

THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



**CANDIDATES' ITEMS RESPONSE ANALYSIS REPORT
FOR THE ADVANCED CERTIFICATE OF SECONDARY
EDUCATION EXAMINATION (ACSEE) 2018**

155 FOOD AND HUMAN NUTRITION

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155 FOOD AND HUMAN NUTRITION

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FOREWORD

The Candidates' Items Response Analysis Report for the Advanced Certificate of Secondary Education Examination (ACSEE) 2018 on the subject of Food and Human Nutrition has been prepared in order to provide feedback to the students, teachers, parents, policy makers and other educational stakeholders on the performance of the candidates in the subject. The feedback provided will enable the education administrators, school managers, teachers and other stakeholders to identify appropriate measures to be taken in order to improve students' acquisition of knowledge and skills, and performance in future examinations administered by the Council.

The Advanced Certificate of Secondary Education Examination marks the end of two years of advanced secondary education. It is a summative evaluation which, among other things, shows the effectiveness of the education system and the education delivery system in particular. The candidates' responses to the examination questions is a strong indicator of what the education system was able or unable to offer to the students in their two years of advanced secondary education.

The report highlights some of the reasons which made some of the candidates to score low marks in the questions. Such reasons include inadequate knowledge and practical skills of Food and Human Nutrition concepts, misconceptions of the question requirements and failure to provide clear or sufficient explanation or description to the mentioned points. The report also highlights some of the reasons which made some of the candidates to perform well in some questions. Such reasons include the adequate knowledge and practical skills they had in the respective concepts, ability to understand the question requirements and provision of proper explanation and description.

The National Examinations Council of Tanzania would like to thank all staff members, examiners and others who participated in the preparation of this report. Lastly, the Council will highly appreciate constructive comments and suggestions from students, teachers, policy makers and the public in general which will help to improve future analysis reports.



Dr. Charles E. Msonde
EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report presents the performance of the candidates who sat for 155 Food and Human Nutrition Advanced Certificate of Secondary Education Examination (ACSEE), in May 2018. The report is based on two theory papers *155/1 Food and Human Nutrition 1* and *155/2 Food and Human Nutrition 2*. The examination questions tested candidates' abilities as per the requirements of the 2009 syllabus.

The Food and Human Nutrition papers one (155/1) and two (155/2) comprised ten questions distributed into two sections namely section A and section B. Section A had five compulsory short answer questions, each carrying 8 marks. Section B consisted of five essay questions, each carrying 20 marks. The candidates were required to choose only three questions from this section.

A total of 250 candidates sat for this examination in 2018, out of which 231 candidates (92.4%) passed the examination with the following grades: C - 2 (0.8%), D - 48 (19.2%), E - 150 (60%) and S - 31 (12.4%). However, 19 candidates (7.6%) failed this examination by obtaining grade F. The rate of performance of the candidates in this year has decreased by 3.5 percent as compared to the performance in 2017 in which out of 244 candidates who sat for that examination, 95.9 percent passed and 4.1 percent failed.

The report provides an analysis of the candidates' performance in each question. The minimum pass mark for each question was 35 percent. Therefore, the performance of the candidates is considered weak if the candidates scored from 0 to 34 percent; average if scored from 35 to 59 percent; and good if scored from 60 to 100 percent of all the marks allocated in each question. Red, yellow and green colours are used to indicate weak, average and good performances respectively. The report also points out some possible reasons for the observed performance in each question. In addition, some extracts of candidates' responses and figures are inserted to illustrate the presented cases.

2.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE FOR EACH QUESTION IN PAPER 1

2.1 SECTION A: SHORT ANSWER QUESTIONS

The section had five compulsory questions constructed from the following topics: *Food Composition*, *Nutrient Requirement*, *Food Production* and *Technology of Specific Products*. Each question carried 8 marks. The performance of candidates in each question was regarded as poor if the scores range from 0 to 2.5; average if the scores range from 3 to 4.5; and good if the scores range from 5 to 8 marks.

2.1.1 Question 1: Food Composition

In part (a), the candidates were required to differentiate between saturated fats and unsaturated fats. In part (b), they were required to identify the three major groups of carbohydrates basing on their chemical structures and to give one example of carbohydrate in each group.

The question was attempted by 99.6 percent of the candidates and 0.4 percent did not attempt it. The general performance of the candidates in this question was good, since 90 percent scored 3 marks or above. Out of these, 53 percent scored from 5 to 8 marks and 37 percent scored from 3 to 4.5 marks. The remaining 10 percent scored from 0 to 2.5 marks. Figure 1 is an illustration of this performance.

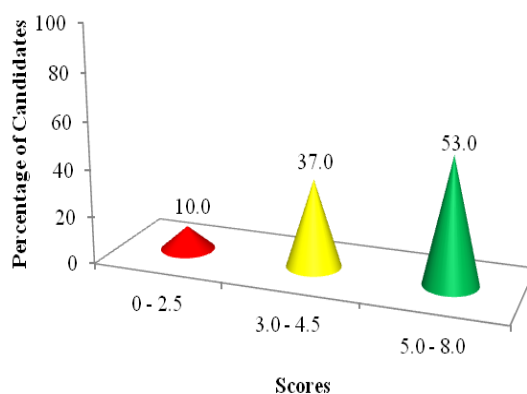


Figure 1: *The Percentage of the Candidates' Performance in Question 1.*

The analysis of candidates' responses indicates that some of the candidates who performed well had sufficient knowledge of the main components of food. In part (a), the candidates were able to differentiate saturated fats from

unsaturated fats as they wrote *saturated fats are solid at room temperature obtained mainly from animals and have fatty acid chains connected by single bonds, while unsaturated fats are liquid at room temperature obtained mainly from plants and have one or more double bonds connecting the fatty acid chains.* The candidates were also able to identify the three major groups of carbohydrates based on their chemical structures and they gave relevant examples in each group in part (b). Those who failed to score all eight marks provided either insufficient explanations on the groups of carbohydrates or gave incorrect examples. Extract 1.1 is a sample of a response from a candidate with a good performance.

Extract 1.1

1a	Differences between saturated fats and unsaturated fats	
	Saturated fats	Unsaturated fats
	1. Are the fats which contain only a single bond between carbon atoms. forexample C-C	Are the fats which contain double or tripple bund between carbon atoms forexample $C=C$
	2. They are found mainly in animal products such as meat	They are found mainly in plant products such as sunflower
	3. They are solid at room temperature.	They are liquid at room temperature
b	Groups of carbohydrates	
	1. MONOSACCHARIDES	
	These are simple sugars and they can not be split ed to form other size units of sugar. The monosaccharides are soluble in water also are sweet and they are cry stals. Example of monosaccharides are glucose, fructose and galactose	
	2. DISACCHARIDES	
	They are formed by the combination of two of the monosaccharides. They are also soluble, and sweet. They include: Maltose, lactose and sucrose.	
	Glucose + Glucose \rightarrow Maltose.	
	Glucose + Galactose \rightarrow lactose.	
	Glucose + fructose \rightarrow sucrose.	

	3. POLYSACCHARIDES	
	They are formed by many combination of many monosaccharides. They are insoluble in water, they are not sweet. They include cellulose, glycogen, starch, chitin and dextrin.	

In Extract 1.1, the candidate was able to give the differences between saturated and unsaturated fats. He/she was also able to identify the three major groups of carbohydrates and to provide correct examples in each group.

Conversely, the candidates with poor performance had insufficient knowledge of food components. In part (a), some of the candidates confused the properties of saturated fats with those of unsaturated fats. Others mentioned incorrect differences between the given types of fats. For example, one candidate wrote *saturated fats are those needed in the body in large quantities, are unbonded and have high boiling point and melting point while unsaturated fats are those needed in small quantity, is the fat which is in bonded form and have low melting point and boiling point.* In part (b), a few candidates managed to mention one or two correct groups of carbohydrates although they failed to give correct examples. Others mentioned the examples of monosaccharides, disaccharides and polysaccharides instead of the main groups. Extract 1.2 is a sample of a response from a candidate with poor performance in this question.

Extract 1.2

	Saturated fat	Unsaturated fat
i)	It have single bond	It has no bond
	⇒ Have low melting point	high boiling point
	Dissolve fat soluble	Insoluble in fat
b) i)	Maltose this group formed by combination of two glucose Eg sugar cane	
	ii) Galactose is formed when 1 glucose combine with Maltose Example ripen fruit like banana	
	iii) Sucrose Example Milk.	

In Extract 1.2, the candidate provided incorrect differences between saturated and unsaturated fats in part (a) of the question. In part (b), the candidate

mentioned the examples of monosaccharides and disaccharides, instead of the main groups of carbohydrates.

2.1.2 Question 2: Nutrient Requirement

The question required the candidates to explain briefly four factors which affect Basal Metabolic Rates.

The question was attempted by 99.2 percent of the candidates, and was omitted by 0.8 percent. The data shows that 11.3 percent of the candidates scored from 5 to 7.5 marks, and 51.6 percent scored from 3 to 4.5 marks. Moreover, 37.1 percent of the candidates scored from 0 to 2.5 marks, including 0.4 percent who scored 0. None of the candidates scored all the 8 marks. The candidates' performance in this question was good since 62.9 percent of the candidates scored 3 marks or above of the total marks allocated to this question. Figure 2 illustrates this performance.

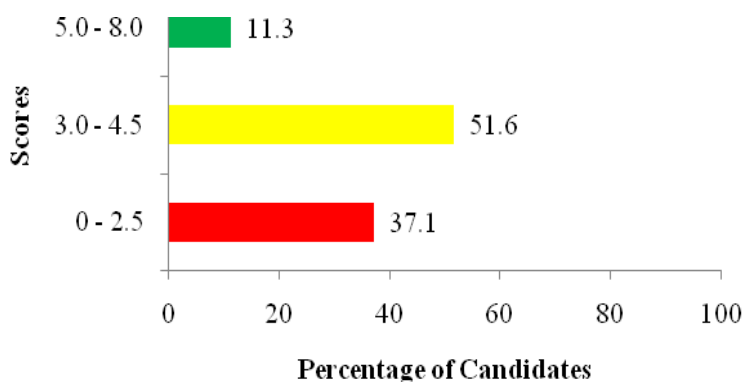


Figure 2: *The Percentage of the Candidates' Performance in Question 2.*

The candidates with good and average performance had adequate knowledge of the concept of Basal Metabolism. Some of the candidates were able to explain how body composition, body size, age, sleep or rest, climate, state of health and sex affect the Basal Metabolic Rates. However, the candidates in this category failed to score full (8) marks because some of them explained three instead of four correct factors. Yet others provided incorrect or insufficient explanations on how some of the correctly mentioned factors affect the Basal Metabolic Rates. Moreover, some of the candidates who scored average marks mentioned the factors but did not provide any explanation. Extract 2.1 is a sample of a response from a candidate with a good performance.

Extract 2.1

2	- The Age. During the period of rapid growth the metabolic rate is high because the more tissue and body composition growth is taking place so the a lot energy consumed and high rates of growth occur particularly in girls.
	- Body Composition. The composition of body different from male and female, the female consist more adipose tissue than male consist more muscle tissue. So the muscle tissue need more oxygen or energy to carry out the normal function than the body with high amount of adipose tissue, so the metabolic rate is higher for male rather than female.
	- Body Size. The one with large body size need much energy than the small body size. This is because the large body size consumed a lot energy and basal metabolic rate is higher in order to recover the energy lost than the small size.
	- The state of health or fever. The fever increase the metabolic rate of an individual because the a lot of energy need to maintain the constant conditions of that individual due to loss of energy for example in sweating.

In Extract 2.1, the candidate provided inadequate explanation on how age affects Basal Metabolic Rates, and consequently failed to score full marks.

Further analysis indicates that, majority of the candidates who performed poorly in this question failed to understand its demand. Some of them mentioned the body measurements which are used in the assessment of the nutritional status of an individual. Others provided the groups of physical activities which increase the energy requirement above the basal metabolism, which include *sedentary work*, *moderate work* and *heavy work*. A few candidates provided one or two correct factors but failed to give correct explanations due to inadequate knowledge on the concept of Basal Metabolism. The incorrect factors mentioned by these candidates include *occupation*, *nutritional status of an individual*, *obesity* and *body growth*. Extract 2.2 is a sample of a response from a candidate with poor performance.

Extract 2.2

2.	The following are the factors which affecting basal Metabolic Rate:	
	Weight of an Individual; This is the several assessment of weight to an individual according to his or her own growth. Example: Childrens and Youth.	
	Height of the body; When an individual weigh is increased it should be direct proportional to his or her own height in order to avoid an individual to become over weight. Example: Obese.	
	Head and Chest circumference; This is more applicable to the children under five years where by the head should be direct proportional to the chest. Example malnourished Childrens.	
	Upper middle arm Circumference; This should be the diameter of the arm of an individual should be direct proportional to his /her own age. Example: People who are under Eightee years old.	

In Extract 2.2, the candidate explained the body measurements which are used in the assessment of nutritional status of an individual instead of factors which affect Basal Metabolic Rates due to misinterpretation of the question.

2.1.3 Question 3: Food Production

Part (a) of the question required the candidates to define the term food security. In part (b), they were required to identify three essential requirements of household food security and in part (c), they were required to describe briefly four factors that influence the availability of sufficient food to all household members.

The question was attempted by all (100%) candidates, of which 36.4 percent scored from 5 to 7.5 marks; 43.2 percent scored from 3 to 4.5 marks; and 20.4 percent scored from 1 to 2.5 marks. This data indicates a good

performance since 79.6 percent of the candidates scored 3 marks or above. Figure 3 summarizes this performance.

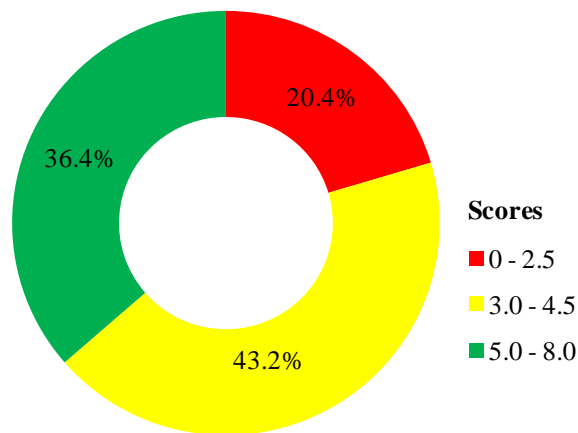


Figure 3: *The Percentage of the Candidates' Performance in Question 3.*

The candidates with good performance had sufficient knowledge of the concept of household food security. They were able to define food security as *the access of food by all the people, all the time to nutritionally sufficient and safe for an active and healthy life* in part (a). In part (b), the candidates were also able to identify the correct essential requirements of household food security which include stability of food supply, access by all family members to sufficient food, utilization of food and supply of adequate and safe food. However, in part (c) most candidates in this category managed to describe only two or three out of the four required factors which influence the availability of sufficient food to all household members, and consequently failed to score full marks. Extract 3.1 is a sample of a response by a candidate with a good performance.

Extract 3.1

3. a)	Food security, is the access of food by all the people, all the time to the sufficient required for a healthy and active life. It can be determined by accessibility, stability and utilization of food in the body.
b)	Household food security, is the ability of the household to acquire food either through purchase, production transfer or exchange of adequate product in quality and quantity to meet the nutritional need of all members at the household.
	⇒ There are essential requirements of household food security and these are:
i)	Food access, can be physical, economic or social. This involves all access of food including purchase amount, bank credits, money, all these can enable the householder to acquire food to the members of the household.
ii)	Food stability - This involves processing and storage of food. It can be determined by storage of food as some household use purchased food.
iii)	Food supply This is to ensure that the food produced is supplied to the household for their consumption. It can be affected by land availability, climatic conditions, let good quality labour force.

c> Factors that influence the availability of sufficient food to all household members
i> Purchase ability of the household, this affect the availability of sufficient food to all members of the household because when it purchase much food there is high availability of sufficient food but to the house holder with low income find hard to meet sufficient requirement of the members in the household.
ii> Food production in the locality, this can also affect the availability of sufficient food to the household members, as high production of food in the locality will ensure sufficient availability, but in areas with low production of food there will be insufficient availability of food to the household members
iii> Nutrition knowledge, this can be one of the factors that influence the availability of food to the household members because if the household members are aware of their nutrition status they can work for it to ensure sufficient availability of food
iv> Food storage knowledge and facilities, If the household members are well educated about food storage practices and facilities there will be sufficient availability of food to all members in the household beyond areas and seasons production, as storage will ensure the availability of sufficient food to all household members.

In Extract 3.1, the candidate responded correctly to all parts of the question. However, the candidate failed to score full marks because he/she provided only three correct factors which influence the availability of sufficient food to all household members instead of four.

On the other hand, some of the candidates scored low marks in this question because of the misinterpretation of the requirement of the question. In part (a), the candidates failed to define food security. For example, one candidate defined it as *a process of assuring that food is available to all household members*, which is a definition of food availability. Another candidate provided the definition of food instead of food security as he/she wrote *it is*

something liquid or solid which can be eaten to provide the body with nutrients.

In part (b), some of the candidates listed the essential requirements of household food security instead of identifying them. Others listed factors which improve household food security such as *good food distribution, proper use of food grains produced, increase food production, good and enough storage structures, proper methods used in food processing and favourable climatic conditions*. Some candidates did not answer this part of the question due to lack of knowledge.

In part (c) of the question majority of the candidates mentioned the pillars or requirements of household food security instead of the factors that influence the availability of sufficient food to all household members. Others provided the factors which affect intra-household food distribution, as they mentioned *sex, birth order, traditions and customs*. Very few candidates managed to mention one or two correct factors but provided incorrect description. Extract 3.2 is a sample of a response from a candidate with poor performance.

Extract 3.2

3. a)	Food security is the access by all people all time to secure sufficient amount of food to maintain health and active life.	
b)	Food storage management the household should know how to manage their food by store in a good way to ensure no any infestation by pest.	
ii)	No wastage of food - household member should serve food which is enough for them and not over excess amount.	

	ii) No wastage of food - household member should serve food which is enough for them and not over excess amount.	
	c) i) Food use: the household members should use the food in a good way to ensure food is available all the time.	
	ii) Food stability In the household the food should be stable that through the year the family have enough food for their need.	
	iii) Food accessibility - food should be accessible for the family / household members all the time year the family have enough food for their need.	
	iv) Food availability - the household should ensure the food is available all the time by purchasing or produce.	

In Extract 3.2, the candidate was able to define food security in part (a) of the question. In part (b), the candidate provided the practices to ensure availability of enough food at the household level. However, in part (c), the candidate described the requirements of household food security instead of factors that influencing food availability because he/she misunderstood the demand of the question.

2.1.4 Question 4: Technology of Specific Products

This question required the candidates to describe briefly the importance of (a) wheat flour, (b) fresh yeast, (c) warm liquid and (d) table salt in bread making.

This question was attempted by all (100%) candidates. The performance of candidates was good since 75.2 percent of those who attempted it scored from 3 to 8 marks. These include 29.6 percent who scored from 5 to 8

marks, and 45.6 percent who scored from 3 to 4.5 marks. The rest (24.8%) scored from 0.5 to 2.5 marks. None of the candidates scored 0. Figure 4 illustrates this performance.

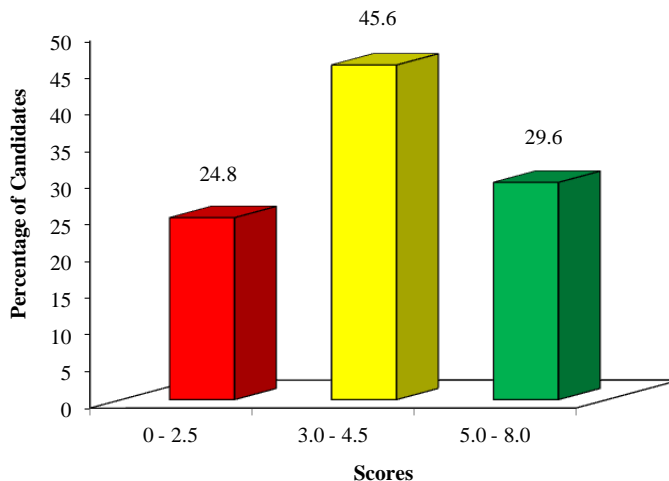


Figure 4: *The Percentage of the Candidates' Performance in Question 4.*

The analysis indicates that the candidates who performed well in this question had adequate practical skills of bread making. Most of the candidates were aware of the nature, composition and functions of different ingredients in bread making. This enabled them to describe correctly the importance of each of the given basic ingredients. However, some of the candidates failed to score full marks because they failed to describe clearly the importance of wheat flour and fresh yeast in bread making. For example, one candidate wrote *wheat flour is capable of stretching* but did not explain clearly the content of wheat flour which is responsible for elasticity property of the dough and how it brings about that property. Another candidate wrote *fresh yeast is a raising agent producing carbon dioxide gas* but he/she did not state the process of fermentation which produces carbon dioxide gas and the importance of the gas in bread making. Extract 4.1 is a sample of a response from a candidate who scored high marks.

Extract 4.1

4	a) <u>Wheat flour</u> ; This ingredient in bread making help to provide a light dough containing the protein substance known as gluten which allow the stretching of flour as it is very elastic in nature.	
	b) <u>Fresh yeast</u> ; This is the one which provide the carbon dioxide gas CO_2 through fermentation process for the expansion of dough before baking. This is the living organism which is facultative it can have live anaerobically or aerobically. In anaerobic condition it undergoes fermentation to provide alcohol, CO_2 , water and energy.	
	c) <u>Warm liquid</u> - This is the ingredient which help in providing proper temperature for the yeast to work properly as it is warm and the yeast work best in warmth condition to produce gas for the expansion of dough.	
	d) <u>Table salt</u> ; This is the ingredient which help to add flavour on the bread also it act as the food for the yeast in fermentation process to release carbon-dioxide gas.	

In Extract 4.1, the candidate managed to provide the correct responses in all parts of the question, implying that he/she had adequate practical skills of bread making.

On the other hand, the analysis shows that the candidates with poor performance lacked the practical skills of bread making. As a result, majority of the candidates provided a variety of irrelevant responses. For instance, in part (a), some candidates wrote *wheat flour is used to make a dough* while others wrote *wheat flour is used to trap air from the environment*. In part (b), most candidates provided incorrect responses, such

as yeast is important because it help the bread to be good in structure after baking because yeast allow air to trap, is used to introduce air into the mixture and to allow digestibility, which are all incorrect. They failed to recall that yeast is a fermentation agent which convert the sugars present in the dough into carbon dioxide gas, which makes the baked bread light and soft. Very few candidates managed to state that *fresh yeast produces a gas or is a leavening agent* but failed to give correct explanation, hence scored a half mark in this part. In part (c), most candidates provided incorrect points regarding the importance of warm liquid. For example one candidate wrote that *warm liquid help during kneading of the flour, you cannot knead the flour without warm liquid because is the one which help to get dough*. Another candidate wrote that *warm liquid is used to inactivate the present of micro-organisms*. In part (d), most candidates successfully mentioned the importance of salt in bread making as *to add taste and improves flavour*. This response was attributed to the fact that salt is an ingredient which is used in most food preparations. Extract 4.2 is a sample of a response from a candidate with poor performance.

Extract 4.2

4.	The following are the importance of each of the following basic ingredients in bread making	
a)	Wheat flour : wheat flour is used in making a dough for bread making.	
b)	Fresh yeast : fresh yeast also used as a raising agent in which it increase the volume of the dough mixture and make it more open in texture	
c)	Warm liquid : warm liquid is used in softening the mixture of bread making	
d)	Table salt : Table salt is add flavor in a bread.	

In Extract 4.2, the candidate scored low marks because he/she failed to describe the importance of the given ingredients due to inadequate practical skills of bread making.

2.1.5 Question 5: Nutrient Requirement

The candidates were required to describe briefly eight factors which influence the choice of food we eat.

The question was attempted by 99.6 percent of the candidates, and 0.4 percent did not attempt it. The data analysis shows that 17.3 percent of the candidates scored from 5 to 7.5 marks and 46.6 percent scored from 3 to 4.5 marks. The remaining 36.1 percent scored from 0 to 2.5 marks. Out of these, 2 percent scored 0. These scores imply that the general performance of the candidates in this question was good since 63.9 percent scored 3 marks or above, as illustrated in Figure 5.

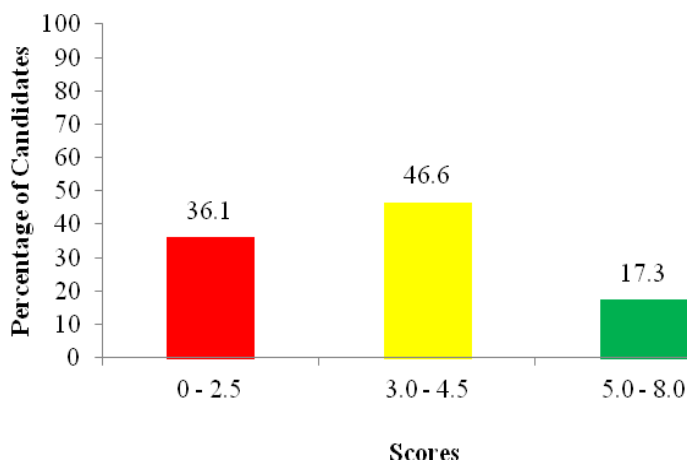


Figure 5: *The Percentage of the Candidates' Performance in Question 5.*

The analysis of the candidates' responses shows that the candidates with good and average performance had adequate knowledge of healthy eating, particularly on food selection. The candidates were aware that the choice of the food to eat depends on *availability of the food, cost of the food, personal likes and dislikes, tradition, religion and moral beliefs, food science and technology knowledge, advertising, time availability for shopping and preparation, perception of food, the physical needs of the body and facilities available for food preparation, cooking and storage*. However, the candidates in this category failed to score full marks because either they provided less than eight factors or they failed to provide adequate explanation relevant to the mentioned factors. Extract 5:1 is a sample of a response from a candidate with a good performance.

Extract 5.1

5	Factors influencing the Choice of the food we eat are
	i) <u>Personal like and dislike:</u>
	The personal like and dislike can influence the choice of the food to eat where one someone can choose the food which he or she like to eat.
	ii) <u>Traditional, religious, Moral and social customs believes</u>
	- This factor influence the choice of the food to eat where by someone can choose the food which acceptable according to his or her believer. for example. Muslims are not allow to eat pork due to islamic rules
	iii) <u>food science and technology.</u>
	- This factor influence the food choices where by someone can choose the food to eat according the knowledge of skills she or he have about food science and technology.
	iv) <u>Advertising:</u>
	Advertisement of the certain type can influencing the person to choose the food to eat.
	v) <u>Time available for shopping and preparations:</u>
	Availability of the time for shopping and preparation can influence the person to choose the food to eat where by the foods which is taking alot of time in shopping and preparation can not be chosen by the person.

	<u>Vii) facilities available for preparation and storage</u>	
	facilities for preparing the food and storing them	
	influencing the choice of the food to eat where	
	by an individual can choose the food according	
	the facilities he or she can use in preparation	
	of food and storage of food.	
	<u>Viii) Perception of food:</u>	
	The choice of the food also is influenced by the	
	perceptions of the food. that is, what our sense	
	tell us about that food which was chosen.	
	<u>ix) Cost of the food:</u>	
	This factor can influence the food which we eat	
	where by the cost cost of the food which is	
	higher can make the person to be unable to	
	purchase that food. And the cost of the food	
	is low or affordable can make the person	
	to afford the price to be able to buy the food to	
	eat.	

Extract 5.1 shows a response from a candidate who was able to describe the correct factors which influence the choice of food we eat.

Furthermore, the analysis reveals that most candidates who scored low marks had insufficient knowledge of food selection. The candidates provided incorrect factors such as *climate, types of people, processing methods used, quality of food and food security*. Other candidates provided incorrect factors because they failed to understand the demand of the question. For example, one candidate mentioned *age, sex, health status, body size, occupation, pregnancy, climate and body composition*, which are the factors affecting the Basal Metabolic Rates of an individual. Another candidate mentioned some qualities of food such as *colour of the food, taste and flavour, good nutritive value, should be digestible and free from microorganisms*, instead of the factors which influence the choice of the food we eat. Extract 5.2 is a sample of a response from a candidate with poor performance.

Extract 5.2

5)	The energy giving food; This is the one of the factors that are influence the food we eat in order to get energy of doing work and other metabolic activities. like carbohydrate
ii)	The body building food; there is essential food used for body building like building of bones and teeth. Example of foods are mineral food
iii)	The protective foods; there is some of food which are used for protection of our body like vitamins food. We are eating food from protection of diseases and make our body strong.
iv)	We are eating food for good health and good growth of our body. The food is essential for growth of our body and giving good health
v)	Food for metabolic activities in our body like water for regulation of nutrients and transports different material within the body organs
vi)	Also food is medicine to our body the eating of food is the source of medicine to our body and most of medicine are made from food we are

	eating	
vii	We are eating food for biological activities and bring development in increasing in number. Body can not work without food so food is the source of fuel in our body.	
viii	The food we eat is balanced and well cooked so as to ensure no contamination of food with our body because of hygiene safety	

Extract 5.2 shows the candidate who failed to understand the demand of the question as he/she outlined the three groups of food basing on their functions in the body. Other points mentioned by the candidate related to the functions of food in the body and not the factors which influence the choice of the food we eat.

2.2 SECTION B: ESSAY QUESTIONS

There were five essay questions constructed from the following topics: *Technology of Specific Products*, *Food Storage* and *Food Processing and Preservation*. Each question carried 20 marks and the candidates were instructed to choose only three questions. The performance of candidates in each question was regarded as poor if the scores range from 0 to 6.5; average if the scores range from 7 to 11.5; and good if the scores range from 12 to 20 marks.

2.2.1 Question 6: Technology of Specific Products

The candidates were required to elaborate the statement, “Air and carbon dioxide gas are leavening agents that should be introduced into the flour mixture before baking”, by describing (a) five ways of introducing air into a flour mixture; (b) three chemical ways of introducing carbon dioxide gas into the flour mixture; and (c) one biological way of introducing carbon dioxide gas into the flour mixture.

This question was opted by 98 percent of the candidates, and left out by 2 percent. The candidates' performance in this question was good since 89.8 percent scored from 7 to 19 marks. Out of these, 50.2 percent scored from 12 to 19 marks and 39.6 percent scored from 7 to 11.5 marks. However,

10.2 percent of the candidates scored from 0 to 6.5 marks. Figure 6 summarizes this performance.

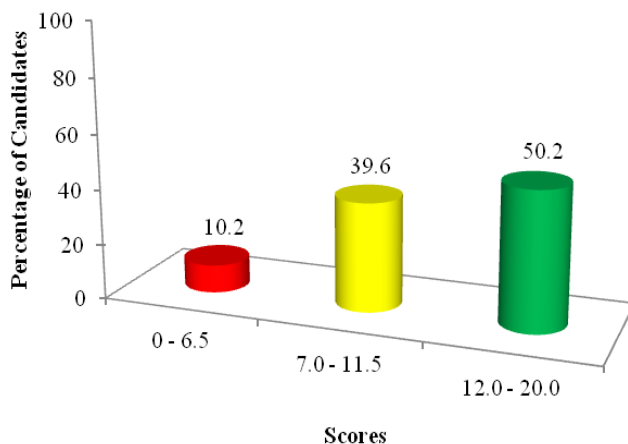


Figure 6: *The Percentage of the Candidates' Performance in Question 6.*

The analysis of the candidates' responses indicates that the candidates who scored high marks had adequate practical knowledge and skills on the concept of raising agents. In part (a), most candidates were able to describe the ways of introducing air into the flour mixture as *sieving*, *rubbing in*, *whisking*, *creaming* and *rolling and folding*. In part (b), some of the candidates failed to describe correctly three chemical ways of introducing carbon dioxide gas into the flour mixture. Majority were able to provide at least one correct chemical way. Yet others provided incorrect descriptions of the mentioned ways. Furthermore, in part (c) most candidates managed to give the correct descriptions of biological way of introducing carbon dioxide gas into the flour mixture. They understood that the only biological raising agent is yeast, which under favourable conditions, will produce a leavening gas (carbon dioxide) in the process of fermentation. However, some candidates failed to describe clearly the conditions required for the yeast to work best to produce carbon dioxide gas. Extract 6.1 is a sample of a response from a candidate with a good performance.

Extract 6.1

6.	<p>Leavening agents are substances which are added to the baked products that raises the baked products and making them more lighter. This leavening agents is also called raising agents since they raise the baked products and they are added before baking. The following are ways that air is introduced in the flour mixture.</p> <p>Sieving: This process occur when flour is sieved, air is trapped into the flour mixture in the tiny particles, which therefore help the mixture to raise. The introduction of air in the mixture is called mechanical raising agent.</p> <p>Rubbing in: This process occurs when fat is rubbed with flour mixture air is trapped into many particles of flour mixture which raises the mixture. This process is done by using finger tips.</p> <p>Creaming: This process occurs when fat is creamed with sugar the air is trapped into the mixture which give raise the mixture.</p> <p>Whisking: This is where by when egg is beaten with sugar using whisker machine air is trapped into the mixture in bubbles.</p>	
	<p>Folding and rolling: This is where by during rolling ^{during the} the mixture to join up particles and rolling them, the ^{the} air is incorporated into the mixture so as to raise the mixture. This process is done mostly in plucky pastries.</p> <p>Followed by chemical ways of introducing carbon dioxide gas into the flour mixture-</p> <p>Bicarbonate of soda alone: This process occurs when bicarbonate of soda alone is added into flour mixture under heat it lead to the release of carbon dioxide gas which give raise to the mixture. $2\text{NaHCO}_3 \xrightarrow{\Delta} \text{Na}_2\text{CO}_3 + \text{CO}_2 + \text{H}_2\text{O}$</p> <p>Bicarbonate of soda with acid: This process occurs when bicarbonate of soda and acid are added into flour mixture which also lead to the release of carbon dioxide gas which help the raise of the mixture. Example of the acid used to combine with bicarbonate of soda is cream of tartar (tartaric acid).</p>	

	Baking powder:- This is the chemical which when added into the flour mixture helps it also release the carbon dioxide gas which helps the raise of the mixture.	
	Followed by biological way of introducing carbon dioxide gas into the flour mixture.	
	Yeast:- This is biological way since it is involve micro-organism which is yeast. Yeast causes fermentation which leads to the production of alcohol, energy and carbon dioxide gas which gives raise to the mixture.	
	$C_6H_{12}O_6 \xrightarrow[\text{pH 4-5}]{\text{Yeast, 20-28}^\circ\text{C}} 2C_2H_5OH + 2CO_2 + \text{Energy}$	
	Therefore, the view above are ways how air and carbon dioxide gas is are introduced into flour mixture before baking so as to raise the mixture. And also those raising agents should not be toxicant, impact add any undesirable flavour, smell and others.	

In Extract 6.1, the candidate managed to provide correct responses to all parts of the question regarding the ways of introducing air into a flour mixture in part (a), chemical ways of introducing carbon dioxide gas into the flour mixture in part (b), and the biological way of introducing carbon dioxide gas into flour mixture in part (c).

Further analysis indicates that the candidates who performed poorly in this question failed to understand its demand. In part (a), some of the candidates provided the procedure of making a dough which include *mixing*, *sponging* and *kneading*, instead of ways of introducing air into the mixture. Others mentioned the chemical and biological ways instead of ways of introducing air into a flour mixture. For example one candidate mentioned *ammonium carbonate*, *bicarbonate of soda*, *baking powder* and *yeast*. Furthermore, the candidates who lacked practical knowledge and skills of the ways of introducing air into a flour mixture provided irrelevant responses. For example, one candidate mentioned *wheat flour mixture*, *dough making*, *mixing*, *baking* and *leavening*.

In part (b) of the question, some of the candidates misinterpreted its demand, and ended up listing the ways of introducing air into the mixture. They mentioned *creaming*, *sieving*, *whisking*, *rolling and folding* and *rubbing in* instead of bicarbonate of soda, bicarbonate of soda and an acid, baking powder, ammonium carbonate and ammonium bicarbonate. Those who lacked practical knowledge and skills of baking process provided irrelevant responses. For example one candidate wrote *rising dough*, *reaction of content* and *producing gases (leavening)*, which were wrong.

In part (c), some of the candidates mentioned the physical process of introducing air to the mixture, which is *steam* instead of yeast. Others mentioned incorrect agents due to lack of practical knowledge and skills. The incorrect agents mentioned by these candidates include *carbon dioxide gases*, *ammonia* and *warm water*. Extract 6.2 is a sample of a response from a candidate who scored low marks.

Extract 6.2

a)	Raising agent is the chemical substance and process of in which make flour mixture raise by introducing raising gas before raising age gas produce include ammonia, air and carbon dioxide. way of introducing air into flour mixture.
	it help to reduce bacteria when you introduce the air flour mixture must be reduce bacteria to grow in the flour mixture
	it help the flour to be lightness. the another point in which when you introducing the flour mixture it help the flour to be lightness so that it help when you cooking
	it help the flour to be mixing well on other ingredients so the flour when you mixing well must be the help the other flour to be mixing of other ingredient which you putting so that for using the flour
	it help the flour to be easy in making may be dough - so that will help the flour to be easy to making the something which you making
	it help the flour to raise early when you making the dough so the air of the flour mixture it help to making dough.
b)	it help to trapping the flour mixture the another point in which when you putting the carbon dioxide on the flour mixture it help to trapping the flour mixture
	it help to react of other ingredient the another point which the carbon dioxide will react when you putting the flour mixture so that the carbon dioxide have strong reaction to flour mixture

	it help to raise the dough easy the flour mixture it must put the carbondioxide because it help	
	the raise the dough easy so they it important to put the carbondioxide in the flour mixture	
c.	it help to raise the dough easy. when you put carbondioxide gas into the flour must raise a is dough in biological way of the introducing carbondioxide gas into the flour mixture	
	the raising agent it help the flour the raising by introducing raising gas or other way so that the flour mixture will be raising	

In Extract 6.2, the candidate lacked practical knowledge and skills on the concept of raising agents as he/she provided irrelevant responses in all parts of the question, and consequently scored low marks.

2.2.2 Question 7: Food Storage

This question required the candidates to describe six natural compounds used to protect food grains against pest infestations and state the effect of each compound to the food grain pests.

The question was opted for by 17.6 percent of all the candidates and left out by 82.4 percent. The data analysis in this question shows that 97.7 percent of the candidates scored from 0 to 6.5 marks, of which 38.6 percent scored 0. Further analysis indicates that only 2.3 percent of the candidates scored 7.5 marks and none of them scored above 7.5 marks. The general performance of candidates in this question was poor as summarized in Figure 7.

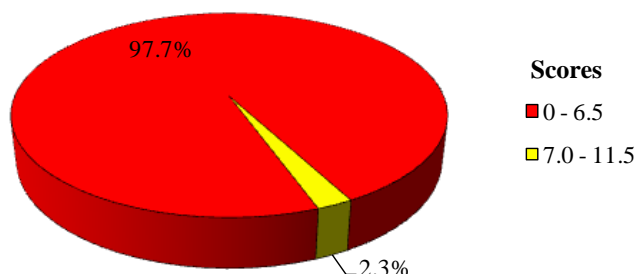


Figure 7: The Percentage of the Candidates' Performance in Question 7.

The analysis of the candidates' responses indicates that majority of the candidates performed poorly due to misinterpretations of the question. Some

candidates described the types of pesticide formulations while others mentioned the steps of preparation of grains for storage as *drying*, *cleaning*, *sorting* and *grading*. A few candidates described the types of storage structures used in rural areas as *raised platforms*, *sacks*, *underground pits*, *calabashes*, *cribs* and *hanging on the trees* instead of the natural compounds used to protect food grains against pest infestations. Extract 7 is a sample of a response from a candidate with poor performance.

Extract 7

7	<p>Natural compounds These are substances which are used in the food or introduced in the food for the aim of preventing food grains from being attracted by pest. They can be in form of solid liquid or gas.</p> <p>The following are the natural compounds used to protect food grains against pest infestation.</p> <p>Smoke Smoke is the natural compound that comes from burned material. Examples woods and leaves which do not cause rapid effect to the consumer. The smoke cover the surface of the grain and prevent the pest from causing deterioration.</p> <p>Dust This is a substance that comes from the milled products which prevents the pests from disturbing the food product. The dust is used to protect food grain against pest infestation.</p> <p>Drying This method prevents pest from causing deterioration of the food grain as the water will be removed from the grain and makes the grain dry which do not favour the pest from causing deterioration.</p> <p>Granulars These are materials which are introduced in the food for the aim of protecting food grains against pest infestation. These materials are mixed in the grain and prevent pest from causing deterioration.</p> <p>Encapsulated materials These are substance which are introduced in the grain for the aim of preventing them from pest infestation.</p>
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ation and increasing the shelf life of the food grain.
Fumigants: These are material which prevent food grains against pest infestation and kill the pest when they are in the grain or make them inactive to cause spoilage on the food grain.
The following are the effect of each compound to the food grain pests.
Smoke: These in excess may cause health problem as to smoke cause effect to the respiratory surface.
Dust cause effect it also cause respiratory effect to the human body. And same time if its not under good care can cause spoilage due to contamination.
Drying: It cause loss in weight of the grain and loss of some nutrients in the prod.
Grasshoppers: They should be under care as they are toxic to the human health and lead to death.
Encapsulated materials are cause effect to the health when are taken in excess with the human being example stomach effect.
Fumigants: These are materials which lead to lungs problem to human being.
Hence the food grains should be well protected in order to prevent pest infestation to the human health.

In Extract 7, the candidate misinterpreted the question as he/she described the types of pesticide formulations instead of the natural compounds used to protect food grains against pest infestation which include ryania, pyrethrins, rotenones, azadirachtin, nicotine and nereis toxin.

Furthermore, a few candidates (2.3%) with average performance had insufficient knowledge of food grain storage. Some candidates in this category managed to identify two to four natural compounds but failed to provide the correct effects of some of the mentioned compounds to the food grain pests. As a result they failed to score high marks. For example one candidate gave the following answers:

- **pyrethrine** - These are produced from pyrethrum plant and are toxic to the pests since the pyrethrin affect the nervous system of the pests and cause sudden death of the pest
- **rotenone** - These are compounds produced from legiminious plant for killing the pests as they tend to absorb the cuticle way present in the pest and lead to continous loss of water and hence the pest dies from dehydration.

This candidate provided correct effects of pyrethrin on pests but failed to identify correct effects of rotenones on pests. Other candidates confused the effects of the mentioned compounds. For example, one candidate confused the effect of pyrethrin with that of azadirachtin as he/she wrote:

- **pyrethrin** - Extracted from pyrethrum flowers, This act as anti-feeding and phagorepellant thus the insect cannot damage the food crop since it will die.
- **azadirachtin** - This is derived from neem tree. it has a knock down effect on the insects.

2.2.3 Question 8: Food Processing and Preservation

The candidates were required to support the statement, “The quality of a milled product is determined by the characteristics of the milled seeds”, by explaining (a) six factors to consider before milling grains, and (b) the four steps of wet milling process.

The question was attempted by 14.4 percent of the candidates and omitted by 85.6 percent. The data analysis shows that 97.2 percent of the candidates scored from 0 to 5 marks, of which 13.9 percent scored 0. The candidates who scored 9 marks were 2.8 percent and none scored from 9.5 marks to 20. The general performance of the candidates who attempted this question was poor as summarized in Figure 8.

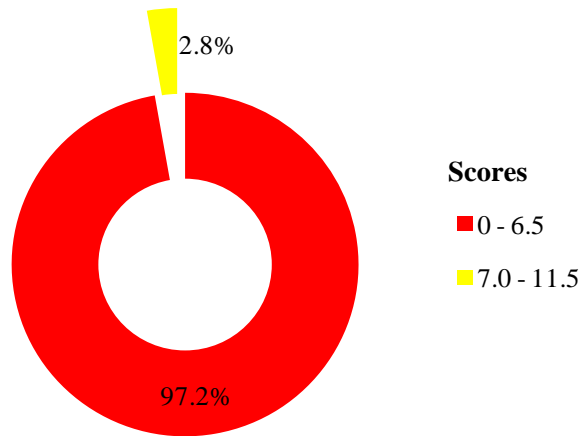


Figure 8: *The Percentage of the Candidates' Performance in Question 8.*

The analysis of the candidates' responses shows that most of the candidates with poor performance lacked the knowledge of milling processes. This made them to mention irrelevant factors to consider before milling grains in part (a). They mentioned such factors as *nutrients needed by the people before milling, quality of the end product before the milling of the grain, effect of milling of the grain, cleaning of the grains, grading of the grains and proper storage before milling, type of people who are going to consume the milled product, availability of good storage structure, availability of machine for milling the grains, consider where the grain was grown, climatic conditions and nutrient composition of the seeds grain*. A few candidates failed to understand the demand of the question as they described the factors to consider when establishing a milling industry instead of the factors to consider before milling grains. For example, one candidate wrote *to consider the type of milling seed grains, to consider the quality and quantity of the grain to be milled, should consider the tools and equipment to be used in milling process, should consider the type of customers of milled product, should consider the availability of skilled people to conduct milling and should consider the availability of other resources like money, water and electricity*. Another candidate described the process of canning fruits and vegetables by mentioning, *cleaning, sorting and grading, blanching, reheating, packaging and exhausting*.

In part (b), majority of the candidates failed to identify the steps of wet milling process due to lack of knowledge of wet milling process. As a result, they mentioned a variety of unrelated steps. For example, one candidate

wrote *removal of impurities, washing, drying and milling*. Other candidates misunderstood the question as some of them mentioned, *harvesting, transporting, drying, cleaning, sorting, grading and storage* which are the steps of preparing food grains for storage, contrary to the demand of the question. Extract 8 is a sample of a response from a candidate with poor performance.

Extract 8

a)	Effect of milling on the grain and its quality do not; so the choice of milling will be yours because you have already know the effects.
	Type of people who are going to consume the milled product, beff before you mill the grains you should know that what type of people are going to consume your product. There are some people who do not like the milled product because they complain that it does not have energy especially older people do not like milled grains.
	Easyness of supplementation or fertification; before you mill any grain you should find out the way to supllment / to replace the nutrients that are lost during milling after knowing how can you replac those nutrients now you are able to do milling of the grain by making sure that you will do fertification by using a certain food.
	Make sure that the grain is clean and dry, for a grain to be milled it should be clean that is all dust and impurities are removed also it should be dry so as to get good product after the process of milling.
b)	The following are the steps of wet milling process.
	Remove of impurities and drying; before milking the grains should be dried and all impurities such as stones and other large wastes should be removed so as to get

safe product and prevent blockage of a	
milling device	
Wetting of the grain (addition of small	
amount of water) in wet milling the grains	
has to be wetted in small amount so	
as to make the milling process easy	
and faster	
Milling; the last stage is milling of	
the wet grain so as to obtain the	
product which is not a grain it is	
flour	
therefore milling products are not healthy	
advised because they lack some nutrients	
so people are advised to use unmilled	
products	

In Extract 8, the candidate provided irrelevant factors to consider before milling grains and the steps of wet milling process because he/she lacked knowledge of milling processes.

In part (a) of the question, the candidates with average performance were able to explain correctly two or three factors to consider before milling. The factors explained include *physical dimension of the grain, thermal properties of seeds, specific gravity of the grain, hygroscopic property, moisture content and bulky density of the grain*. Some of the candidates provided incorrect or insufficient explanations of the mentioned factors. In part (b), some of the candidates mixed the steps of milling and consequently lost marks. For example, one candidate listed some of the steps as *drying, soaking in water and removing husks* instead of *soaking in water, drying then removing husks*. In addition, the candidate skipped the smearing step in which the soaked grain with red earth is mixed with water before dried in the sun.

2.2.4 Question 9: Food Processing and Preservation

The question required the candidates to support the statement, “The handling procedures in food processing convert the food into consumable form”, by (a) describing the three stages of handling food in food processing and (b) six effects of drying food grains on their quality.

The question was attempted by 84.4 percent of all the candidates and omitted by 15.6 percent. The data analysis shows that 8.1 percent of the candidates scored from 12 to 15 marks; 26.5 percent scored from 7 to 11.5 marks; and 65.4 percent of the candidates scored from 1 to 6.5 marks. There was no candidate who scored zero mark or above 15 marks out of 20. The analysis indicates that the general performance of candidates was average since 34.6 percent scored from 7 marks or above. Figure 9 summarizes the performance.

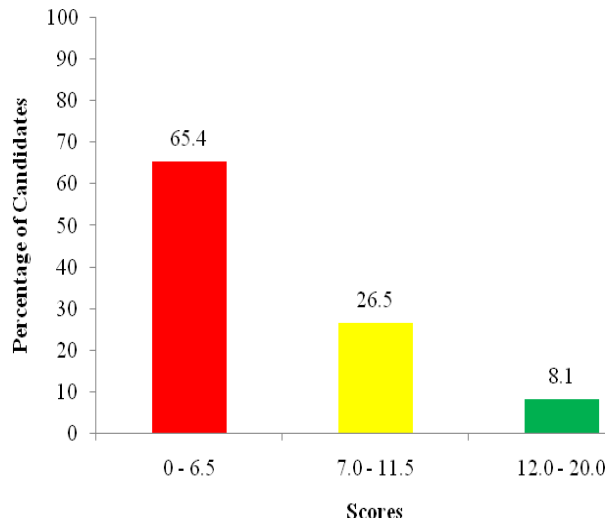


Figure 9: *The Percentage of the Candidates' Performance in Question 9.*

The analysis of the candidates' responses indicates that the candidates with good and average scores had adequate knowledge of the principles of food processing. In part (a), most of them were able to describe the correct stages of handling food in food processing as *primary*, *secondary* and *tertiary food processing*. In part (b), the candidates also managed to provide the effects of drying food grain on their quality. However, the candidates in this category failed to score full marks because some of them mixed correct and incorrect effects of drying food grains on their quality. Some of the incorrect effects mentioned include *removal of the outer layer of the grain, it may lead to reduction of fibre content, increase the absorption of other nutrient, germination of the food grain, can cause the cell present in food to shrink and increase the concentration of food*. Other candidates repeated the effects of drying on food grain quality. A few candidates provided inadequate explanations of the mentioned effects. Extract 9.1 shows a sample of a response from a candidate who scored high marks.

Extract 9.1

9	<p>Food processing is the process where food are converted into Consumable form and in Convenient way. food processing is important because it help to increase availability of food out of season. to keep longer food, for easy transportation and storage. three stages of handling food in food processing as follows;</p> <p>Primary food processing; this is done on the field where harvesting process taking place. threshing, cleaning, drying are done also sorting and grading of food grain according to size, shape and colour also done</p>	
	<p>Secondary food processing stages of handling; this is done where by the food grain are milled to obtain flour. in milling process some nutrient lost like protein, vitamin B and fibre.</p> <p>Tertiary handling food in food processing; this flour from different grains are converted into consumable form where by some used on baking breads, cake, macindazi, rock bunn and packed and distributed to the consumer.</p> <p>Six effect of drying food grain on their quality</p> <p>drying of food grains make grain lighter and easy to transport and for proper storage of the grain during drying grain loss water by evaporation.</p> <p>Drying of food grain reduce the chance of fungi and insects invade the grain during storage and cause deterioration.</p> <p>Drying of food grain reduce or remove water in the food grain and hence reduce the chance of self heating of food during storage. self heating cause discoloration for the grain and hence reduce its quality and biological value of the nutrient in the grains.</p>	

	Reduce nutrient Content of the	
	grain; during drying some nutrient	
	lost by evaporation hence reduce the	
	nutrient content of the food grains.	
	Overdrying cause breakage of the	
	kernels of the food grain hence cause	
	the quality of grain to be reduced.	
	breakage of kernels minimize price of	
	the grain when sold.	
	Drying increase Concentration	
	of the starch since all water are lost	
	during drying also drying prevent	
	germination of the grain.	
	Drying is the proper method of	
	food food grain which make the	
	it stay for the long period of	
	time and reduce the chance of	
	pest infestation. when Drying is	
	done proper the grain will stay	
	for the long time in the storage.	

In Extract 9.1, the candidate managed to provide the correct stages of handling food in food processing in part (a). In part (b), the candidate provided less than six correct effects of drying food grains on their quality because he/she repeated some of the effects.

Further analysis shows that, most candidates with poor performance failed to understand the requirements of part (a). Most of the candidates mentioned the periods through which food grain losses may occur instead of the stages of food handling. Others provided different methods used to prevent food grain losses. For example, one candidate listed such points as *uses of well ventilated structure, uses of modern storage structures and early harvesting*. In part (b), most candidates provided irrelevant effects because they had inadequate knowledge of the principles of food processing. The irrelevant effects provided include *loss of grain attractiveness, presence of impurities during drying, contaminated by dust and sand, loss of marketable, cross contamination of the grain, it reduce natural toxins, it make the food grains to avoid discoloration and stabilize food grain*. A few candidates who misinterpreted the question stated the importance of food storage as *stabilize*

market price, for future use as seeds, for future use as food grains and reduce food wastage, instead of the effects of drying food grains on their quality. Extract 9.2 shows a sample of a response from a candidate who performed poorly.

Extract 9.2

9.	<p>Food processing means the conversion of bulky food into simpler more consumable form for example fruit juice is processed from ripe fruits. Food processing is important as it;</p> <ul style="list-style-type: none"> - Helps preserve food - Saves time of food preparation - Eases transportation of food - Prevents food wastage. <p>ca) <u>Three stages of handling food in food processing :-</u></p> <ol style="list-style-type: none"> 1. <u>Pre-harvesting</u> <ul style="list-style-type: none"> - This involves methods to handle food all the time before harvesting, as the crop grows this involve use of scare crows to stop birds from feeding on the crops and also insecticides to prevent insects infestation on farms, ^{involves} also weeding, adding manure, doe pruning 2. <u>During harvesting</u> <ul style="list-style-type: none"> - On the harvest period, proper handling to ensure no mechanical damage such as breakage of kernels, breaking of testa, crushing ^{involves} by removal of seed coats, dressing shells 3. <u>Post-harvesting</u> <ul style="list-style-type: none"> - These are methods done after the food crops are already harvested include peeling, coring, deseeding so as to ensure food is removed of its bulkness. 	
	<p>(b) <u>Effects of drying food grains on their quality :-</u></p> <ol style="list-style-type: none"> (i) Loss of weight to the food grain as a large amount of water content is removed from the food. 	

(ii) Some nutrients are lost especially water soluble nutrients such as Vitamin C and B evaporate with the water vapour during drying of the food grain, as well as heat sensitive nutrient such as Vitamin E
(iii) If drying is done as sundrying and the food grain is put down on the ground, then the food grain will be in contact with dirt and microbes, hence unsafe
(iv) Drying causes concentration of food grains components on the surface of the food grains such as in fruits due to loss of water.
(v) Decrease in size of the food grain due to loss of water content that adds to its size
(vi) Drying softens and wrinkles food such as vegetables and making them unfirm and unattractive.

In Extract 9.2, the candidate identified the periods through which food grain losses may occur instead of the stages of food handling in part (a). In part (b), the candidate mentioned one correct effect of drying food grains which is loss of some nutrients but he/she provided insufficient explanation. Other mentioned effects were irrelevant indicating that the candidate had inadequate knowledge of food processing.

2.2.5 Question 10: Food Storage

This question required the candidates to describe six categories of the primary causes of food losses.

The question was attempted by 83.6 percent of all the candidates. The data analysis shows that 81.3 percent of the candidates scored from 0 to 6.5 marks, of which 9.1 percent scored 0. Moreover, 9.6 percent of the candidates scored from 7 to 11.5 marks; and 9.1 percent scored from 12 to 18.5 marks. The general performance of the candidates who attempted this

question was poor, since 81.3 percent scored below 7 marks. Figure 10 summarizes this performance.

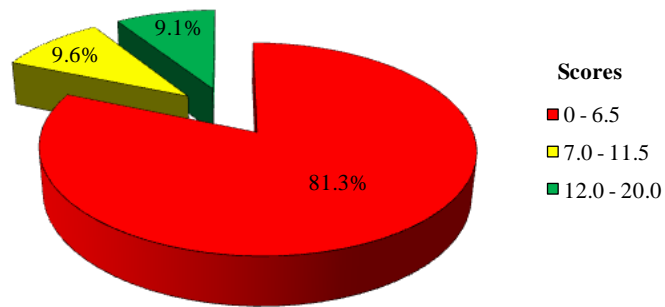


Figure 10: *The Percentage of the Candidates' Performance in Question 10.*

The analysis of the candidates' responses shows that the candidates with poor performance had insufficient knowledge of the agents of food losses. Most candidates described irrelevant categories of primary causes of food losses which include *poor storage structures, ignorance of the people, food handlers, inadequate pesticides, insects and animal, plant and plant products, cross contamination, food processing methods, dirty environment, lack of transportation and the relative humidity*. The candidates who failed to understand the demand of this question, provided incorrect responses. For example, one candidate mentioned food preservation methods as *fermentation method, canning, milling, bottling, dehydration and freezing* instead of primary causes of food losses. Another candidate mentioned some of the factors which influence growth of microorganisms in food, such as *pH, oxidation-reduction, atmospheric gas, temperature, nutrients of the food and water availability*. Extract 10.1 is a sample of a response from a candidate with low score.

Extract 10.1

10.	<p>Food is anything which is in liquid or solid form we eating in order to survive. Each organism must have take in food to the body so that to continue live thus why once a person or an organism does not taken in food for the long time die due to hunger therefore food is the basic need to living organisms. The following are the primary causes of food losses.</p> <p>Food handlers and processors, these are the one which are being involved in preparing and providing food for example once these people will preparing the food in unhygiene condition led to contamination of food therefore food losses.</p> <p>Air and dust, this cause food losses when the foods will not be covered therefore will allow microorganism to enter in the food.</p> <p>Soil, there are some microorganism which are being found in the soil for example bacteria, mould and yeast as we know that food we get from the soil through planting once they will be removed from the soil food is usually having microorganism. Thus why we are advised to washing and cooking the food well before taken it to the body.</p> <p>Sewage, this is the system where by useless materials are being transported. Useless materials always having bad smell when the sewage will be near to the kitchen where foods are being prepared cause food losses. For example the whole smell of sewage will be shifted to the food.</p> <p>Water, this is the food which is in liquid form. Water cause food losses when the foods will be cooked with unhygiene water as we know that always unhygiene things having effect. For example unhygiene</p>	
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	water contain microorganisms which can enter to the	
	food once those water will be used in cooking food.	
	Animal feeders, these are among of food losses	
	where by they cause food losses through eating foods	
	forexample rat can eat a certain food which cause	
	that food to be contaminated and finally food losses.	
	Conclusion, Through the primary causes of food losses	
	education should be provided to all people in the	
	country so as to avoid food losses such as sewage	
	people should not keep sewage near the kitchen	

In Extract 10.1, the candidate provided irrelevant response instead of the categories of the primary causes of food losses, implying that he/she had insufficient knowledge of the agents of food losses.

The candidates who showed good and average performance were knowledgeable of food storage, particularly on the agents of food losses. The candidates were able to describe the categories of primary causes of food losses as *biological, microbiological, physical, biochemical, chemical, physiological* and *psychological causes*. However, these candidates failed to score more than 18.5 marks because most of them provided less than the six causes required. Other candidates treated the examples of the causes as categories. For example, one candidate mentioned *insects* and *vertebrates* as two separate categories while they fall under the category of biological causes. Extract 10.2 shows a sample of a response from a candidate who scored good marks.

Extract 10.2

10.	<p>Food loss is the loss of weight of the food, quality of the food, viability of the food and also market loss due to the reduction of the price of the food. And below are primary causes of food losses.</p> <p>Biological causes - This is caused by biological agents like rodents, birds, insects and also big animals like elephant whereby some feed on the food and cause quantity loss, while other feed on nutritive part of the food and cause quality loss. But also they can cause loss of food by their faeces, urine and their hairs and cause market loss.</p> <p>Micro-biological^{causes} - This is caused by small organisms like bacteria, yeast, fungi and virus. Bacteria causes loss of food by spoiling the food example carrot and tomatoes, yeast causes fermentation of food and yeast^{mould} introduce toxin to the food and also cause black spots to the food. So all microorganism cause loss of the food.</p> <p>physical causes - Also some physical causes can lead to loss of food example during transporting there is breakage kernels in cereals which can lead to infestation, overpeeling causes loss of some nutrients in the food. Cutting of roots and tuber food causes spoilage of the food and also bruising of fruit and vegetable cause food losses.</p>
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	<p>Biochemical causes - This is caused by enzymes where by the enzymes causes food loss by oxidation like oxidation of vitamin c by enzymes in the food. And also hydrolysis of protein, lipid by enzymes present in the food causes loss of some nutrients in the food hence reduce the quality of food and cause loss.</p> <p>Physiological causes - This is cause by life process related in food like during respiration some nutrients become losted. Also during transpiration water become losted and cause wilting and cause loss of the quality of the food and senescence causes loss of the food.</p> <p>Chemical causes - This is non-enzymatic reaction where by the chemical constituents present in food react and cause food loss example the reaction of organic and inorganic constituent and also constituents of food and air causes loss of texture and flavour and this causes food loss.</p> <p>To sum up there should be improved storage structures and also use of pesticides so as to kill those pest that causes food losses.</p>	
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In Extract 10.2, the candidate managed to describe six categories of primary causes of food losses and consequently scored high marks.

3.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE FOR EACH QUESTION IN PAPER 2

3.1 SECTION A: SHORT ANSWER QUESTIONS

This section consisted of five compulsory short answer questions constructed from the following topics: *Food Quality and Safety*, *Nutrition Program Planning and Intervention*, *Catering and Institutional Feeding* and *Food Microbiology*. Each question carried 8 marks. The performance of candidates in each question was regarded as poor if the scores range from 0 to 2.5;

average if the scores range from 3 to 4.5; and good if the scores range from 5 to 8 marks.

3.1.1 Question 1: Food Quality and Safety

The candidates were required to define food quality assurance systems and to state their importance in part (a). In part (b), they were required to explain briefly five activities involved in quality assurance systems.

The question was attempted by 99.2 percent of all the candidates and omitted by 0.8 percent. This was the most poorly performed question, as 99.6 percent of the candidates scored from 0 to 2 marks, including 36.3 percent who scored 0. The percentage of the candidates who scored 3 out of 8 marks allotted to this question was only 0.4, meaning that none of the candidates scored above 3 marks. The candidates' performance is summarized in Figure 11.

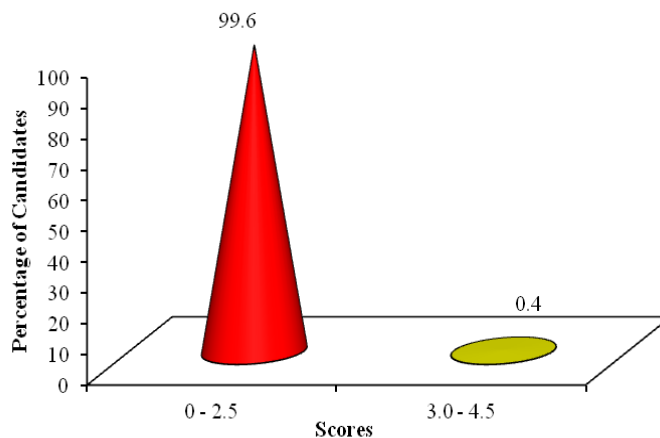


Figure 11: *The Percentage of the Candidates' Performance in Question 1.*

Most of the candidates who scored low marks provided a variety of irrelevant responses, showing that they had insufficient knowledge of the concept of food quality assurance systems. In part (a), majority of the candidates provided incorrect definitions of food quality assurance systems. For example, one candidate defined it as *the assuring that the food is safe and will not cause harm to the consumer when prepare or eaten*. Another candidate defined it as *the term used to describe the food which cause less hazard which can be taken by consumers without causing any health problem*. These candidates failed to understand that food quality assurance systems are systems that include documents which describe operations and

activities that relate to food quality and safety. The candidates also failed to respond correctly on the importance of food quality assurance systems. The incorrect points provided include *to prevent food spoilage and ensure stability of food, it prevent contradictions on the price to be bought and sold to the people, it ensure that the product delivered has followed regulatory requirement that are kept by organization of food quality system such as TBS and TFDA and to give a satisfied description of labeling for the customers understanding*. Such candidates failed to understand that food quality assurance systems focus on the prevention of mistakes/problems and therefore they ensure that food companies are capable of meeting food quality and safety requirements. Other candidates left this part of the question unanswered due to lack of knowledge.

In part (b), the candidates explained incorrectly the activities involved in the quality assurance systems because they misinterpreted the question. Some of the candidates responded by referring to the activities of a store keeper. For example, one candidate mentioned such points as *to check on the incoming and outgoing materials, to ensure the use of not expired foods, to check the remaining stock of food and checking the kind and amount of preservatives present in food on food labels for catering and instructional feeding*. Others mentioned the importances of food labels such as *it enable the consumers to know the manufacturing and expiring dates of foods, it enable the consumer to know the type and amount of nutrients or ingredients present in food, to provide the name of the food produced and ensure that the method of food product storage and method of cooking are known to consumers of food*, instead of the activities involved in quality assurance systems. The candidates who scored zero provided wrong answers in all parts of the question due to lack of knowledge on the concept of food quality. Extract 11 is a sample of a response from a candidate with poor performance.

Extract 11

1	<p>a) Food quality assurance.</p> <p>- Is the system of assure that the food is free from micro-organisms and can not cause any harm to the consumer of the food.</p>	
	<p>(b) Activities involved in quality assurance:-</p>	
	<p>i) Checking the ingredients of the food.</p> <p>- Quality assurance deals with checking the ingredients that used to make a particular food if they are bring dietary health.</p>	
	<p>ii) Checking the kind and amount of preservatives present in food.</p> <p>- The quality assurance also, deals with checking if the preservatives are not harm to people and the amount of preservative added to the food is optimum amount for preservation of such food.</p>	
	<p>iii) Deals with ensuring the shelflife of the food.</p> <p>- Quality assurance deals with checking if the food products has expire date and manufacture date so as it can not used be used when its in out of season.</p>	

	(b) iv) Check for the quality of the food.	
	- Quality assurance deals with ensuring that, the food product is good to be used and has all the ingredients required for that food at a appropriate amount	
	v) Ensuring if the food is free from chemical hazards and micro-organisms and if it can resist the environmental condition changes.	

Extract 11 shows a sample of response from a candidate who provided irrelevant responses to all parts of the question. In addition, the candidate did not explain the importance of food quality assurance systems.

The candidates with average performance managed to define food quality assurance systems in part (a) but failed to explain its importance. Majority of these candidates managed to mention two or three correct activities involved in food quality assurance systems although they failed to provide correct brief explanations of the mentioned points. For example, one candidate wrote:

- *To control the processing of food to ensure that the food which is to be consumed is hygienically prepared.*
- *Inspection of foods in order to ensure that they are not expired.*

This candidate mentioned the correct activity, *to control the processing of food* but provided incorrect explanation as he/she failed to understand that quality assurance systems control all the necessary conditions of the process so as to keep the process within boundaries and minimize the variation of the process and not to ensure that the food which is to be consumed is hygienically prepared. Likewise, the candidate mentioned *inspection of foods* but failed to correctly explain that quality assurance systems inspect the food by examining the characteristics of raw materials involved in the production process and by comparing with specified requirements in order to ensure that consistency for each characteristic is achieved and not to ensure that they are not expired.

3.1.2 Question 2: Nutrition Program Planning and Intervention

The question required the candidates to describe briefly eight features of successful nutrition intervention programs.

The analysis indicates that 97.2 percent of the candidates attempted this question. The candidates' performance was poor since 78.2 percent of the candidates failed, with 56.8 percent scoring from 0.5 to 2.5 marks and 21.4 percent scoring 0. Only 21.8 percent scored from 3 to 4.5 marks and none scored above 4.5 marks, as summarized in Figure 12.



Figure 12: *The Percentage of the Candidates' Performance in Question 2.*

The analysis of the candidates' responses indicates that some of the candidates scored low marks in this question due to misinterpretations of the question. Some of them described the important elements of successful nutritional program planning instead of features of successful nutrition intervention programs. Others provided the indicators of a successful nutrition rehabilitation program, which include *decrease of infant morbidity and mortality rates, a decrease in the incidence of severity of nutritional deficiency disorders, improved well being of the people, improved biological values and increased intake of enough balanced foods*. Those who lacked knowledge on nutrition intervention programs provided irrelevant features such as *to improve supply of clean water, to improve health education, increase dietary therapy, increase breastfeeding, and improve care of expectant mothers and children*. Extract 12.1 is a sample of a response from one of the candidates who performed poorly in this question.

Extract 12.1

2.	i/ Political commitment; the various political agencies like the government should also involve it self in nutritional ^{intervention} program like by forming policies so as to help succession of the program.
	ii/ Community participation and mobilization; the community has to participate well in a nutritional intervention program so as to get informations and when they practice them they results into success of the program.
	iii/ Human resources; Individual should involve them selves in a nutritional intervention program so as to make it real.
	iv/ Mobilization, evaluation and maintenance of informations; The nutritional intervention program ensures mobilization, evaluation and maintenance of informations provided.
	v/ Accessibility and affordability; A nutrition intervention programme is accessible to the community and it is affordable hence it is not expensive.

In Extract 12.1, the candidate misinterpreted the question as he/she described the important elements of successful nutritional program planning instead of cost effectiveness, relevance of the intervention, feasibility/replicability, sustainability, ease in evaluation, integration with other existing programs and ease in targeting.

Furthermore, the candidates with average performance were able to point out two to four out of eight features of successful nutrition intervention programs. Some failed to give clear explanations of the mentioned features. The common features mentioned include *replicability, sustainability, targeting, cost effectiveness* and *relevancy*. Others mixed the correct

features of successful nutrition intervention programs with the important elements to consider when setting nutritional objectives, such as *resources available, extent of the problem, time frame and evaluation*. Extract 12.2 is a sample of a response from a candidate with average performance.

Extract 12.2

2	The following are the features of the successfully nutrition intervention programme.
i-	Participation of community This involves the majority availability of people within the community but if the people are few this shows that the nutrition intervention can't work out well but if the majority volunteered are many.
ii-	Relevancy. This involves, how people have accepted the nutrition intervention programme and what have they see, meaning of the strengths and weaknesses of the programme.
iii-	Cost effectiveness: If the cost is enough for the programme and if the money and the costs needed for the programme are many this another alternatives must be taken.
iv-	Target group The group targeted may be the adolescent, female women or children even men. so this is important since a person need to prepare well according to the targeted group which it is going to be provided with education.
v-	Sustainability If the community is socially organised and if the social members, knows about the programme and if they will listen to it.

vi.	Availability of fund. fund can be from parents, personal fund, from loans and others, fund is needed much so that the programme to be effective.
vii.	Availability of Resources Resources such as cars that can help in moving from one place to another so that to provide that education easily.
viii.	Acceptability Is it the programme acceptable within people or it is not acceptable? In order for the nutrition intervention.

In Extract 12.2, the candidate managed to provide four out of eight correct features of successful nutrition intervention programs, and consequently scored average marks.

3.1.3 Question 3: Catering and Institutional Feeding

In part (a) of the question, the candidates were required to define the term “standard recipe”. In part (b), they were required to describe briefly seven items to be included in a standard recipe.

The question was attempted by 98.8 percent of the candidates who registered for this examination, of which 24.7 percent scored from 5 to 6.5 marks and 36.0 percent scored from 3 to 4.5 marks. The candidates who scored from 0 to 2.5 marks were 39.3 percent, of which 3.6 percent scored 0. The general performance of the candidates was good since 60.7 percent scored 3 marks or above. Figure 13 is a summary of the performance of the candidates.

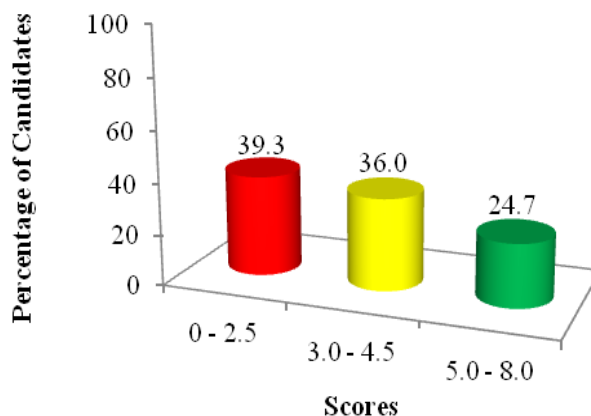


Figure 13: The Percentage of the Candidates' Performance in Question 3.

The analysis of candidates' responses shows that the candidates who scored average marks or above had knowledge of food recipes, particularly the standard recipes. In part (a) of this question, they were able to define standard recipe *as a written formula for preparing a food product of a specified quality and quantity for use in a particular establishment*. In part (b), some candidates mixed correct and incorrect items. Some of the incorrect items provided by these candidates include *type of local food items present, find the composition of traditional foods for use, storage facility, acceptability of the recipe, measurements available, order of work, choice of target group first, source of income of the people and methods of enriching the food with other foods*. Some of these items are the steps of formulating a new recipe to a special group of people. Other candidates provided insufficient descriptions of the mentioned items while a few simply mentioned the items instead of describing them. Extract 13.1 is a sample response from a candidate with good performance in this question.

Extract 13.1

3a.	Standard recipe is the written formula which used to prepare the food of the certain quality and quantity to be used in the establishment	
b.	It must include the name of the dish. The standard recipe should include the name of the dish if it is the fried fish or any other kind of the dish	
	- It must include the ingredients along with their quantity. The standard recipe should be well specific on the ingredients needed for the dish without forgetting to indicate its quantity required.	
	- Also equipments which are required in the preparation of the dish should also be included if it is saucepan, basin or fryingpan all equipments should be identified.	
	- A standard recipe should include an orderly steps for the combining of the ingredients and making the food product.	
	- Also the standard recipe should identify the number of serving and this is very important in the big catering establishments like in hotels since if they want to prepare the food (the same food) for 6 people while the recipe indicate the number of serving which is 1 then the chef should know that he/she should add the ingredients so as he/she can	
	meet her/his demand of serving his/her customers all at the same time.	
	- It should also include the time needed for the preparation of the food.	
	- The standard recipe also should include the texture and flavour of the prepared dish.	

In Extract 13.1, the candidate managed to define standard recipe in part (a). However, the last item provided by the candidate in part (b) was incorrect causing the candidate to fail to score all 8 marks.

Further analysis shows that the candidates who performed poorly in this question failed to understand its demand. In part (a), majority of the candidates provided incorrect definitions of standard recipe. For example, one candidate defined it as *a standard direction which shows how food is supposed to be prepared*, which was incorrect. In part (b), majority of the candidates described the factors to consider when planning to start a new catering establishment instead of the items to be included in a standard recipe. Some mentioned the factors to consider in the procedure of formulating a new recipe to a special group of people, as *consider local materials available, traditional recipes used, group of people to make the recipe for, income level of the people, time available and activities of the people and source of power to be used*. Others mentioned the food nutrients such as *carbohydrates, proteins, vitamins, mineral salts, fats and oils and roughages*. Extract 13.2 is a sample of a response from a candidate who scored low marks.

Extract 13.2

Q	a) standard recipe	
	Is the recipe which has been written in the standard form.	
	b) i- type of the customer, also due to this they should be consider the type of the customer. example childrens the food which they should involve in the food which can help them in growth.	
	ii- Nutrients the requirements, also they should be considered the nutrients which has been required in the certain place.	
	iii- purchasing power, also you should be look at your customer if they should be afford the price which they have been given.	
	iv- catering equipment, also it is important because if there is no the catering equipment you will not save time.	

v-	local materials available, due to this on your food which you have been prepared you should also suppose to have the local materials at hand.
vi-	competition and the locality, also due to this they have should be having the competition in their localities in order for them to have good due the food quality.
vii-	income level, and also you should be look for the income level of your people in order to avoid the wastage of the food.

In extract 13.2, the candidate misunderstood the question as he/she described the factors to consider when planning to start a new catering establishment instead of the items to be included in a standard recipe.

3.1.4 Question 4: Food Microbiology

The candidates were required to mention three foods associated with outbreak of staphylococcal food poisoning in part (a) (i), and five symptoms of staphylococcal food poisoning in part (a) (ii). Part (b) required the candidates to state four steps used to limit the incidence of staphylococcal enterotoxin in food.

The question was attempted by 99.2 percent of all the candidates. On the other hand, 0.8 percent did not attempt it. The analysis shows that 53.2 percent of the candidates scored from 5 to 7 marks; 37.5 percent scored from 3 to 4.5 marks; and 9.3 percent scored from 1.5 to 2.5 marks. None of the candidates scored 0. The general performance of the candidates in this question was good since majority (90.7%) scored 3 marks or above. Figure14 summarizes the performance of the candidates in this question.

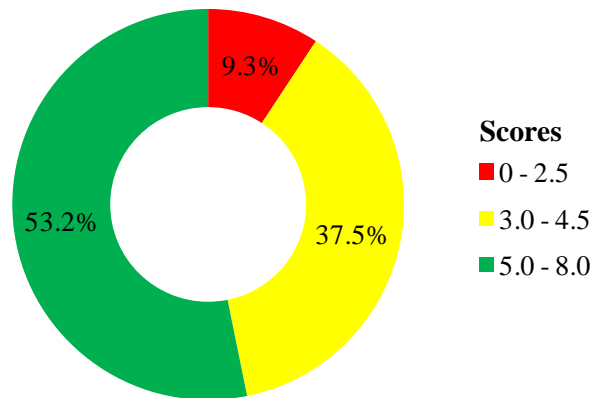


Figure 14: The Percentage of the Candidates' Performance in Question 4.

Out of the candidates who performed well in this question, the majority managed to mention three foods associated with outbreak of staphylococcal food poisoning as, *meat, fish* and *milk* or their products in part (a) (i). In part (a) (ii), they managed to mention five symptoms of staphylococcal food poisoning such as *nausea, abdominal pains, vomiting, fatigue* and *diarrhoea*. Other mentioned symptoms include *shock, salivation, muscular cramping, weak pulse* and *sweating*. These candidates also managed to state correctly the steps used to limit the incidence of staphylococcal enterotoxin in food in part (b). However, some candidates in this category treated one step as two or more separate steps, hence failed to score full (8) marks. For example, some mentioned *canning, bottling* and *use of chemical preservatives* as three separate steps while in actual sense these are the examples of *processes of destroying the microorganisms in food*. Other candidates mentioned *using refrigerators* and *using freezers* as two separate steps used to limit the incidence of staphylococcal enterotoxin in food. These points actually fall under the step of *lowering temperature*. Extract 14.1 shows a sample of a response from a candidate who performed well.

Extract 14.1

4 a) i)	Foods associated with outbreak of Staphylococcal food poisoning	
	i.- Meat	
	ii.- Fish	
	iii.- Milk	

	ii) Symptoms of staphylococcal food poisoning	
	i. - Nausea	
	ii. - Abdominal pains	
	iii. - Vomiting	
	iv. - Fatigue	
	v. - Diarrhoea	
4b)	Steps used to limit the incidence of Staphylococcal enterotoxin in food:	
	i) Adequate heat treatment on food especially food being processed	
	ii) Avoiding cross contamination between cooked food and raw food.	
	iii) People with boils and wounds should not be allowed to prepare food since it may cause contamination.	
	iv) Personal hygiene, food hygiene and kitchen hygiene should be ensured.	

Extract 14.1 is a sample of a good response by a candidate who managed to mention correctly three foods associated with outbreak of staphylococcal food poisoning, symptoms of staphylococcal food poisoning and steps used to limit the incidence of staphylococcal enterotoxins in food. However, the candidate failed to score full marks because the third and fourth steps he/she mentioned fall under the step of reducing exposure of cooked foods to human contacts.

Furthermore, the analysis indicates that the candidates with low scores had insufficient knowledge of the staphylococcal food poisoning. In part (a) (i), majority of the candidates managed to mention one or two correct foods associated with outbreak of staphylococcal food poisoning. The incorrect foods mentioned by these candidates include *potatoes, eggs, bread, fruits, fats, contaminated foods* and *dirty foods*. In part (a) (ii), a few candidates managed to mention at least one correct symptom of staphylococcal food poisoning. In part (b), majority of the candidates failed to state correctly the steps, and ended up providing examples of steps instead. For example, they mentioned the examples of the methods which are used to lower the temperature of the food so as to inactivate staphylococci instead of mentioning the step itself which is *lowering the temperature*. A few

candidates provided irrelevant steps used to limit the incidence of staphylococcal enterotoxin in food. For example, one candidate mentioned such points as *prevent attraction of insects, avoid eating leftovers, inhibit fungi growth and observe environmental sanitation*. Extract 14.2 is a sample of a response from a candidate with poor performance.

Extract 14.2

7a	i) Vegetables	
	ii) Fruits	
	iii) Meats.	
	ii) Symptoms	
	i) unfavorable smell	
	ii) Sour of the food when tasted	
	iii) Change of colour	
	iv) the texture of the food change	
	v) spoilage of food due to diarrhea.	
	b.i) avoid to leave food with moisture content.	
	ii) Drying of the food will limit the incidence of staphylococcal (staphylococcus).	
	iii) Also freezing with high point will limit the incidence of staphylococcus	
	iv) Avoid leaving food opening.	

In Extract 14.2, the candidate mentioned only one correct food which is associated with outbreak of staphylococcal food poisoning and irrelevant symptoms of staphylococcal food poisoning. However, he/she mentioned one correct example of the methods used to lower the temperature of the food instead of stating the step itself, hence scored low marks.

3.1.5 Question 5: Nutrition Program Planning and Intervention

This question required the candidates to define nutrition education and give its role in part (a). Part (b) required them to describe briefly three major components of nutrition education.

The question was attempted by 98.8 percent of the candidates. This was among the poorly performed questions since 89.1 percent scored from 0 to

2.5 marks, of which 2.8 percent scored 0. Moreover, 6.4 percent of the candidates scored from 3 to 4.5 marks, while 4.5 percent scored from 5 to 6 marks. No candidates who scored above 6 marks. Figure 15 summarizes the performance of candidates in this question.

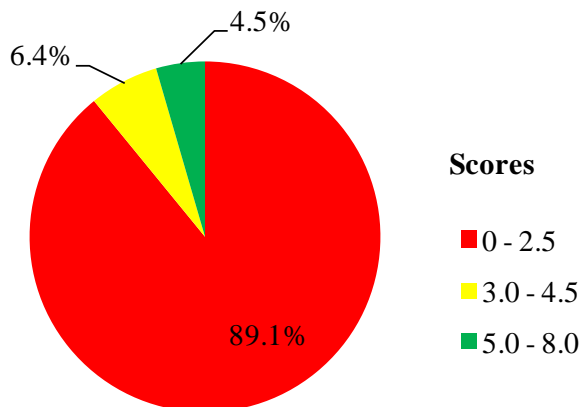


Figure 15: *The Percentage of the Candidates' Performance in Question 5.*

Most candidates (89.1%) scored low marks in this question because they lacked knowledge of the concept of nutrition education. In part (a), they provided an incorrect definition and role of nutrition education. For example, one candidate wrote *a nutrition education is the education that deals with nutrition and nutritional status of the people*. The candidates in this category failed to understand that nutrition education is a basic knowledge given to the people on food nutritional values, quality and safety, preservation methods, processing and handling, preparation and eating so as to help them make the best choice of foods for an adequate diet.

Majority of the candidates misinterpreted part (b) of the question. Some of them mentioned the health and nutrition services provided in the Reproductive and Child Health (RCH) clinics. Others provided the services incorporated in primary health care including *nutrition education, health services, water supply and environmental sanitation* instead of major components of nutrition education. In addition, a few candidates mentioned the components of food security as *food access, food supply, biological utilization of food and stability in the supply of food* instead of the components of nutrition education. Extract 15 is a sample of a response from a candidate who scored low marks in this question.

Extract 15

5	a) Nutrition education is the process of the provide of the education to the people's- and its role. - It help the people to be aware about the nutritional programmes. - It help to eliminate hunger and malnutrition programme.	
	b) i- Growth monitoring, this is due the low of the health of your child which you will indicate that your health of your is in good health or bad health as clinical care.	
	ii- Family planning, also due to this the peoples they should be using the family planning method to have the spacing of the children.	
	iii- Food supplement, this was due to the all babies they should be get it in order to prevent the child from the disease.	

In Extract 15, the candidate failed to provide the correct definition and role of nutrition education in part (a). He/she provided some of the services provided in the Reproductive and Child Health clinics instead of mentioning a motivational, an action, an environmental components in part (b).

Out of the candidates who scored from 3 to 6 marks, majority managed to define nutrition education and to give its role in part (a) of the question. For example, one candidate defined nutrition education as *a knowledge provided to the people concerning with adequate meals containing all nutrients to be taken to the body so as to make sure that the good health status of the people is maintained*. This candidate was aware that nutrition education is the necessary education provided to the people which can change their behaviour on food and nutrition practices resulting into improvement of their health status. Others provided unclear definition and role of nutrition education. Some of the unclear roles of nutrition education provided by these candidates include *to improve the nutritional status of the people in the community, to promote good health, to eradicate malnutrition and to prevent nutritional problems*. These candidates did not write how nutrition education brings about such changes.

In part (b), the candidates managed to mention at least two major components of nutrition education although they failed to provide sufficient descriptions. For example, one candidate wrote *increase diversity and quantity of family food availability by providing knowledge on food production*. The description provided was not sufficient because the candidate failed to understand that family food availability or supply is not only affected by food production but also by other factors, such as food storage practices, food processing, food preservation, selection and diversification of crops as well as the effects of food preparation and cooking processes on food nutrients.

3.2 SECTION B: ESSAY QUESTIONS

There were five essay questions in this section constructed from the following topics: *Catering and Institutional Feeding, Malnutrition, Food Microbiology* and *Nutrition Program Planning and Intervention*. Each question carried 20 marks and the candidates were instructed to choose only three questions. The performance of candidates in each question was regarded as poor if the scores range from 0 to 6.5; average if the scores range from 7 to 11.5; and good if the scores range from 12 to 20 marks.

3.2.1 Question 6: Catering and Institutional Feeding

The question required the candidates to give seven reasons for controlling resources and two techniques of controlling resources in a catering industry.

The question was attempted by 13.6 percent of the candidates. The performance of candidates was poor as majority (88.2%) scored from 0.5 to 6.5 marks, of which 14.7 percent scored 0.5 marks. Moreover, 11.8 percent of the candidates scored from 7 to 9.5 marks. No one scored above 9.5 marks out of 20. Figure 16 summarizes the performance of the candidates in this question.

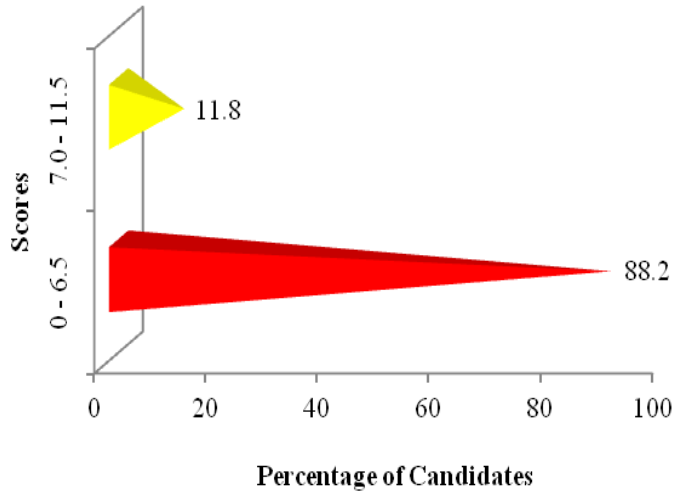


Figure 16: *The Percentage of the Candidates' Performance in Question 6.*

Majority of the candidates performed poorly due to misconception of the question. In the first part of the question, some candidates described the economic importance of catering industry as *to support other sectors, to provide employment opportunity to the people, to increase income and alleviate poverty, advertize other national resources and to increase foreign exchange of the nation* instead of giving the reasons for controlling resources in a catering industry. Others provided the areas of expenditure to be checked when estimating the cost required in establishing a catering industry. In the second part of the question, majority of the candidates mentioned the sources of capital for establishing a catering industry instead of the techniques of controlling resources. Others mentioned the effective guidelines to reduce costs in catering industry which include *control food costs, control labour costs, control food wastage and control internal theft*. Some of the candidates lacked knowledge on the concept of resource control in catering business as they provided a variety of irrelevant responses such as *provision of enough education, to avoid bioavailability of food, to introduce waste disposal methods, to enact different laws, advertisement through social media and control material costs* instead of the techniques of controlling resources in a catering industry. Extract 16 is a sample of a response from a candidate with poor performance.

Extract 16

6.	<p>Catering industry is the hospitality of providing food, drinks and sometimes accommodation at various people and places catering industry established in area where there is availability of people in good area and infrastructure. The following are reasons for controlling resource in catering industry.</p> <p>Transport, this are among of resource in catering industry management because in catering area resource of transport should be well established in proper way make sure that customer can never suffer when they move on road therefore the reason of</p>	
	<p>of controlling resource in a catering industry is important because help in establishment of road line</p> <p>Capital equipment, in catering industry a lot of money is needed so as to make sure that all equipment which is needed at catering industry are prevent example cooking equipment, utensils, electricity and electrical water, those equipment used alot of money so when plan about catering industry should consider capital equipment</p>	
	<p>Premises, this needed in the catering industry because due to premises of invest alot of money help to increase lumpsum which will help to drive your catering establishment and development of catering management.</p>	
	<p>working capital, when establish catering industry must manage of workers, who is need you and make sure that you are responsible to pay their salaries on time, so even that should consider during the planning up catering industry so as to prevent disturbance from the workers.</p>	
	<p>Starting up cost, during the catering industry establishment alot of money will be used because you will need to planning, equipment, building, this need alot of money so as to make good catering industry establishment.</p>	
	<p>Capital for the kind of foods as we know in catering establishment capital for the kind of menu is needed because there some of religion example muslim, they never use pork meat so when you are establish catering industry should consider all people which is found in that area.</p>	

area	Capital for the method of working, also that should be considered because when planning about catering
	ing industry should consider the method of working which is needed in catering industry establishment.
	The following are two techniques of controlling resource in catering industry.
	Bank loan, this is area which concern about deposit and withdraw money. In terms of the catering industry money is deposited in the bank which will be used for the things which have already explained above by saying that sometimes bank may assist some money and later will replace it due to the resource which is used to dining catering industry.
	Trade credit loan, this are very important because due to the establishment which you have will help to get some money from trade credit loan which will be used to rise your establishment in the catering industry.
	Therefore, controlling resource in the catering industry is very important because will help you to generate different problem which will be faced in catering industry.

In Extract 16, the candidate described areas of expenditure to be checked when estimating the cost required in establishing a catering industry instead of the reasons for controlling resources. He/she also explained the sources of capital for establishing a catering industry instead of techniques of controlling resources in a catering industry.

Furthermore, most candidates with average performance managed to give at least four reasons for controlling resources. Others provided insufficient explanation of the mentioned reasons, hence failed to score all 2 marks allocated to each point. The correctly mentioned reasons for controlling resources include *to comply with legal requirement, to serve time of operations, to avoid wastage of food, to prevent theft of items, to ensure availability of the required supplies, to ensure right quality and quantity of supplies and to maximize profit*. Very few candidates managed to give one correct technique of controlling resources in a catering industry. Others skipped this part of the question. However, some candidates successfully

provided a relevant introduction but only a few of them provided a relevant conclusion.

3.2.2 Question 7: Malnutrition

The candidates were required to analyze six practical solutions to nutrition problems.

The question was attempted by 94 percent of the candidates, of which 56.2 percent scored from 0 to 6.5 marks, 41.7 percent scored from 7 to 11 marks, and 2.1 percent scored from 13 to 15.5 marks. None of the candidates scored from 16 to 20 marks. The performance of candidates in this question was average as 43.8 percent of the candidates scored 7 marks or above, as summarized in Figure 17.

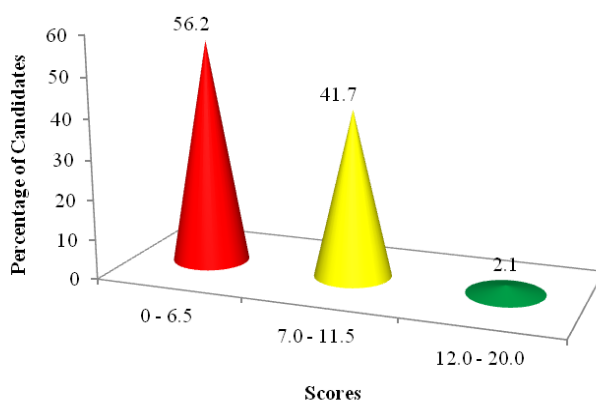


Figure 17: The Percentage of the Candidates' Performance in Question 7.

The analysis of candidates' responses shows that most candidates who scored good and average marks were able to describe the practical solutions because of the experience they had on the nutritional problems existing in our country and the measures being taken to solve them. The solutions provided by the candidates include *improvement of food production, nutritional education, food storage, food processing and preservation, food safety and health care*. However, some candidates either provided inadequate explanation of some of the mentioned solutions or mixed correct and incorrect solutions, hence failed to score full marks. The incorrect solutions mentioned by the candidates include *physical exercises, avoid poor use of food crops, prevention of infections, improve supply of clean water, increase dietary therapy and using available resources properly*. Extract 17.1 is a sample of a response from a candidate who performed well in this question.

Extract 17.1

7.	Nutritional problems are those problems which are associated with the consumption and utilization of food nutrients. This can be high utilization or intake of nutrients which can lead to obesity or hypertension problem or be very low that can lead to problems example Malnutritional problems such as Kwashiorkor. The practical solution for solving this problems of nutritional problems are:
	Improve food production, by proper allocation of resources, improve the availability of pesticides and other agricultural inputs, proper selection of seeds to ensure highly production of foods this availability of foods can improve the health situation, also introduction of home gardens that improve the availability of fruits, and vegetables for maintenance of proper health of people. This can solve the problem of nutrition.
	Improve food distribution. example from farm to the market, equal distribution of food to the family level and also ensure food security in the household society and community as whole. Improving the infrastructures like roads, railways also this can improve the availability of enough foods to the people and hence improve the nutritional status of the people and solve the problem of nutritional
	Improving food storage. especially the storage structures. Maintenance of stores and regular monitoring and inspection of stores to ensure safe storage of grains that prevent food losses, food spoilage and food deterioration hence improve the availability of food hence can solve nutritional problems such as hunger

	and malnutrition problems.	
	Improve food processing and preservation, by maintain a proper preservation methods to avoid loss of nutrient value, ensure good processing methods of food to improve the nutritional problems by making food safe with no any risk of getting diarrhea and hence this improve the nutritional status of people.	
	Improvement of health care, such as promoting clinics, vaccination and immunization programs, availability of medicine and qualified doctors to the health centers in the village hence this improve the health standards of people and improve and solve nutritional problems. Through supplementation, oral rehydration, immunization growth monitoring programmes developed in the health centers. Hence solve the problem of nutrition / nutritional problem in the society.	
	Improve nutritional education to people in whole community example, nutrition education to mothers on preparation of weaning food, supplementary foods to ensure the health standards of the children. also adult education on family planning and child spacing this can reduce the big family size which is most prone to nutritional problems also The education on balance diet to the community in order to improve the health status of the people and solve the Nutritional problems.	
	Nutritional problems mostly caused by poverty that people lack adequate foods in a better forms, also poor utilization of foods by people due to diseases; infection that leads to undernutrition, also poor diet eating by people like consumption of high fat diets which leads to over intake of nutrient foods. The food and nutrition education should be provided to the all peoples in order to solve the problems of Nutritional problems.	

Extract 17.1 is a sample of a good response by a candidate who analyzed the practical solutions to nutritional problems. However, the candidate failed to score all 20 marks because he/she provided insufficient explanation of some of the solutions.

On the other hand, some candidates who performed poorly in this question lacked knowledge of the concept of the nutritional problems in our country and their management. As a result, they mentioned irrelevant solutions. For example, one candidate mentioned such points as *eating balanced diet practice, proper feeding practice, good care, proper breastfeeding processes, body checkup practicals and good weaning practice in children*. Other candidates in this category performed poorly due to misconception of the question. Most of them wrote the principles of nutritional program planning while a few provided some of the intervention programs which are promoted to comprehensively tackle the problem of malnutrition in our country instead of the practical solutions to nutrition problems. The mentioned intervention programs include *reducing women workload, reducing parasite infections, improving child feeding practices, improving food security, reducing poverty and improving macro-nutrient consumption*. Extract 17.2 shows a sample of a candidate's poor response.

Extract 17.2

7.	<p>Nutrition problems are problems that arise from poor eating habits that may affect the health and lead to malnutrition. The most important problem that affect most in society is malnutrition, this lead to inadequate or sufficient taking of food that result to malnutrition. The following are solutions to nutrition problems.</p> <p>Problem identification; This is the first practical solution to nutrition problem to be taken so as to identify what type of problem present. This solution is made by doing research at that particular area so as to find what type of nutritional problem is present. Example problem identification is the determination of that particular problem present is sometimes involve asking of each one question of all about his/her diet per day so as to see what type of problem is present and also by recording age symptoms and signs that present and refer to what kind of deficient can be present. Example when some one has kwashiorkor he/she will have the following symptoms and signs, moon face, loss of appetite, presence of oedema so by recording these symptoms and signs one will be able to identify the problem.</p> <p>Analysis of the problem; When the problem is already identified, then analysis of the problem should follow so as one can be able to obtain treatment and be sure that that particular problem that he/she identify is that particular problem that present at that area. Example analysis of problem is done done by collecting all data that one he/she obtained from his/her research that did so as to solve the problem.</p>
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Setting of objectives; Setting of objectives is done after the analysis of problem is obtained. This solution is done by taking measures and treatment that will be present that when introduced to people it will cure them and they will be able to prevent themselves so as they cannot be affected again. Example if after knowing that the problem is kwashiorkor deficient, so to set objectives is that on what way should you use so as to prevent this deficient and cure the deficient and people will be able to receive that treatment obtained and follow. And if you set your object you should be able to make people follow it so as it can be successful and cure people.

Decision making; This solution is done when you already know ~~to~~ what to do, that is when one decide to make decision. The decision that one make should be beneficial and well interpreted so as to solve that particular nutritional problem. Example when already know that that area most of people especial children are the ones that passes that deficient like kwashiorkor, the decision made should involve educating of their mothers because they are the ones that feed on their children so through educating them the children will be safe due to the practise that their parent did most especially mothers, and that education should involve most they way to feed their children with proper & balanced meal and food from different nutrients they should avoid feeding children to only one meal which comprise with one nutrients only.

Implementation; This is done through when already you decide on what should be done so as to eradicate that particular deficient. Implementation is done through solving that problem that is already been

identified, this implementation is where the problem is being treated whether by treating and educating them so as to avoid the occurrence of that problem. Due this practical application of solving nutritional problem one must be able to convince people to attend the meeting that will be arranged by nutritionalist so as education that they provide should be all measured and make sure that all people attend. Example when at a particular area the problem available is ~~pro~~ kwashiorkor and marasmus one must provide education that will be able to make

<p>people understand what is the cause, effect that will arise so as they can know how much the deficient is not good for one's health and helps should promote good health for his/her family.</p> <p>Evaluation; This is the last stage done when solving nutrition problem in at a particular area. This pre method is done through observation of measures and education that people provide that followed by the people, the rate of people with particular problem are decreasing or increasing so as further measures and treatment can be obtained. The nutritionalist should be able to indicate</p>	
<p>and well observing that area with problem so as to avoid any further problem to occur. And if the solution made are not that successful the precaution should be take and search for another alternative.</p> <p>The problems of nutrition are most obtained due to lack of nutrients that the body need for its proper growth. The body need food which comprise of all nutrient like Carbohydrates, Proteins, Vitamins, mineral and Iron so as they can perform different function and avoid nutritional problem that may arise due to insufficient lack nutrients available that the body need.</p>	

Extract 17.2 shows the candidate who analysed the principles of nutritional program planning instead of practical solutions to nutrition problems due to misinterpretation of the question.

3.2.3 Question 8: Food Microbiology

The question required the candidates to support the statement, "Requirements for growth of microorganism are identical regardless of whether they are harmful or beneficial organisms", by (a) classifying the microorganisms important in food microbiology and (b) describing four extrinsic factors that influence growth of microorganisms in foods.

The question was attempted by 95.6 percent of all the candidates. The general performance of the candidates was average since 53.1 percent of the candidates scored from 7 to 11.5 marks and 46.9 percent scored from 0.5 to 6.5 marks. None of the candidates scored zero or above 11.5 marks. Figure 18 summarizes this performance.

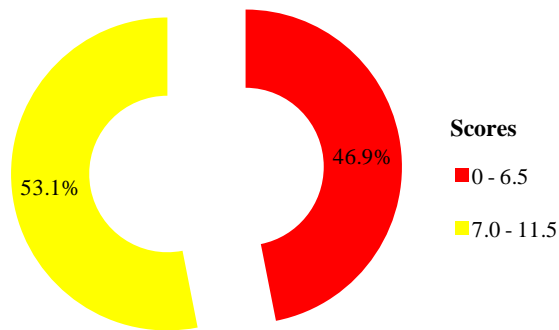


Figure 18: The Percentage of the Candidates' Performance in Question 8.

In part (a), out of the candidates who scored averagely in this question, a few were able to classify correctly the microorganisms important in food microbiology as *bacteria*, *fungi*, *viruses* and *protozoa*. Most of them included *yeasts* and/or *moulds* in their responses because they failed to understand that these microorganisms fall under the group of fungi. In part (b), some of the candidates in this category mixed correct and incorrect extrinsic factors that influence growth of microorganisms in foods. Some of the incorrect factors mentioned include *climate*, *rainfall*, *sunshine*, *oxygen* and *environmental temperature*. Those who mentioned climate, rainfall and sunshine failed to understand that climate is the condition of a place in relation to various phenomena of the atmosphere, which include rainfall and sunshine and that, they do not affect growth of microorganisms in foods. Others failed to provide sufficient explanations relevant to the extrinsic factors mentioned. As a result, they failed to score above average marks. Extract 18.1 shows a sample of a candidate's average performance.

Extract 18.1

8.	Growth is the irreversible increase in the food microbiology is the study of microorganisms that are found in food. This can only be seen by aid of microscope and not by our naked eyes. The microorganisms can be harmful and others harmless. Any microorganisms to grow in food requires proper factors for it to grow in the food. The following is the classification of the microorganisms important in food microbiology.
	Bacteria: The important microorganisms in food microbiology. Some bacteria are harmful which cause the spoilage of the food and others are harmless that leads to formation of other

of the food will make the microorganisms grow in the food. Example lactobacilli bacteria ferment fresh milk to curd milk which are used by people.

Moulds: Another important microorganism in food microbiology. All have some moulds which cause harmful effects on food and other do not cause harmful effect in that their harmless. Example of harmful moulds are those which grow on the breads and change its texture, flavour and appearance of the breads.

Yeast: Another class of microorganism which is important in food microbiology. All in yeast their harmful yeast and useful yeast such as those involved in breadmaking. Yeast is the group of fungi which grow more in food by process of fermentation when given food in form of sugar, moisture, suitable pH and temperature.

The following are extrinsic factors that influence growth of microorganisms in foods:

Temperature: None among the extrinsic factors that influence the growth of microorganisms in foods. Some of microorganisms grow well in high, moderate and low temperature. Every microorganism at suitable temperature for its growth. So when the food is stored in suitable temperature will enable the microorganisms to grow on it. Example staphylococcal bacteria grow well in low temperature in food like meat, fish, milk and its products stored in refrigerator temperature below $20^{\circ}C$.

Relative humidity: Another extrinsic factor that influence growth of microorganism. Most microorganisms require an availability of moisture for them to grow in food. If the food is stored in environment where relative humidity surrounding is high than the relative humidity in the food, the food will pick up moisture from the atmosphere until the equilibrium is reached and when stored the microorganism which grow well in presence of moisture grow in the food and at the end the food will be spoiled.

Availability of gases concentration in the atmosphere: gases such as carbon dioxide inhibit the growth of ^{some of} microorganisms in foods. Because microorganisms some of them do grow in the presence of oxygen, microorganisms which grow in absence of oxygen ~~or~~ but in presence of other gases such as carbon dioxide will influence the growth of microorganisms in foods.

Climate condition: Another extrinsic factor that influence growth of microorganisms. Such as vapour pressure

	which increases relative humidity in the atmosphere when the food is stored in that environment it pick up moisture as the result microorganisms grow on the food.	
	Generally microorganisms which growth in food and cause spoil can be prevent by making the growth requirements unable to support them. Example removing moisture in food.	

Extract 18.1 illustrates the candidate who performed averagely in this question because he/she treated moulds and yeasts as two separate classes while in actual sense they both fall under the group of fungi. In addition, the candidate mentioned climatic conditions, which is not a correct factor.

On the other hand, the candidates whose scores range from 0.5 to 6.5 marks were unable to classify the microorganisms important in food microbiology as they had insufficient knowledge on the types and classes of microorganisms in part (a). These candidates faced a problem in distinguishing groups of the microorganisms which are important in food microbiology from other groups. Most of them mentioned the major groups of microorganisms according to their activity. Others categorized them basing on the temperature range at which they act best as *psychrophiles*, *thermophiles*, *mesophiles* and *facultative*. Some candidates failed to understand this part of the question, and ended up mentioning the uses of microorganisms as *used in making antibiotics*, *used in brewery*, *as a source of food*, *to improve soil fertility* and *used to manufacture dairy products* instead of the classes of microorganisms which are important in food microbiology.

The candidates misinterpreted part (b) of the question as most of them described the intrinsic instead of extrinsic factors that affect growth of microorganisms in foods. A few candidates provided the causes of food contamination instead of the required extrinsic factors. For example, one candidate mentioned *dirty hands of food handlers*, *poor kitchen hygiene*, *cross contamination* and *dirty utensils* as the extrinsic factors that affect growth of microorganisms in foods. Extract 18.2 shows a sample of a response from a candidate with poor performance.

Extract 18.2

8.	<p>Food microbiology is the studying of small microorganisms found in food, these among of them are bacteria, yeast and mould.</p> <p>The microorganisms important in food microbiology are the following.</p> <p>Pathogenic microorganism. These are microorganism which they donot cause harm to the humans, they destroy the host of human and sometimes food such as the virus.</p> <p>Non-pathogenic microorganism. These are microorganism that they donot cause harm to the human, they are used in production of others things, hence the name useful microorganism for example candida, lactobacillus for conversion of milk fresh to yoghurt, bacteria and mould.</p> <p>The extrinsic factors that influence the growth of microorganisms in food are;</p> <p>Nutrient Content. To the media whereby there are alot of energy for growth of an organism, ^{even} if there is no further factors which determine it is growth for example oxygen supply.</p>	
	<p>Moisture Content - This is determined by water activity of the organism and the environment. For example if the grain have more moisture content that the environment the growth is faster because the sugar available and optimum moisture for growth is available.</p> <p>pH. Is the negative logarithm of the hydrogen ion concentrations, the different organisms grows according to their optimum pH for example the bacteria cannot grow under low pH value such as 4.5 pH the organism like virus yeast and moulds they grow best.</p> <p>Physical and biological structures of the food. The structures of the certain foods such as egg can be used the culture for the growth of organisms for example the cracks on eggshell the microorganism can obtained their requirements due to the</p>	
	<p>presence of optimum condition for multiplication, the cracks allow the organisms to enter inside.</p> <p>Apart for that the non-pathogenic microorganism are applicable in food production including production of cheese, in bakery industries for making breads from yeast and also bacteria in doing fermentation. Due to their usefulness they must be used more to improve the food products.</p>	

Extract 18:2 shows a sample of a response from a candidate who misconceived all parts of the question. In part (a), the candidate explained the groups of

microorganisms according to their activity instead of the classes of microorganisms important in food microbiology. In part (b), he/she mentioned the intrinsic instead of extrinsic factors that influence growth of microorganisms in foods.

3.2.4 Question 9: Nutrition Program Planning and Intervention

The candidates were required to describe six health practices to be addressed when providing nutrition education to mothers having undernourished children.

It was an optional question attempted by 89.2 percent of all the candidates. The candidates performance was good as 61.4 percent scored from 7 to 15.5 marks, of which 54.7 percent scored from 7 to 11.5 marks and 6.7 percent scored from 12 to 15.5 marks. The percentage of candidates who scored from 0 to 6.5 were 38.6, of which 0.4 percent scored 0. Figure 19 shows the candidates performance in this question.

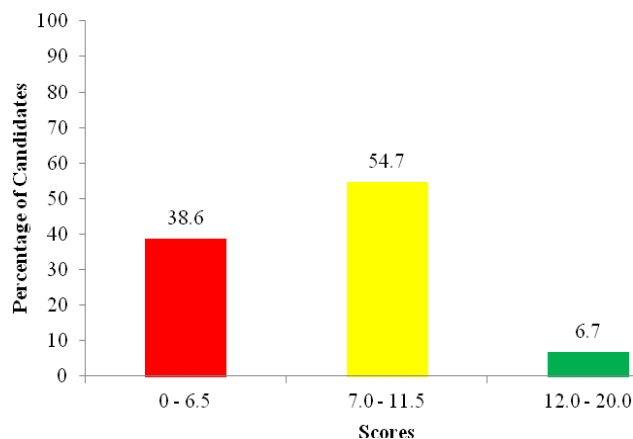


Figure 19: The Percentage of the Candidates' Performance in Question 9.

The analysis of the candidates' responses indicates that majority of the candidates who scored average and good marks mentioned three to six correct health practices to be addressed when providing nutrition education to mothers having undernourished children. However, these candidates failed to score more than 15.5 marks out of 20 because they provided incorrect or unclear descriptions of the mentioned health practices. For example, one candidate mentioned *supporting breastfeeding to mothers* and then explained that *mothers should breastfeed for 2 years accompanied by*

feeding the children weaning food, which is not clear. Extract 19.1 shows a script of a candidate who scored high marks.

Extract 19.1

Qn 9.	<p>Undernutrition is a condition of a body resulting from low intake of nutrients which are required by the body. This may lead to disease like kwashiorkor, anaemia, goitrogen and others. This are classified into the following categories:- Protein energy malnutrition, vitamin A deficiency, iodine deficiency, nutrition anaemia. When providing nutrition education to a mother having undernourished children, the following health practices should be addressed:-</p> <p>Maintain hygiene during preparation of food. In order to improve health of a children, a mother should have personal hygiene and should ensure hygiene before, during and after preparation of food. This will help to prevent disease which can be caused due to contamination of food. Example of such disease include typhoid, diarrhoea and vomiting. This maintenance of hygiene also will help to ensure good intake and appetite of eating food.</p> <p>Increase intake of food contain all nutrients. A mother with undernourished children should provide and prepare food which contain large amount of nutrients for her child. This will help a child to improve his/her health and growth. Therefore a mother should be educated on which kind of food can be used to feed her child so as to increase nutrient intake to the body.</p> <p>Emphasize breast feeding to a baby. A mother should be educated on proper feeding of her baby when is under two years. This will help a child to get all required nutrients which are required for proper and strong immunity. Also weaning should be introduced slowly by including all nutrients when a child reach 6 month after birth. Weaning food should be cooked well and in hygienic environment. In breast feeding a mother also should ensure that is getting balanced diet so that can feed well and frequently her baby.</p> <p>Advise mother to use locally available food. A mother should not use food which contain chemicals, this involve food from industry. Therefore should use natural and available food which have essential nutrients required by the body. This will make easy in preparation of food. Also should</p>	
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have home gardens with all fruits and vegetables.	
Attending clinic. A mother should be advised to attend clinic regularly for check-up. This will help to be provided medication if required. And nutrition rehabilitation can be provided to both mother and child if have poor living condition. There are a mother should be advised to attend clinic for more help.	
Educate a mother to use family planning. This are good method which will help to get few number of children which will be affordable and get all nutrients required by the body. When you have family planning will enable a mother to take care of her babies hence feed them properly and prevent undernourished children.	
A mother should follow the education provided by a nutritionist and skilled people as to prevent under nutritional disease like PEM, NAD, VAD and IDD.	

In extract 19.1, the candidate managed to mention correctly six health practices to be addressed when providing nutrition education to mothers having undernourished children. However, the candidate failed to score full marks because he/she provided unclear descriptions of the mentioned practices.

The candidates with low scores failed to understand the demand of the question. Some described the nutrition interventions to be used in nutrition education programs. Others mentioned the services which are provided in the Reproductive and Child Health clinics which include *nutritional care of children, supplementation of Vitamin A, growth monitoring, immunization, health education, nutritional advice, examination and treatment of minor illnesses and care for pregnant women* instead of health practices to be addressed when providing nutrition education to mothers having undernourished children. Besides, other candidates treated one activity as two or three separate activities, hence scored less than average marks. For example, one candidate wrote, *personal hygiene, prevention of childhood infections and proper environmental sanitation* as three separate practices instead of merging them under the practice of *promotion of personal and environmental hygiene*. Extract 19.2 is a sample of a response by a candidate with poor performance.

Extract 19.2

9	<p>Nutrition education is the programme which provide education so as to intervene and prevent the problem of malnutrition in community.</p> <p>The following are health practices to addressed when providing nutrition education to Mothers having undernourished children.</p> <p>Food supplementation, due to this through provide variety of food to the child it will improve the health of the child and thus so strengthen the health of undernourished child. through supplementation mother should under stand which food are local available and having more nutrient.</p> <p>Macro nutrients supplementation, due to this nutrient sometime must be provided directly example vaccination of vitamin A or protein or vitamin tableted this provide nutrient directly so as to strengthen the health of the child which is undernourished.</p> <p>Growth monitoring due to this mother should be aware about the stage of growth of children example at 6m the child should be given weaning food this will help to provide nutrient more to the baby also it improve the health of the children which are malnourished.</p> <p>Nutrition orientation, due to this mother must access the utilization of nutrients to the child by provide more nutrients which are required to the children so as to strengthen his health and eliminate the problem of undernourished.</p> <p>Action to improve food security, through making sure that food are available all the time this will ensure that health of people are well strengthen because there is no shortage of food in the community. So through improve food security will ensure health practices.</p>	
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In extract 19:2, the candidate described the nutrition interventions to be used in nutrition education programs instead of health practices to be addressed when providing nutrition education to mothers with undernourished children.

3.2.5 Question 10: Malnutrition

The candidates were required to support the statement, Breastfeeding practice is the best way of feeding infants and it should be promoted in developing countries by (a) describing seven measures to control promotion and use of infant formulae and (b) suggesting four alternative ways that working mothers can apply to make sure that their infants are fed with breast milk during working hours.

The question was attempted by minority (6.4%) of the candidates, of which 87.5 percent scored from 0.5 to 6.5 and 12.5 percent scored 7.5 marks, meaning that there were no candidates who scored from 8 to 20 marks. This data indicates that the general performance of the candidates in this question was poor as summarized in Figure 20.

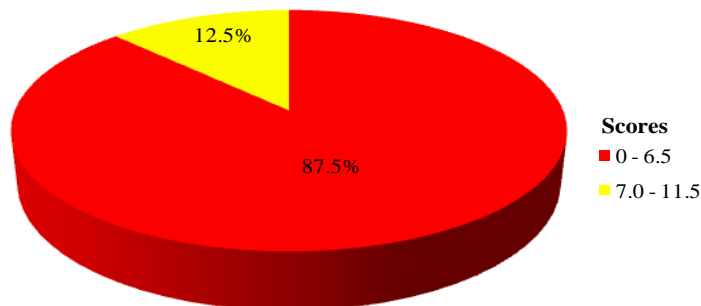


Figure 20: The Percentage of the Candidates' Performance in Question 20.

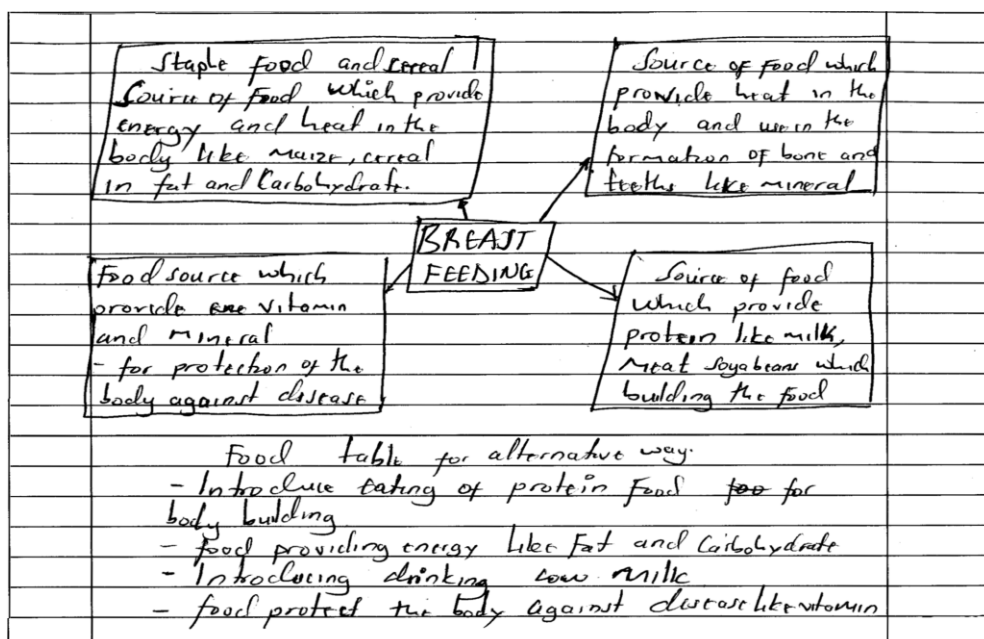
The analysis of the candidates' responses shows that majority of those who opted for this question scored low marks because they had insufficient knowledge of breastfeeding practice as a result, they provided irrelevant responses in part (a). For example, one candidate wrote *formulae should be suit for infant consumption, the formulae should be prepared in a good hygienic condition, the formulae should be easy to use and store, should not be allergic to infants, it should be well balanced that contain all the nutrients that baby need and should be easy for baby to digest* instead of measures to control promotion and use of infant formulae. Another candidate mentioned the following points: *correct temperature of the formula, quality of the milk formula should be considered, controlling*

hygiene of the equipment, adequate heat treatment of the formula should be ensured, portioning of the quantity of the formulae should be controlled, must feed the baby anytime and the mother must be eating balanced diet, which were incorrect. Other candidates in this category misinterpreted this part of the question. For example, some of them described the qualities of weaning foods. Others gave the anthropometric measurements used in the assessment of nutritional status of an individual which include; *weight, height, skinfold thickness, head circumference, chest circumference and mid upper-arm circumference* because they misinterpreted the term 'measures' used in the question.

In part (b), some candidates were able to suggest one or two correct alternative ways that working mothers can apply to ensure that their infants are fed with breast milk during working hours. Others provided incorrect responses due to misinterpretations of this part. For example, one candidate mentioned the advantages of breast milk as *it contain correct amount of all nutrients for infants, breast milk is cheaper, is clean and safe and is a protective to infants*. In addition, most candidates in this category did not include introduction and conclusion in their responses. A few provided irrelevant introductions and conclusions. Extract 20 is a sample of an incorrect response.

Extract 20

10	a/ Measures to control promotion and use of infant formulae	
	i/ The food should be balanced and eaten three per day or all the time	
	ii/ The food should contain protein for baby building and growth of her baby	
	iii/ The food should contain mineral like iron for formation of teeth and bones	
	iv/ The food should be not toxic	
	v/ Should introduce natural food like fruit juice	
	vi/ Should avoid use of breast bottle feeding	
	vii/ Should introduce simple food	



In Extract 20, the candidate misinterpreted all parts of the question. In part (a), the candidate provided some of the qualities of weaning foods and in part (b), he/she presented a food square used to formulate weaning foods for malnourished children. In addition, the candidate did not include introduction and conclusion in his/her response.

Furthermore, 12.5 percent of the candidates who opted for this question scored average marks. In part (a), these candidates mixed incorrect with few correct measures of controlling promotion and use of infant formulae. Besides, the candidates mentioned the measures instead of describing them. For example, one candidate wrote *by controlling labels of infant formula, to control the selling and purchasing infant formulae and prevent producers to give lactating mothers free infant formula* but did not explain how each measure can be applied. In part (b), they were able to suggest at least three alternative ways that a working mother can apply to breast feed their infants during working hours. They suggested that *day care centres to be established near working places for mothers to go and breast feed their infants during working hours, mothers can breast feed through milking the milk from her breasts and store it safely in clean containers to be fed to the baby during working hours, breastfeeding mothers to be allowed to return back home to breast feed their infants and if possible infants to be taken to the working place for the mothers to breast feed then taken back home by a relative or friend.*

4.0 ANALYSIS OF CANDIDATES' PERFORMANCE PER TOPIC

The analysis of the candidates' performance is summarized in **Appendix A**. It indicates that of the 11 topics examined this year, 5 topics had good performance, 1 topic had average performance and 5 topics had poor performance.

The topics which had good performance were: *Food Composition (90.0%)*, *Technology of Specific Products (82.55)*, *Food Production (79.6%)*, *Food Microbiology (71.9%)* and *Nutrient Requirement (63.4%)*. The good performance was attributed to adequate knowledge and practical skills of the tested concepts, ability to understand the question requirement and provision of proper and sufficient explanations and descriptions in their responses. The topic which had average performance was *Catering and Institutional Feeding (36.3%)*. The analysis indicates that the average performance of candidates in this topic was contributed by failure to recall the required number of points and failure to provide sufficient explanations of the mentioned points.

On the other hand, poor performance was observed in the topics of *Nutrition Program Planning and Intervention (31.4%)*, *Malnutrition (28.2%)*, *Food Processing and Preservation (18.7%)*, *Food Storage (10.5%)* and *Food Quality and Safety (0.4%)*. The poor performance in these topics was attributed to inadequate knowledge and practical skills of the subject content of these topics, misconceptions of the questions and failure to provide sufficient explanations of some of the points. This might be caused by lack of reference books for these topics which resulted into failure to teach and learn them thoroughly.

The comparison of the candidates' performance in each topic between 2017 and 2018 is shown in **Appendix B**. It shows that the performance has improved in the topics of *Food Composition*, *Technology of Specific Products*, *Food Production*, *Nutrient Requirement* and *Catering and Institutional Feeding* but it has decreased in the topics of *Malnutrition*, *Nutrition Program Planning and Intervention* and *Food Storage*. It was observed that the decrease of the candidates' performance in these topics was attributed to inadequate knowledge of the examined concepts and misinterpretations of the questions.

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

The general performance of the candidates in *155 Food and Human Nutrition* paper 1 and 2 for the ACSEE 2018 was good since 92.4 percent of the candidates passed by scoring C to S grades. In the year 2017, 95.9 percent of the candidates passed the examination. The comparison of the candidates' performance between 2017 and 2018 is summarized in **Appendix C**.

The analysis of the candidates' performance in each question indicates that the candidates with good performance had adequate knowledge and practical skills of the tested concepts, understood the question requirements and provided relevant and sufficient explanations for the presented responses. Those with average performance provided partial responses due to inadequate knowledge and practical skills of the concepts taught in this subject. Besides, the candidates with weak performance misinterpreted the demand of the questions, had inadequate knowledge on the concepts tested and provided insufficient explanations or descriptions.

5.2 RECOMMENDATIONS

For the better performance of this subject in future, it is recommended that:

- (a) Students should be encouraged to study hard so as to have adequate knowledge and practical skills which will enable them respond correctly to the examination questions.
- (b) Guest speakers from different sectors should be invited by the schools to teach the topics with unreliable sources of material to enhance understanding.
- (c) Heads of schools and school managers should facilitate practical sessions to enable students to link theory with practical observations and become more competent in a particular area of study.
- (d) Students should be encouraged to read the examination questions carefully before attempting them so as to respond correctly.

- (e) Teachers should provide enough exercises, tests and examinations to enable students to get experience in answering the National Examination questions.

- (f) Teachers should ensure that all topics stipulated in the syllabus are covered and they should use various sources of material to revise their teaching notes.

Summary of Candidates' Performance per Topic for ACSEE 2018

S/n.	Topic	Number of questions	The percentage of candidates who scored 35% or above.	Remarks
1.	Food Composition	1	90.0	Good
2.	Technology of Specific Products	2	82.5	Good
3.	Food Production	1	79.6	Good
4.	Food Microbiology	2	71.9	Good
5.	Nutrient Requirement	2	63.4	Good
6.	Catering and Institutional Feeding	2	36.3	Average
7.	Nutrition Program Planning and Intervention	3	31.4	Weak
8.	Malnutrition	2	28.2	Weak
9.	Food Processing and Preservation	2	18.7	Weak
10.	Food Storage	2	10.5	Weak
11.	Food Quality and Safety	1	0.4	Weak

Comparison of Candidates' Performance per Topic for ACSEE between 2018 and 2017

S/n.	Topic	2018			2017		
		Number of questions	The percentage of candidates who scored 35% or above.	Remarks	Number of questions	The percentage of candidates who scored 35% or above.	Remarks
1.	Food Composition	1	90.0	Good	1	3.3	Weak
2.	Technology of Specific Products	2	82.5	Good	2	53.6	Average
3.	Food Production	1	79.6	Good	1	43.6	Average
4.	Food Microbiology	2	71.9	Good	2	83.5	Good
5.	Nutrient Requirement	2	63.4	Good	2	40.0	Average
6.	Catering and Institutional Feeding	2	36.3	Average	2	10.8	Weak
7.	Nutrition Program Planning and Intervention	3	31.4	Weak	3	58.7	Average
8.	Malnutrition	2	28.2	Weak	2	91.6	Good
9.	Food Processing and Preservation	2	18.7	Weak	2	34.8	Weak
10.	Food Storage	2	10.5	Weak	2	56.8	Average
11.	Food Quality and Safety	1	0.4	Weak	1	12.3	Weak

The Comparison of Candidates' Performance between 2017 and 2018

