|---|---|
| No. of candidates | 66,761 | 90,477 | 253,667 | 55,563 | 438,160 | 12,459 |
| % of candidates | 7.28 | 9.87 | 27.66 | 6.06 | 47.78 | 1.36 |

This question was from the topic of Energy, Machine and Work and it intended to measure the candidate's understanding on stating the SI unit of force. Dat from **Table 20** shows that the performance of the candidates in this question was average.

A total of 438,160 (47.78%) candidate chose the correct answer which was E, *newton.*This shows that they had adequate knowledge of the SI unit of force. 253,667 (27.66%) of the candidates chose the

distractor C, *joule*, as they did not understand that, joule is a unit measure of energy and work. Likewise, 90,477 (9.87%) of the candidates chose the distractor B, *kilogramme*, as they did not understand that, kilogram is the unit measure of mass. 66,761 (7.28%) of the candidates chose the distractor A, *Metre*, as they failed to understand that, metre is a unit measure of distance. 55,563 (6.06%) of the candidates chose the distractor D, *kilometre*. Those failed to understand that *kilometre* is a unit measure of distance. Furthermore, 12,459 (1.36%) of the candidates was composed by those who eother chose more than one option because they failed to adhere to the instructions or did not answer the question entirely.

**Question 24**: Which instrument is used to measure a human body temperature?

A Thermometer.
B Galvanometer.
C Ameter.
D Balance.
E Voltmeter.

**Table 21**: Number and Percentage of the Candidates in Each Option.

| Option | A* | B | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 584,088 | 140,416 | 63,373 | 62,990 | 54,256 | 11,964 |
| **% of candidates** | 63.69 | 15.31 | 6.91 | 6.87 | 5.92 | 1.30 |

This question was set from the topic of Health, Health Services and Methods of Preventing Diseases. The question intended to measure the candidate's understanding of the uses of instruments. Data from

**Table 21** shows that the performance of the candidates in this question was good.

A total of 584,088 (63.69%) candidates chose the correct answer A *thermometer*. Those had enough understanding of the use of a thermometer.

258,045 (28.14%) of the candidates chose either the distractor B, *Galvanometer* C, *Ameter* or the distractor E, *Voltmeter*. Those candidates failed to understand that *galvanometer, ammeter and voltmeter* are used to measure direction of electric currents, electric current and potential difference, respectively.

Likewise, 62,990 (6.87%) of the candidates who chose the distractor D, *balance* failed to understand that a balance is used to measure mass. Besides, 11,964 (1.30%) of the candidates either chose more than one option for failing to adhere to the instructions of the examination or did not answer the question completely.

**Question 25**: The following are sources of electricity **except**

A battery
B dry cell
C bulb
D generator
E magnet.

**Table 22**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C* | D | E | Others |
|---|---|---|---|---|---|---|
| No. of candidates | 40,841 | 208,815 | 317,323 | 74,230 | 264,311 | 11,567 |
| % of candidates | 4.45 | 22.77 | 34.60 | 8.09 | 28.82 | 1.26 |

The question was set from the topic of Energy, Machine and Work. It aimed at measuring the candidate's understanding of various sources of electricity. **Table 22** shows that the performance of the candidates in the question was weak.

A total of 317,323 (34.6%) candidates chose the correct option C, *bulb*. Those candidates understood that bulb is a resistor which gives out light, not the source of electricity.

A total of 338,541 (36.91%) candidates chose either the distractor D, *generator* or the distractor E, *magnet*. Those candidates failed to understand that generator is a machine which produces electricity by converting wind energy, water or fuels into electrical energy. Futhermore, they failed to understand that once a coil of wire is rotated into the magnetic field it produces electricity. 249,656 (27.22%) candidates chose either the distractor A, *battery* or B, *dry cell*. Those candidates failed to understand that battery and dry cell are the sources of electricity. Besides, 11,567 (1.26%) of the candidates were those who either chose more than one option for failing to adhere to the instructions of the examination or were those who did not answer the question.

**Question 26**: What is the meaning of friction?

A A force which produce motion.
B A force which stops motion.
C A force which accelerate motion.
D A force opposite to motion.
E An incident force.

This question was from the topic of Energy, Machine and Work and it intended to measure the candidates' understanding of the meaning

of friction. **Figure 4** shows that, the candidates' performance in this question was weak.

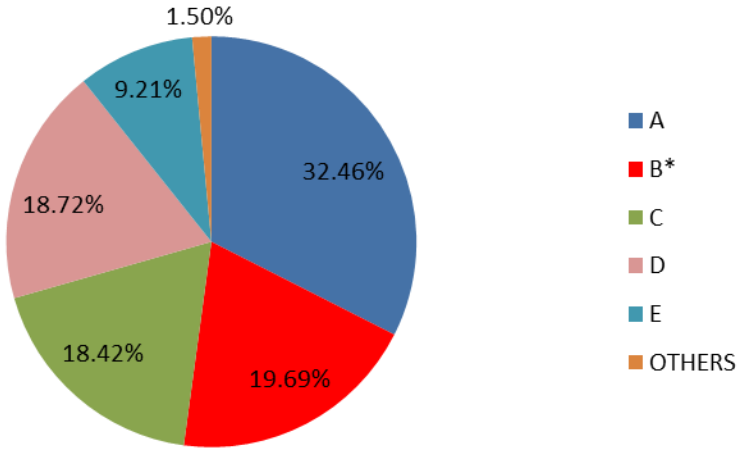


***Figure 4:*** *The Percentage of the Candidates' choice in Each Option*.

A total of 297,713 (32.46%) candidates chose distractor A, *A force which produce motion* because they failed to understand that a force which produce motion is a force which resisits a force which stops a motion. 168,955 (18.42%) of the candidates who chose distractor C, *A force which accelerate motion* failed to understand that a force which accelerate a motion is greater than a force which stops a motion. 171,668 (18.72%) of the candidates who chose distractor D, *A force opposite to motion* failed to understand that a force force opposite to motion is a force opposite to a force which stops motion. 84,421 (9.21%) of the candidates who chose distractor E, *An incident force* failed to understand that an incident force is the force perpendicular to the force which stops motion. On the other hand, 180,610 (19.69%) of the candidates who chose the correct option B, *A force which stops motion* had adequate knowledge of forces and their effects. Furthermore, 13,720 (1.50%) of the candidates either chose more than one option contrary to the instructions given in the examination or did not answer this question.

**Question 27**: Which one of the following lists of materials are in the group of complex machines?

A Padlock, hammer and scissors.

B Wheelbarrow, razorblade and hammer.

C A razor blade, padlock and a bicycle.

D A sewing machine, padlock and a bicycle.

E A razorblade, padlock and a wheelbarrow.

**Table 23**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C | D* | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 104,896 | 65,023 | 48,724 | 651,356 | 36,144 | 10,944 |
| **% of candidates** | 11.44 | 7.09 | 5.31 | 71.02 | 3.94 | 1.19 |

This question was set from the topic of Energy, Machine and Work. The question was set to test candidates' understanding of the structure of complex machines. **Table 23** shows that the candidates' performance in this question was good.

The correct answer D, *a sewing machine, padlock and a bicycle* was chosen by 651,356 (71.02%) candidates. Those candidates had enough knowledge that complex machines are made of two or more simple machines.

However, 254,787 (27.78%) of the candidates selected either the option A, *padlock, hammer and scissors* B, *wheelbarrow, razorbade and hammer* C, *A razorblade, padlock and a bicycle* or option E, *A razorblade, padlock and a wheelbarrow*. Those candidates were attracted to these options, because each contained at least one item which is a complex machine, which is a padlock. A total of 10,944

(1.19%) were those candidates who failed to follow instruction of the examination by choosing more than one option or those who did not attempt this question.

**Question 28**: Records of experiments are important because they are used to do the following **except**

A to compare results of one experiment and others

B to give information of the experiment

C to be used as reference by other experts

D to enable other experiments to be conducted

E to issue unconfirmed reports.

**Table 24**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C | D | E* | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 108,730 | 77,608 | 149,535 | 86,792 | 481,992 | 12,430 |
| **% of candidates** | 11.86 | 8.46 | 16.31 | 9.46 | 52.56 | 1.36 |

This question was set from the topic of Methods and Procedures in Science. It intended to measure the candidate's knowledge of scientific methods and procedures. **Table 24** shows that the candidates' performance in this question was average.

The analysis of data shows that a total of 422,665 (46.09%) candidates chose either the distractor A, *to compare results of one experiment and others* B, *to give information of the experiment* C, *to be used as reference by other experts* or the distractor D, *to enable other experiments to be conducted*. Those candidates failed to understand that the question required them to identify a distractor which is not one of the uses of the records in scientific experiment.

The correct answer E, *to issue unconfirmed report*s was chosen by 481,992 (52.56%) of the candidates. Those candidates had adequate knowledge about the use of records of experiment in the scientific investigation.

The rest 12,430 (1.36%) candidates either chose more than one option contrary to the instructions given in the examination or did not attempt this question intirely.

**Question 29**: Which of the following are the five components of a scientific report?

A Questionnaire, apparatus, method, aim and conclusion.

B Hypothesis, questionnaire, apparatus, results and conclusion.

C Questionnaire, apparatus, examples, results and conclusion.

D Aim, example, apparatus, results and conclusion.

E Aim, apparatus, methods, results and conclusion.

**Table 25**: Number and Percentage of the Candidates in Each Option.

| **Option** | **A** | **B** | **C** | **D** | **E*** | **Others** |
|---|---|---|---|---|---|---|
| **No. of candidates** | 70,960 | 179,444 | 76,214 | 89,013 | 489,026 | 12,430 |
| **% of candidates** | 7.74 | 19.57 | 8.31 | 9.71 | 53.32 | 1.36 |

This question came from the topic of Methods and Procedures in Science. It intended to measure the candidates' ability to identify the components of a scientific report. **Table 25** shows that the candidates' performance in the question was average.

The analysis of data shows that 415,631 (45.32%) of the candidates chose either the distractor A, *Questionnaire, apparatus, methods, aim, and conclusion* B, *Hypothesis, questionnaire, apparatus, results and conclusion* C, *Questionnaire, apparatus, examples, results and conclusion* the distractor D, *Aim, example, apparatus, results and conclusion*. Those candidates had inadequate knoweledge of the components of a scientific report and its sequential presentation in a scientific report from, Aim, apparatus, methods, results and conclusion.

The correct answer E, *Aim, apparatus, methods, results and conclusion* was chosen by 489,026 (53.32%) of the candidates. Those candidates successifully recalled the five components of a scientific report sequentially. Furthermore, 12,430 (1.36%) of the candidates either opted for more than one option, contrary to the instructions given in the examination or did not answer this question cmpletely.

**Question 30**: In order to come up with a hypothesis for a scientific experiment, there must be

A an experiment
B some data
C a report
D an apparatus
E a problem.

**Table 26**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C | D | E* | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 74,966 | 187,797 | 101,544 | 197,081 | 343,453 | 12,246 |
| **% of candidates** | 8.17 | 20.48 | 11.07 | 21.49 | 37.45 | 1.34 |

This question came from the topic of Methods and procedures in Science, and it intended to examine the candidate's ability to identify various scientific methods. **Table 26** shows that, the performance of the candidates in this question was weak.

A total of 364,307 (39.72%) candidates selected either the option A, *an experiment* B, *some data* or the option C, *a report*. Such candidates failed to understand that a hypothesis is a gues answer to a problem that has not been tested. Therefore, in order to come up with a hypothesis for a scientific experiment, there must be a problem.

Besides, 197,081 (21.49%) candidates selected the distractor D, *an apparatus*. Those related a scientific experiment with an apparatus used in the experiment. They failed to understand that an apparatus is a component of a scientific report. 343,453 (37.45%) of the candidates chose the correct option E, *a problem*. Those candidates understood the methods and procedures of a scientific investigation. Others, 12,246 (1.34%) candidates either chose more than one option contrary to the instructions of the examination or did not attempt this question comletely.

**Question 31**: In a lever, a load of 50 kg was put 3 meters from the fulcrum. What is the distance required from the fulcrum to put an effort of 20 kg in order to balance the lever?

A 1.6 m

B 6.7 m

C 7.5 m

D 2.5 m

E 3 m

**Table 27**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C* | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 91,060 | 80,949 | 477,437 | 156,800 | 97,429 | 13,412 |
| **% of candidates** | 9.93 | 8.83 | 52.06 | 17.10 | 10.62 | 1.46 |

This question was prepared from the topic of Energy, Machine and Work. It aimed at measuring the candidate's understanding of the formula used to calculate the distance from the load to the effort. **Table 27** shows that candidates' performance in this question was average.

The analysis of data shows that 426,238 (46.48%) of the candidates chose either the distractor A, *1.6 m* B, *6.7 m* D, *2.5 m* or distractor E, *3 m*. Those candidates failed to recall a correct formula used to calculate any of the four items in any class of lever which is;

*Effort x Effort arm = Load x Load arm*. The formula is derived from the law of levers which states that *the sum of clockwise moments about any point equals the sum of anticlockwise moments.*

A total of 477,437 (52.06%) candidates chose the correct option C, *7.5 m*. This shows that, the candidates had adequate knowledge about the law of levers and its application. Furthermore, 13,412 (1.46%) of the candidates either chose more than one option contrary to the instructions given in the examination, or did not attempt this question entirely.

**Question 32**: Blood defficiency is caused by

A decrease of white cells, iron and vitamin

B decrease of vitamin, protein and plasma

C increase of water in the body, decrease of iron and protein

D increase of platelets, iron and vitamin

E decrease of iron, vitamin and protein in the food

**Table 28**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C | D | E* | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 426,913 | 136,626 | 87,181 | 56,593 | 197,577 | 13,197 |
| **% of candidates** | 46.55 | 14.90 | 9.51 | 6.17 | 21.43 | 1.44 |

This question was set from the topic of Health, Health Services and Methods of Preventig Disease. It measured the candidate's understanding of the cause of blood defficiency. **Table 28** shows that, the performance of candidates in this question was weak.

A total of 426,913 (46.55%) candidates chose the distractor A *decrease of white cells, iron and vitamin*. Those candidates lacked knowledge of the components which cause blood defficiency. Furthermore, they failed to understand that blood defficiency is

caused by the lack of iron, vitamin and proten in the diet. 136,626 (14.90%) of the candidates chose the distractor B, *decrease of vitamin, protein and plasma*. Those also lacked knowledge of components of the blood and the material for making each components. 87,181 (9.51%) of the candidates chose the distractor C, *increase of water in the body, decrease of iron and protein*. Those candidates were attracted to the words 'decrease of iron' because blood is made up of iron, thus its decrease will lead to blood deficiency. 56,593 (6.17%) of the candidates chose the distractor D, *increase of platelets, iron and vitamin*. Those candidates failed to understand that the increase of the mentioned componets lead to the increase of blood. On the other hand, 197,577 (21.43%) of the candidates chose the correct answer E *decrease of iron, vitamin and protein in the food*. Those candidates had enough knowledge of things which constitute the formation of blood.

Besides, 13,197 (1.44%) of the candidates either chose more than one option for failing to adhere to the examination instructions or did not answer the question completily.

**Question 33**: Light ray travelling in a straight line strike an object and land on a plane mirror. What will be the characteristics of the object which appear in the mirror?

A The image will be upright.
B The image will be coloured.
C The image will be inverted.
D The image will be the same as the object.
E The image will be bigger than the object.

This question was set from the topic of Changes of Objects, States and Events. It intended to measure the candidates' understanding of the properties of image formed on a plane mirror. **Figure 5** shows that the level of performance of the candidates in this question was poor.

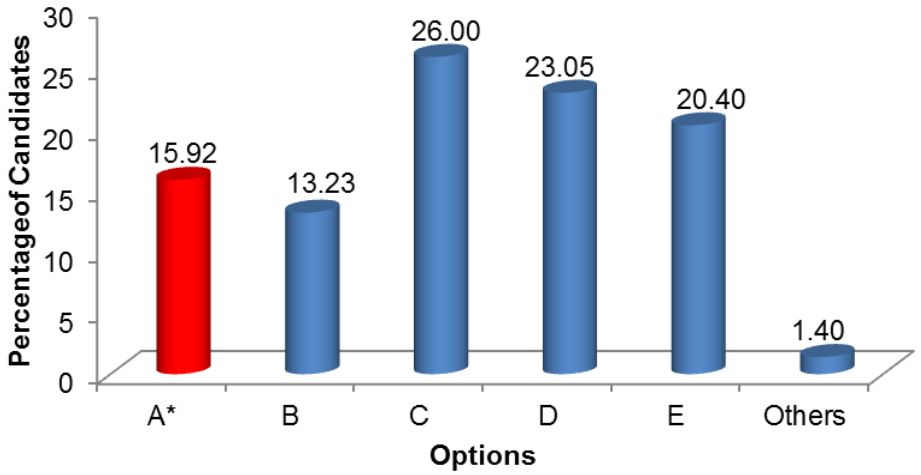


***Figure 5:*** *The Percentage of the Candidates' choices in Each Option*.

A total of 238,397 (26.00%) candidates who chose the distractor C, *The image will be inverted* failed to understand that an image can only inverted if an object is placed behind the center of curvature of concave mirror. 211,427(23.05%) of the candidates who chose the distractor D, *The image will be the same as the object* failed to understand that the image can be the same as the object if the object is placed at the center of curvature of concave mirror. 187,046 (20.40%) of the candidates who chose the distractor E, *The image will be bigger than the object* failed to understand that the image can be bigger than the object if the object is placed in between the center of curvature of concave mirror and the focus. 121,346 (13.23%) of the candidates who chose the distractor B, *The*

*image will be coloured* lacked the knowledge about the properties of image formed on a plane mirror.

On the other hand, 146,031 (15.92%) of the candidates chose the correct answer A, *The image will be upright*. Those candidates had enough knowledge of the properties of image formed on a plane mirror. However, 12,840 (1.40%) of the candidates either chose more than one option for failing to adhere to the examination instructions or did not answer the question.

**Question 34**: A person whose diet lacks iodine is likely to get the disease called

A beriberi

B goitre

C anaemia

D trachoma

E rickets.

**Table 29**: Number and Percentage of the Candidates in Each Option.

| Option | A | B* | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 113,848 | 486,943 | 106,065 | 84,874 | 114,242 | 11,115 |
| **% of candidates** | 12.41 | 53.10 | 11.57 | 9.25 | 12.46 | 1.21 |

This question was derived from the topic of Health, Health services and Methods of Preventing Diseases. It intended to measure the understanding of the importance of eating diet contains iodine. **Table 29** shows that the performance of the candidates in this question was average.

A total of 486,943 (53.10%) candidates chose the correct answer B, *goitre* because they had adequate knowledge of the importance of diet containing iodine. 419,029 (45.69%) of the candidates chose either the distractors A, *beriberi* C, *anaemia* D, *trachoma* or the distractor E, *rickets*. Those candidates had inadequate knowledge of the importance of the diet containing iodine. They failed to understand that beriberi is caused by the lack of vitamin B, anaemia is caused by the lack of iron, trachoma affects eyes and rickets resulting from the deficiency of vitamin D in the body. 11,115 (1.21%) of the candidates either chose more than one option for failing to adhere to the instructions or did not answer this question completely.

**Question 35**: Elements found in table salt are

A potassium and chlorine

B sodium and chlorine

C potassium and sodium

D sodium and sulphur

E Calcium and magnesium.

**Table 30**: Number and Percentage of the Candidates in Each Option.

| Option | A | B* | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 81,585 | 351,121 | 177,397 | 140,815 | 154,883 | 11,286 |
| **% of candidates** | 8.90 | 38.29 | 19.34 | 15.35 | 16.89 | 1.23 |

This question was set from the topic of Changes of Objects, States and Events. It was set to measure the candidates' understanding of the elements present in table salt. **Table 30** shows that the level of performance of the candidates in this question was weak.

A total of 554,680 (60.48%) candidates chose either the distractor A *potassium and chlorine*, C *potassium and sodium,* D *sodium and sulphur* and E *sodium and sulphur*. Those candidates they were attracted to the presence of sodium element in the distractors C or the distractor E. However, those who chose the distractors A and E lacked knowledge of the elements which make table salt. Futher, they failed to understand that the mentioned elements in distractor E are metals, thus, there is no any compound which can be formed between two metals. On the other hand, 351.121 (38.30%) of the candidates chose the correct answer B *sodium and chlorine*. Those candidates had enough understanding of the elements which combine to form table salts. However, 11,286 (1.23%) of the candidates either chose more than one option for failing to adhere to the examination instructions or did not answer the question entirely.

**Question 36**: Zuzu dipped a stone in a bucket full of water. About 5000 $cm^3$ of water spilled out. Which principle is correct about this scientific action?

A Water which spilled out is the same as that which remained in the bucket.

B The volume of the stone is the same as the volume of water which is spilled out.

C Water which spilled out is heavier than the stone.

D The stone is heavier than the water which spilled out.

E Water spilled out and stone have the same mass.

**Table 31**: Number and Percentage of the Candidates in Each Option.

| Option | A | B* | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 76,570 | 424,142 | 55,253 | 268,367 | 80,609 | 12,146 |
| **% of candidates** | 8.35 | 46.25 | 6.02 | 29.26 | 8.79 | 1.32 |

This question was set from the topic of Changes of Objects, States and Events, and it was intended to measure the understanding of the candidates on how to determine the volume of a stone by using water. **Table 31** shows that the performance of the candidates in the question was average.

A total of 424,142 (46.25%) candidates chose the correct answer B, *The volume of the stone is the same as the volume of water which is spilled out*. This shows that the candidates had adequate knowledge of how to determine the volume of stone by using water. 404,229 (44.07%) of the candidates chose either the distractor C, *Water which spilled out is heavier than stone*, D *the stone is heavier than the water which spilled out* or the distractor E, *Water spilled out and stone have the same mass*. Those candidates were attracted to those distractors because water, stone and mass have been mentioned in those options. However, the candidates failed to understand that there is no relationship between mass and water which spilled out. 76,570 (8.35%) of the candidates chose the distractor A, *Water which spilled out is the same as that which remained in the bucket*. Those candidates had inadequate knowledge of how to determine the volume of stone by using water. Candidates 12,146 (1.32%) either chose more than one option after

failing to adhere to the instructions or did not answer the question completely.

**Question 37**: Night blindness is a defect caused by the lack of

A vitamin *K*

B vitamin *A*

C vitamin *E*

D vitamin *C*

E vitamin *B*.

**Table 32**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C* | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 174,469 | 397,930 | 106,110 | 141,846 | 83,210 | 13,522 |
| **% of candidates** | 19.02 | 43.39 | 11.57 | 15.47 | 19.07 | 1.47 |

The question was set from the topic of Health, Health Services and Methods of Preventig Disease. The question aimed at measuring the candidates' knowledge of the vitamin whose deficiency lead to night blindness defect. The performance of the candidates in the question was average. **Table 32** presents the detailed performance in the question.

A total of 397,930 (43.39%) of the candidates who chose the correct answer B, *vitamin A* had enough knowledge of the diseases caused by the lack of balanced diet. Moreover, they had a good understanding of the function of different vitamins in the human body. On the other hand, a total of 505,636 (55.13%) candidates chose either the distractor A, *vitamin K*, C, *vitamin E*, D, *vitamin C* or E, *vitamin B*. Those candidates failed to understand the function of

different vitamins, for example they failed to realize that vitamin *K* helps blood to clot, vitamin *E* prevents sterility and vitamin *C* prevents scurvy. Besides, 13,522 (1.47%) of the candidates either chose more than one option for failing to adhere to the examination instructions or did not answer the question completely.

**Question 38**: Matter is made up of small particles known as
A valency
B compound
C element
D atom
E molecule.

**Table 33**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C | D* | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 46,311 | 96,681 | 116,446 | 575,264 | 70,357 | 12,028 |
| **% of candidates** | 5.05 | 10.54 | 12.70 | 62.73 | 7.67 | 1.31 |

This question was prepared from the topic of Changes of Objects, States and Events, and it intended to measure the candidates' understanding of small particles which constitute matter. **Table 33** shows that the performance of the candidates in the question was good.

More than half, 575,264 (62.73%) candidates chose the correct answer D, *atom*. Those had enough knowledge of the smallest particles which compose matter. 116,446 (12.70%) of the candidates chose the distractor C, *Element*. Those lacked enough knowledge of the relationship between the matter, element and small particles called atom. Although a matter is made up of elements, they are not small particles. 46,311 (5.05%) of the candidates who chose the

distractor A, *valency* failed to understand that a valency is the number of elctrons which can be lost or gained by a substance. 96,681 (10.54%) of the candidates who chose the distractor B, *compound* failed to understand that a compound is a substance which is made up of two or more elements which combine in simple or whole number and does not change. 70,357 (7.67%) of the candidates who chose the distractor E, *molecule* failed to understand that a molecule is a smallest particle of an element that can exist on its own and remain with properties of that element. Besides, 12,028 (1.31%) percent of the candidates either chose more than one option, for failing to adhere to the examination instructions or did not answer the question entirely.

**Question 39**: The amount of vapour in the air is measured by

A barometer

B hygrometer

C anemometer

D ammeter

E thermometer

F

**Table 34**: Number and Percentage of the Candidates in Each Option.

| Option | A | B* | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 172,899 | 461,287 | 123,716 | 56,810 | 89,416 | 12,959 |
| **% of candidates** | 18.85 | 50.30 | 13.49 | 6.19 | 9.75 | 1.41 |

This question was set from the topic of Changes of Objects, States and Events. It intended to measure the candidates understanding about the measurements. **Table 34** shows that the performance of the candidates in the question was average.

A total of 461,287 (50.30%) candidates chose the correct answer, which is B *Hygrometer*. Those candidates had adequate knowledge of measurement instruments. 172,899 (18.85%) of the candidates chose the distractor A, *barometer*. They failed to recognize that the instrument is used to measure the atmospheric pressure. 123,716 (13.49%) of the candidates chose the distractor C, *anemometer*. This instrument is used to measure the speed of wind. 89,416 (9.75%) candidates chose the distractor E, *Thermometer*. Those failed to understand that the instrument is used to measure the amount of temperature. 56,810 (6.19%) of the candidates chose the distractor D, *ammeter*. Those failed to differentiate between the hygrometer which measures the amount of vapour in the air and the ammeter which measure the amount of electric current. Furthermore, 12,959 (1.41%) of the candidates either chose more than one option after failing to adhere to the instructions of the examination or did not answer the question completely.

**Question 40**: In order for iron to get rust, it requires humidity and

A hydrogen
B carbon
C neon
D oxygen
E nitrogen.

**Table 35**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C | D* | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 88,875 | 102,553 | 51,426 | 602,154 | 60,436 | 11.643 |
| **% of candidates** | 9.69 | 11.18 | 5.61 | 65.66 | 6.59 | 1.27 |

This question was picked from the topic of Changes of Objects, States and Events. It was set to measure the candidates' knowledge of the necessary conditions for iron to get rust. **Table 35** shows that the performance of the candidates in the question was good.

A total of 602,154 (65.66%) candidates chose the correct answer D, *Oxygen*. This shows that they had adequate knowledge about the necessary conditions for iron to get rust. 102,553 (11.18%) of the candidates chose the distractor B, *Carbon*. Those candidates failed to understand that carbon can not react with iron in the presence of moisture. 88,875 (9.69%) of the candidates chose the distractor A, *Hydrogen*. Those candidates failed to recognize that hydrogen is a light gas and thus cannot form an oxide with iron. 60,436 (6.59%) of the candidates chose the distractor E, *Nitrogen* due to fact that this gas constitute 78% of air. 51,426 (5.61%) of the candidates chose the distractor C, *Neon* for failing to understand that Neon does not take part in any chemical reaction. Hence, cannot not react with iron to form rust. Furthermore, 11,643 (1.27%) of the candidates either chose more than one option for failing to adhere to the instructions of the examination or did not answer the question.

**Question 41**: What are the results of oxidation of glucose in the blood?

A water, oxygen and heat
B water, heat and carbon monoxide
C energy, water and carbon dioxide
D dew, heat and carbon dioxide
E oxygen, energy and sweat.

**Table 36**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C* | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 273,963 | 134,778 | 240,600 | 100,156 | 151,882 | 15,708 |
| **% of candidates** | 29.87 | 14.70 | 26.24 | 10.92 | 16.56 | 1.71 |

This question was from the topic of Essential Needs for Health and Living, and it inteded to measure the candidates' understanding of the oxidation of glucose in the blood. **Table 36** shows that the performance of the candidates in the question was weak.

A total of 425,845 candidates, equal to 46.43 percent, chose either the distractor A, *Water, Oxygen and Heat* or the distractor E, *Oxygen, Energy and Sweat*. Those candidates failed to understand that oxygen is not produced in oxidation process rather, it is used in the process. 240,600 of the candidates, equal to 26.24 percent, chose the correct answer C, *Energy, Water and Carbon dioxide* because they had adequate knowledge of the products of oxidation of glucose in the blood. On the other hand, 234,934 of the candidates, equal to 25.62 percent, chose either the distractor B, *Water, Heat and Carbon monoxide* or D, *Dew, Heat and Carbon dioxide*. Those candidates lacked knowledge about the products of oxidation of glucose in the blood. Furthermore, 15,708 of the candidates, equal to 1.71 percent, either chose more than one option for failing to adhere to the instructions of examination or did not answer the question.

**Question 42**: In order to crystallize salt from water, the water must be

A frozen

B vapourized

C cooled

D boiled

E poured.

**Table 37**: Number and Percentage of the Candidates in Each Option.

| Option | A | B* | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 145,313 | 238,427 | 63,419 | 381,001 | 77,018 | 11,909 |
| **% of candidates** | 15.85 | 26.00 | 6.92 | 41.54 | 8.40 | 1.30 |

The question was set from the topic of Changes of Objects, States and Events and it was set to measure the candidates' understanding about the method of separating salt from water. The candidates' performance in this question was weak as shown in **Table 37**.

A total of 381,001 (41.54%) candidates chose the distractor D, *boiled*. Those candidates lacked understanding about method of separating salt from salt solution. Further they failed to understand that when water is boiled, it changes to vapour and leaves salt in the evaporating container. 285,750 (31.17%) candidates chose either the distractor A, *frozen*, C, *cooled* or E, *poured*. Those candidates had no enough knowledge of methods of separating mixtures. Therefore they failed to identify the correct method of removing salt from salt solution.

On the other hand, 238,427 (26.00%) of the candidates chose the correct answer B *vapourized*. Those candidates had enough knowledge of how salt is separated from salt solution. In addition, they managed to differentiate between boiling and evaporation.

Besides, 11,909 (1.30%) of the candidates either chose more than one option after failing to adhere to the examination instructions or did not answer the question entirely.

**Question 43**: The Scientific Experiment carried in order to verify the truth of the results of another ongoing scientific experiment is known as

A special experiment

B reference experiment

C control experiment

D model experiment

E Concluding experiment.

**Table 38**: Number and Percentage of the Candidates in Each Option.

| **Option** | **A** | **B** | **C*** | **D** | **E** | **Others** |
|---|---|---|---|---|---|---|
| **No. of candidates** | 170,786 | 218,070 | 278,842 | 72,537 | 163,320 | 13,532 |
| **% of candidates** | 18.62 | 23.78 | 30.41 | 7.91 | 17.81 | 1.48 |

The question was based on the topic of Methods and Procedures in Science. It intended to measure the candidates' understanding of the types of scientific experiments and scientific procedures. **Table 38** shows that the performance of the candidates in the question was weak.

A total of 218,070 (23.78%) candidates chose the distractor B, *reference experiment*. Those candidates were attracted to this distractor because of wrong concept that scientific experiment carried in order to verify the truth of the results of another ongoing

scientific experiment is the one which is done for the second time. 170,786 (18.62%) of the candidates chose distractor A *special experiment* bacause of wrong concept that an experiment which is done to verify the truth of another experiment is a special experiment. 163,320 (17.81%) of the candidates chose the distractor E, *concluding experiment.* Those candidates thought that experiment carried in order to verify the truth of the results is the concluding experiment. 72,537 (7.91%) of the candidates chose the distractor D, *model experiment*. Those candidates failed to understand that a model experiment is an experiment conducted in a similar way as the real experiment and its result has no effect on the real experiment.

On the other hand, 278,842 (30.41%) of the candidates who chose the correct option C, *control experiment* had enough understanding about scientific experiment and their steps. Furthermore, 13,532 (1.50%) of the candidates either chose more than one option for failing to adhere to the examination instructions or did not answer the question.

**Question 44**: The function of the bile in the digestive system is

A to kill germs
B to dissolve proteins
C to break down fats
D to dissolve starch
E to absorb water.

**Table 40**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C* | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 186,966 | 129,710 | 407,372 | 101,779 | 78,368 | 12,892 |
| **% of candidates** | 20.39 | 14.14 | 44.42 | 11.10 | 8.55 | 1.41 |

This question was set from the topic of Living Things. It intended to measure the candidates' understanding of the function of bile in the digestive system. **Table 40** shows that the performance of the candidates in this question was average.

A total of 407,372 (44.42%) candidates chose the correct answer C, *to break down fats*. Those candidates had enough understanding about that, the function of bile that is to emulsify fats so as to simplify its digestion. 186,966 (20.39%) of the candidates chose the distractor A, *to kill germs*. Those candidates were attracted to this distractor because they failed to understand that the function of hydrochloric acid is to kill germs collected with food in the stomach. Moreover, 129,710 (14.14%) of the candidates were attracted to distractor B, *to dissolve proteins*. Those failed to understand that protein is digested by pepsin which is in the stomach and trypsin which is in the small intestine. 101,799 (11.10%) of the candidates chose the distractor D, *to dissolve starch* because they failed to understand that starch is digested by salivary amylase, which is contained in the saliva and other digestive juices from the small intestine. 78,368 (8.55%) of the candidates chose the distractor E, *to absorb water* because they failed to understand that the absorption of water is done by the colon, not the bile. Furthermore, 12,892 (1.41%) of the candidates either chose more than one option for

failing to adhere to the instructions of examination or did not answer the question completely.

**Question 45**: Which of the following food is mostly rich in starch?

A Mango

B Potatoes

C Soya bean

D Groundnut

E Fish

**Table 41**: Number and Percentage of the Candidates in Each Option.

| Option | A | B* | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 39,091 | 460,694 | 114,986 | 158,677 | 131,444 | 12,195 |
| **% of candidates** | 4.26 | 50.23 | 12.54 | 17.30 | 14.33 | 1.33 |

This question was made from the topic of Essential Needs for Health and Living Things. It intended to measure the candidates' understanding about food which is rich in starch. **Table 41** shows that the candidates' performance in this question was average.

A total of 460,694 (50.23%) candidates chose the correct answer B, *Potatoes*. Those managed to correctly differentiate between the foods that are mostly rich in starch and those with high proteins, such as soya bean, groundnut and fish. 158,677 (14.33%) of the candidates chose the distractor D, *Groundnut*. Those candidates failed to understand that groundnut is a type of food which contains oil, not starch. 246,430 (26.87%) of the candidates chose either the distractor C, soya bean or E, *Fish*. Those had inadequate knowledge that soya bean and fish contain protein. 39,091 (4.26%) candidates chose distractor A, *Mango*. Those candidates failed to understand

that mango is a fruit, therefore, it belongs to a group of food which contains vitamin and which reduce sugar. 12,195 (1.33%) of the candidates either chose more than one option for failing to adhere to the examination instructions or did not answer the question altogether.

**Question 46**: Which organs are strengthened by calcium mineral and vitamin D?

A Tongue and nose

B Skin and stomach

C Bones and teeth

D Lungs and liver

E Kidney and bladder

**Table 42**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C* | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 52,047 | 64,389 | 651,074 | 89,019 | 48,680 | 11,878 |
| **% of candidates** | 5.68 | 7.02 | 70.99 | 9.71 | 5.31 | 1.30 |

The question was set from the topic of Essential Needs for Health and Living and it was set to measure the candidates' knowledge of organs that are strengthened by calcium mineral and vitamin D in the body. The candidates' performance in this question was good as indicated in **Table 42**.

More than half 651,074 (70.99%) of the candidates chose the correct answer C, *Bones and teeth*. Those candidates understood that calcium minerals and vitamin D strengthen hard tissues like teeth and bones. On the other hand, a total of 254,135 (27.72%) of the candidates chose either the distracor A *Tongue and nose* B,

*Skin and stomach* D, *Lungs and liver* or E, *Kidney and bladder*. Those candidates failed to understand that the mentioned organs are strengthened by food which is rich in protein. Furthermore, 11,878 (1.30%) of the candidates either chose more than one option after failing to adhere to the examination instructions or did not answer the question altogether.

**Question 47**: Which of the following is **not** part of blood?

A Salts

B White cells

C Platelets

D Red cells

E Plasma

**Table 43**: Number and Percentage of the Candidates in Each Option.

| Option | A* | B | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 656,869 | 45,891 | 46,776 | 28,800 | 126,812 | 11,939 |
| **% of candidates** | 71.63 | 5.00 | 5.10 | 3.14 | 13.83 | 1.30 |

This question was prepared from the topic of Living Things; and it intended to measure the candidates' understanding of the parts of blood. **Table 43** shows that the performance of the candidates in this question was good.

A total of 656,869 (71.63%) candidates chose the correct answer A *Salts*. Those candidates understood that salts are not part of blood, but rather a type of waste product given out through skin as sweat.

Again 126,812 (13.83%) of candidates chose the distractor E, *Plasma*. Those candidates failed to understand that plasma is part of

blood which is watery in nature. Furthermore, the function of plasma is to transport food in various parts of the body. 46,776 (5.10%) of the candidates chose the distractor C, *Platelets*. Those candidates failed to understand that platelets are types of blood cells which are plate like structure and are manufactured in red bone marrow.

A total of 45,891 (5.00%) candidates chose the distractor B, *White cells*. Those candidates failed to understand that white cells are part of blood which is manufactured in yellow bone marrow and lymph glands. 28,800 (3.14%) of the candidates chose the distractor D, *Red cells.* Those candidates failed to understand that red cells are cells with compressed circle structure at the centre and are manufactured in red the bone marrow. Furthermore, 11,939 (1.30%) of the candidates either chose more than one option after failing to adhere to the instructions of examination or did not answer the question altogether.

**Question 48**: When carbon dioxide combines chemically in a plant with water in the presence of light energy it gives

A cabohydrate and water
B cabohydrate and oxygen
C cabohydrate and heat energy
D cabohydrate and chlorophyl
E cabohydrate and carbon hydroxide

**Table 44**: Number and Percentage of the Candidates in Each Option.

| Option | A | B* | C | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 133,542 | 347,385 | 194,426 | 140,974 | 87,236 | 13,524 |
| **% of candidates** | 14.56 | 37.88 | 21.20 | 15.37 | 9.51 | 1.47 |

This question was set from the topic of Essential Needs for Health and Living. It aimed at measuring the candidates' understanding of photosynthesis. **Table 44** shows that the performance of the candidates in this question was weak.

A total of 347,385 (37.88%) candidates chose the correct answer B, *carbohydrate and oxygen*. Those candidates had enough knowledge about photosynthesis, specifically, its raw materials and products. 556,178 (60.64%) of the candidates chose either the distractor A, *carbohydrate and water,* D *carbohydrate and chlorophyll*, C, *carbohydrate and heat energy* or the distractor E, *carbohydrate and carbonhydroxide.* Those candidates were attracted to the word carbohydrate which is the one of the product of photosynthesis. Futher, they did not know that chlorophyll and $CO_2$ are the raw material of photosynthesis. 13,524 (1.47%) of the candidates either chose more than one option for they failed to adhere to the instructions of examination or did not answer the question.

**Question 49**: The type of worms which spread elephantiasis is known as

A ascaris
B tape worm
C filarial
D millipede
E bacteria

**Table 45**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C* | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 157,155 | 241,739 | 327,602 | 51,544 | 127,449 | 11,598 |
| **% of candidates** | 17.14 | 26.36 | 35.72 | 5.62 | 13.90 | 1.30 |

The question was set from the topic of Health, Health Services and Methods of Preventig Diseases. It intended to measure the candidates' knowledge about worms that cause elephantiasis. **Table 45** shows that the candidates' performance in the question was weak.

A total of 327,602 (35.72%) candidates chose the option C, *filarial* which was the correct answer. Those candidates had enough knowledge of types of worms that cause elephantiasis. This good understanding of the candidates can be attributed to the campaigns made by the Ministry of Health in schools to eradicate elephantiasis.

241,739 (26.36%) of the candidates who chose the distractor B, *tape worm* were attracted to this option because the name *tape worms* is often mentioned in the environment where people are prohibited to eat half cooked pock in the fear of getting diseases caused by tape worm. 157,155 (17.14%) of the candidates who chose the distractor A, *ascaris* were not aware that, ascaris cause ascariasis, not elephantiasis. 51,544 (5.62%) of the candidates who chose D, *millipede* failed to understand that millipedes are arthropods, not worms. On the other hand, 127,449 (13.90%) of the candidates who chose E, *bacteria* did not understand that bacteria causes diseases such as cholera (caused by *Vibrio cholerae*), not elephantiasis.

Furthermore, 11,598 (1.30%) of the candidates either chose more than one option after failing to adhere to the examination instructions or did not answer this question entirely.

**Question 50**: The part of plant which absorb water is called
A stem
B branch
C root
D flower
E leaf.

**Table 46**: Number and Percentage of the Candidates in Each Option.

| Option | A | B | C* | D | E | Others |
|---|---|---|---|---|---|---|
| **No. of candidates** | 98,871 | 31,509 | 688,803 | 26,568 | 61,239 | 10,097 |
| **% of candidates** | 10.78 | 3.44 | 75.11 | 2.90 | 6.68 | 1.10 |

The question was set from the topic of Living Things and it intended to measure the candidates' understanding on the roles of the parts of the plant, specifically the part which is responsible for absorption of water. The performance of candidates in this question was good as shown in **Table 46**.

A total of 688,803 (75.11%) candidates chose the correct answer C, *root* because they had enough knowledge about the roles of different parts of the plant. 98,871 (10.78%) of the candidates who chose distractor A, *stem* failed to understand that stem supports the plant and sometimes carry out photosynthesis if it is green. 61,239 (6.68%) of the candidates chose distractor E, *leaf*. Those candidates failed to understand that a leaf is a part a plant which carries out photosynthesis. 31,509 (3.44%) of the candidates who chose the

distractor B, *branch* failed to understand that a branch is part of plant that holds leaves. 26,568 (2.90%) of the candidates who chose the distractor D, *flower* failed to understand that a flower is reproduction part of a plant. Besides, 10,097 (1.10%) of the candidates either chose more than one option after failing to adhere to the examination instructions or did not answer the question altogether.

## 3.0 EVALUATION OF THE CANDIDATES' PERFORMANCE IN EACH TOPIC

The analysis of the candidates' performance in Science examination in PSLE 2017 indicates that among the eight (8) topics examined, two (02) had a good performance. The topics in which the candidate had a good performance were HIV/AIDS (62.66%) and First Aid (61.58%). Other six (06) topics had average performance. The topics which had average performance include: Living Things (55.50%), Health, Health services and Methods of Preventing Diseases (53.65%), Methods and Procedures in Science (46.81%), Essential Needs for Health and Living (44.93%), Changes of Objects, States and Events (44.48%) and Energy, Machine and Work (42.98%).

A comparison of candidates' performance in PSLE 2016 and 2017 indicates that the performance in the topic of Living Things has increased by 8.24 percent, First Aid by 22.08 percent and Methods and Procedures in Science by 17.06 percent. Contrarily, the performance in other topics dropped. For example, the performance in the topic of HIV/AIDS dropped by 12.99 percent, Essential Needs for Health and Living by 18.16 percent, Health, Health Services and Methods of Preventing Diseases by 8.40 percent, Energy, Machine

and Work by 13.55 percent, and Changes of Objects, States and Events by 1.28 percent.

The average performance of the candidates in the six (06) topics is attributed to inadequate knowledge and skills in Science subject by some candidates; inability to read questions carefully in order to comprehend their requirements were also observed a problem of choosing more than one option or leaving questions unattempted by some candidates. A summary of the candidates' performance in each topic is shown in the **appendix**.

## 4.0 CONCLUSION

The analysis conducted on the responses reaveled that pupils face challenges in responding to questions intended to assess various concepts in the Science PSLE Examination 2017. The following are factors that contribute to failure of some candidates in examination questions.

(a) Failure to identify demand of the questions. This is likely caused by the lack of candidates' seriousness during the reading of questions before attempting them

(b) Lack of knowledge caused some candidates to choose incorrect responses. This implies that there was less participation of these candidates in the teaching and learning process

(c) Some candidates failed to transfer knowledge that would help them to answer the asked questions.

## 5.0 RECOMMENDATIONS

In order to attain good performance in Science subject, the following recommendations are put forward.

(a) Teachers should make sure that all topics in the Science syllabus are covered on time to give time to candidates to revise. The teaching methodology should fully involve students and experts who are in the school surroundings. These experts are such as doctors, engineers and subject experts.

(b) Neighbouring schools should establish subject cooperation among themselves. For example teachers should meet to discuss ways of improving the teaching and learning process.

(c) Students should be given questions from various topics to test skills and abilities they receive in classrooms, which are related to their daily learning environment. In addition, pupils should be given feedback on the test questions, so that they can discover reasons for their incorrect responses.

(d) Students should make sure that they study all topics thoroughly by discussion or forming subject groups/clubs. This will help teachers and students to learn different topics practically.

(e) It is recommended that topics which are practical-oriented be taught more practically.

## APPENDIX

### COMPARISON OF THE CANDIDATES' PERFOMARNCE BY TOPIC BETWEEN 2016 AND 2017 PSLE SCIENCE SBJECT

### 05 SCIENCE

| S/N | Topic | PSLE 2016 | | | | PSLE 2017 | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Performance in each question | | Average perfomance (%) | Remarks | Performance in each question | | Average perfomance (%) | Remarks |
| | | Question No. | % Performance | | | Question No. | % Performance | | |
| 1. | HIV/AIDS | 29 | 65.59 | 75.65 | Good | 16 | 68.02 | 62.66 | Good |
| | | 30 | 85.95 | | | 17 | 45.15 | | |
| | | 31 | 75.40 | | | 18 | 66.38 | | |
| | | | | | | 19 | 71.08 | | |
| 2. | Essential Needs for Health and Living | 5 | 77.88 | 63.09 | Good | 35 | 38.29 | 44.93 | Average |
| | | 10 | 57.93 | | | 41 | 26.24 | | |
| | | 15 | 64.04 | | | 45 | 50.23 | | |
| | | 19 | 58.79 | | | 46 | 71.99 | | |
| | | 22 | 56.83 | | | 48 | 37.88 | | |
| 3. | Health, Health Services and Methods of Preventing Diseases | 13 | 81.29 | 62.05 | Good | 6 | 61.36 | 53.65 | Average |
| | | 16 | 49.19 | | | 7 | 84.57 | | |
| | | 17 | 19.29 | | | 8 | 71.42 | | |
| | | 18 | 81.28 | | | 9 | 69.73 | | |
| | | 20 | 67.65 | | | 10 | 34.23 | | |
| | | 21 | 46.50 | | | 11 | 40.78 | | |
| | | 23 | 89.14 | | | 12 | 64.40 | | |
| | | | | | | 24 | 63.69 | | |
| | | | | | | 32 | 21.43 | | |
| | | | | | | 34 | 53.10 | | |
| | | | | | | 37 | 43.39 | | |
| | | | | | | 49 | 35.72 | | |
| 4. | Energy, Machine and Work | 4 | 84.68 | 56.53 | Average | 5 | 43.87 | 42.98 | Average |
| | | 34 | 68.45 | | | 21 | 29.58 | | |
| | | 36 | 16.55 | | | 22 | 45.25 | | |
| | | 39 | 25.24 | | | 23 | 47.78 | | |
| | | 40 | 32.55 | | | 25 | 34.60 | | |
| | | 41 | 76.47 | | | 26 | 19.69 | | |
| | | 44 | 52.23 | | | 27 | 71.02 | | |
| | | 45 | 87.16 | | | 31 | 52.06 | | |
| | | 47 | 61.74 | | | | | | |
| | | 48 | 60.22 | | | | | | |
| 5. | Living Things | 1 | 54.47 | 47.26 | Average | 1 | 29.61 | 55.50 | Average |
| | | 2 | 21.78 | | | 2 | 85.43 | | |
| | | 6 | 27.98 | | | 3 | 51.05 | | |
| | | 8 | 73.06 | | | 4 | 31.23 | | |
| | | 9 | 47.09 | | | 44 | 44.42 | | |
| | | 11 | 38.37 | | | 47 | 71.63 | | |
| | | 12 | 34.62 | | | 50 | 75.11 | | |
| | | 14 | 71.34 | | | | | | |
| | | 24 | 61.99 | | | | | | |

| S/N | Topic | PSLE 2016 | | | | PSLE 2017 | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Performance in each question | | Average perfomance (%) | Remarks | Performance in each question | | Average perfomance (%) | Remarks |
| | | Question No. | % Performance | | | Question No. | % Performance | | |
| | | 25 | 41.91 | | | | | | |
| 6. | Changes of Objects, States and Events | 33 | 58.33 | 45.76 | Average | 33 | 15.92 | 44.48 | Average |
| | | 35 | 26.01 | | | 36 | 46.25 | | |
| | | 37 | 53.16 | | | 38 | 62.73 | | |
| | | 38 | 40.31 | | | 39 | 50.30 | | |
| | | 42 | 50.03 | | | 40 | 65.66 | | |
| | | 43 | 40.46 | | | 42 | 26.00 | | |
| | | 46 | 52.00 | | | | | | |
| 7. | First Aid | 3 | 22.31 | 39.50 | Weak | 13 | 81.92 | 61.58 | Good |
| | | 26 | 21.57 | | | 14 | 40.98 | | |
| | | 27 | 65.18 | | | 15 | 61.85 | | |
| | | 28 | 48.92 | | | | | | |
| 8. | Methods and Procedures in Science | 7 | 17.56 | 29.75 | Weak | 20 | 60.31 | 46.81 | Average |
| | | 32 | 28.96 | | | 28 | 52.56 | | |
| | | 49 | 28.90 | | | 29 | 53.32 | | |
| | | 50 | 43.59 | | | 30 | 37.45 | | |
| | | | | | | 43 | 30.41 | | |

## A SUMMARY OF COMPARISON OF THE CANDIDATES' PERFORMANCE BY TOPIC BETWEEN 2016 AND 2017 PSLE SCIENCE SUBJECT