



THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



CANDIDATES' ITEM RESPONSE ANALYSIS
REPORT ON THE ADVANCED CERTIFICATE OF
SECONDARY EDUCATION (ACSEE) 2025

155 FOOD AND HUMAN NUTRITION

Published by:

The National Examinations Council of Tanzania,
P.O. Box 2624,
Dar es Salaam, Tanzania.

© The National Examinations Council of Tanzania, 2025

All rights reserved.

TABLE OF CONTENTS

FOREWORD.....	v
1.0 INTRODUCTION.....	1
2.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE IN EACH QUESTION.....	2
2.1 155/1 FOOD AND HUMAN NUTRITION PAPER 1.....	2
2.1.1 Question 1: Food Production.....	2
2.1.2 Question 2: Food Quality and Safety.....	5
2.1.3 Question 3: Food Composition.....	7
2.1.4 Question 4: Food Storage.....	11
2.1.5 Question 5: Technology of Specific Products.....	16
2.1.6 Question 6: Nutrient Requirement.....	20
2.1.7 Question 7: Nutrient Requirement.....	23
2.1.8 Question 8: Food Processing and Preservation.....	31
2.1.9 Question 9: Food Storage.....	37
2.2 155/2 FOOD AND HUMAN NUTRITION PAPER 2.....	40
2.2.1 Question 1: Malnutrition.....	40
2.2.2 Question 2: Nutritional Programme Planning and Intervention.....	45
2.2.3 Question 3: Malnutrition.....	48
2.2.4 Question 4: Nutrition Programme Planning and Intervention.....	53
2.2.5 Question 5: Catering and Institutional Feeding.....	58
2.2.6 Question 6: Food Microbiology.....	60
2.2.7 Question 7: Catering and Institutional Feeding.....	63
2.2.8 Question 8: Nutrition Programme Planning Intervention.....	69
2.2.9 Question 9: Food Microbiology.....	74
2.3 155/3 FOOD AND HUMAN NUTRITION PAPER 3.....	77
2.3.1 Question 1: Food Composition.....	77
2.3.2 Question 2: Technology of Specific Products.....	87
2.3.3 Question 3: Food Processing and Preservation.....	95
3.0 ANALYSIS OF CANDIDATES' PERFORMANCE PER TOPIC.....	101
4.0 CONCLUSION.....	102
5.0 RECOMMENDATIONS.....	103
Appendix A: Summary of Candidates' Performance per Topic in ACSEE 2025.	105
Appendix B: Comparison of Candidates' Performance per Topic between 2024 and 2025.....	106

Appendix C: Comparison of Candidates' Performance in ACSEE between 2024
and 2025..... 107

FOREWORD

The National Examinations Council of Tanzania is pleased to issue this report on Candidates' Item Response Analysis (CIRA) for the Advanced Certificate of Secondary Education Examination (ACSEE) 2025. This report is aimed at providing feedback to educational stakeholders on the performance of the candidates who sat for 155 Food and Human Nutrition examination.

The Advanced Certificate of Secondary Education Examination measures the effectiveness and efficiency of the educational system in general, and educational delivery in particular. The analysis of candidates' responses to the examination questions shows the extent to which the competencies meant to be achieved by students in the subject of Food and Human Nutrition were attained during the two years of advanced secondary education.

The candidates' performance in this subject was good. The report highlights the factors for the candidates' good performance, which include the ability to interpret the demands of the questions, good mastery of the competencies stipulated in the syllabus, and sufficient practical skills. Likewise, the report highlights the reasons for the weak performance on the few topics. These include inability to interpret the demands of the questions, lack of mastery of the subject content and inadequate practical skills.

The feedback provided in this report is expected to enable educational stakeholders to respond appropriately to improve teaching and learning in this subject. This will eventually improve the candidates' performance in the coming years.

Finally, the National Examinations Council of Tanzania is grateful to all who participated in the preparation of this report.



Prof. Said Ally Mohamed
EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report analyses the performance of the candidates who sat for the Food and Human Nutrition subject in the Advanced Certificate of Secondary Education Examination (ACSEE) 2025. The examination was set in accordance with the 2019 ACSEE Food and Human Nutrition format based on the 2009 Advanced Certificate of Secondary Education Food and Human Nutrition syllabus.

The number of candidates who sat for this examination was 278. Among them, 277 (99.64%) candidates passed by scoring grades B (1), C (80), D (153), E (39) and S (4). However, 1 candidate failed the examination by scoring grade F. Statistics shows that the candidates' performance in 2025 has increased by 5.44 per cent from the performance of 2024 where 325 (94.20%) candidates passed.

The Food and Human Nutrition examination had three papers which are Food and Human Nutrition 1, 2 and 3. Paper 1 and 2 were theory while paper 3 was the practical one. Paper 1 and 2 had a total of 100 marks each, while paper 3 carried a total of 50 marks.

The Food and Human Nutrition 1 and 2 had nine (9) questions each. The questions were distributed in sections A and B. Section A consisted of six (6) short answer questions each carrying ten (10) marks and the candidates were required to answer all questions. Section B had three (3) essay questions each carrying 20 marks and the candidates were supposed to answer two (2) questions. The Food and Human Nutrition 3 had three (3) questions, where by question 1 carried 20 marks while question 2 and 3 carried 15 marks each. The candidates were required to answer all the three questions in this paper.

For each question, the performance is analysed into three categories. The performance is considered good if the percentage of the candidates who passed ranges from 60 to 100, average if it ranges from 35 to 59, and weak if it is from 0 to 34. Additionally, green, yellow and red colours are used in figures, tables, and appendices to indicate good, average and weak performance respectively.

The analysis indicates that the candidates' performance in 2025 (99.64%) has increased by 5.44% compared to the performance in 2024 where 94.20 percent of the candidates passed.

2.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE IN EACH QUESTION

The performance of the candidates in each question is analysed by indicating the topic, the demand of the question, candidates' performance and how they responded. The analysis also highlights the strengths and weaknesses observed in candidates' responses and some possible reasons. Samples of responses extracted from the candidates' scripts are inserted to support the explanation on how the candidates responded. In addition, figures and tables that indicate the distribution of candidates' scores are used for illustration. The analysis on each question is provided under the following sub-sections:

2.1 155/1 FOOD AND HUMAN NUTRITION PAPER 1

The paper comprised a total of nine (9) questions constructed from six (6) topics which are; Nutrient Requirement, Food Quality and Safety, Food Composition, Food Storage, Technology of Specific Products and Food Processing and Preservation. The following section gives analysis of each question:

2.1.1 Question 1: Food Production

The question assessed the candidate's knowledge on the concept of food adequacy of an individual. The question stated:

Food adequacy can differ from one person to another based on sex, age and physiological status. Identify five components that constitute this concept.

The question was attempted by all 278 (100%) candidates. Data show that 4 (1.40%) candidates scored from 6.0 to 7.0 marks and 18 (6.50%) scored from 3.5 to 5.5 marks. Furthermore, 256 (92.10%) candidates scored from 0.0 to 3.0 marks. This performance is summarised in Figure 1.

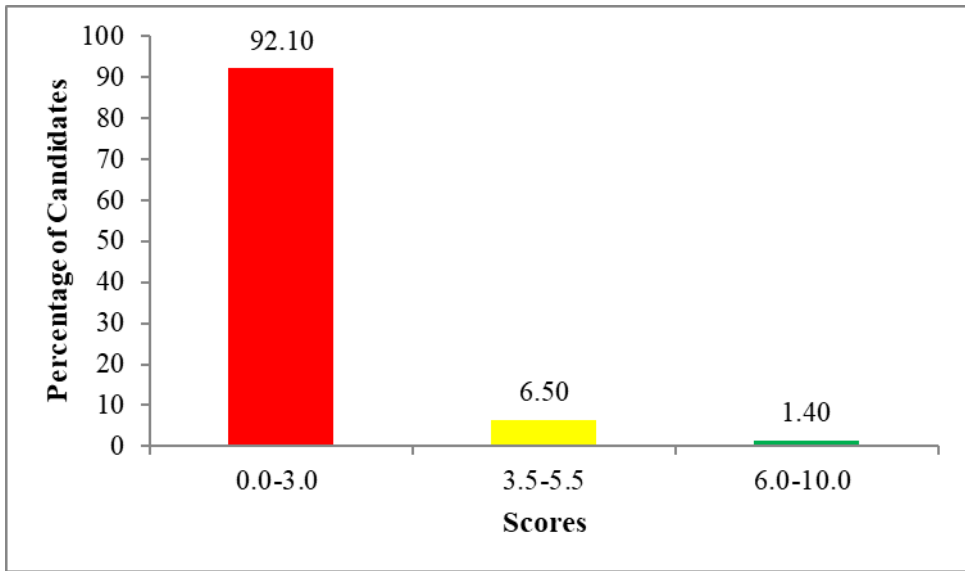


Figure 1: *Candidates' Performance on Question 1*

Figure 1 shows weak performance since only 7.90 per cent of the candidates passed by scoring from 3.5 to 7.0 marks.

Statistics show that 256 (92.10%) candidates had weak performance, of whom 145 (52.20%) scored zero. Analysis of their responses indicates that majority of them lacked knowledge about the concept in the question, hence provided irrelevant responses. For example, one of the candidates wrote, *food preparation, food production, food fortification, food education and food market* which are all incorrect. It was also noted that some candidates misunderstood the demand of the question, for instance, some of them wrote groups of people and their nutrient requirements instead of components that constitute food adequacy. For example, one of the candidates wrote, *Adult, Adolescence, Infant, Children, Pregnant mother or women*. Another candidate wrote, *lactating mother, vegans, invalid, elderly, children*. Others provided factors for adequate nutrient requirements. For example, one of the candidates wrote, *physiological state, gender, age, physical activities, climatic condition*. Extract 1.1 is a sample of the incorrect responses to question 1.

1.	<p>Food adequacy can differ from one person to another due to different in RDA (i.e.)</p> <p>RDA is an estimated amount of nutrients which are adequate to meet the known nutrient requirements for all healthy people.</p> <p>The following are components of RDA which are:-</p> <ol style="list-style-type: none"> i) It used in meal planning for different institutions ii) RDA is used to estimate amount of nutrient required in different institution such as school for student, jail and other institution. This can help people to get required amount of nutrient for their health. iii) It used in food labelling; RDA is used in food labelling of different food production industry example different fruit juice, different bread and cakes. iv) It used in agricultural planning policy; RDA is used in planning agricultural policy such as the required crops need in the country and amount of nutrient required. This can help to get more advantage on the health benefit. v) It used to evaluate new food products developed by different industry (food industry). RDA is used to evaluate and determine new food product. Example to ensure the required nutrient is found in the food product in order to protect health of the people. vi) It help to evaluate food in relation to nutritional needs; RDA help to evaluate food relation to nutritional need which help to identify
----	---

Extract 1.1: A sample of incorrect responses to Question 1

In Extract 1.1, the candidate provided uses of RDA which is contrary to the question's demand, hence scored zero.

Despite the weak performance of the majority, the analysis shows that 5 (1.40%) candidates had good performance. The candidates who performed well in this question were aware about the components that constitute food adequacy of an individual which are; Likes and dislike of people, food availability, food accessibility, Religions and customs belief, nutrients

availability. However, they failed to score all ten allotted marks because they were able to identify only three to four out of five components that constitute food adequacy of an individual.

2.1.2 Question 2: Food Quality and Safety

This question tested the candidates' understanding on the benefit of the quality assurance system. The question stated;

The manager of Utalii Soft Drink Industry disregards establishing the quality assurance system. If you were to advise him, analyse five benefits of the system you would make him aware of.

The question was attempted by 278 (100%) candidates. The analysis indicates that 28 (10.10%) candidates scored from 0.0 to 3.0 marks, among them 13 (4.70%) scored zero. A total of 55 (19.80%) scored from 3.5 to 5.5 marks while 195 (70.10%) scored from 6.0 to 10.0. Figure 2 illustrates this performance.

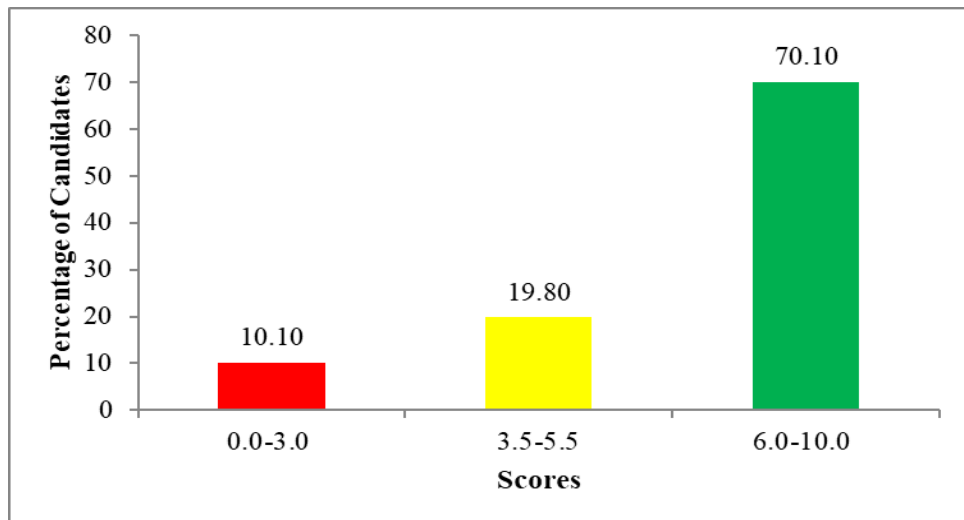


Figure 2: Candidates' Performance on Question 2

Figure 2 shows that the general performance of the candidates was good, since 89.90 per cent scored 3.5 marks or above.

The analysis of the responses indicate that majority of the candidates with good performance provided correct responses such as *help to safe guard consumers' health, helps to minimize cost of food, help to ensure fair food trade practice, help to meet consumer expectation, help to ensure food*

provided is safe and of high quality. However, some of the candidates failed to provide the required number of points, others repeated the point hence failed to score full marks allotted to this question. A sample of the correct responses is shown in Extract 2.1.

2.	Benefits of the quality assurance system -	
	i. It help to meet the consumer expectation.	
	There is one of the benefits of quality assurance because help the consume to satisfy the due to proper standard of the product.	
	ii. It help to ensure food quality.	
	There is one of the benefits of the quality assurance system since it done through well organised and standard procedures and therefore to increase the quality of food.	
	iii: It help to ensure fair trade	
	Once the product is well produced with high quality it may increase fair trade may be from one country to another since the food has legal standard.	
	iv. It help to ensure market competition.	
	There is when the food has good and standard quality so people will compete to sell and buy such commodity and hence ensure market competition due to good and acceptance of food or product toward people.	
	v. It help to minimize food loss.	
	When food is who well process through all designed procedures and techniques actual it will avoid food loss as no part of the food or product will be may be spoiled and got contaminated. so it minimize food loss due to absence of undesirable materials through to food.	

Extract 2:1: A sample of correct responses to Question 2

In Extract 2.1, the candidate correctly provided all the required points on question 2.

On the other hand, the analysis shows that 28 (10.10%) candidates had poor performance. Majority of them had inadequate knowledge about quality assurance system concept hence provided incorrect responses. It also shows that, some candidates provided some principles of food quality and safety instead of benefits of quality assurance system. For example, one of the

candidates wrote, *Hazard analysis critical control point it ensures the determination of procedure on how to prevent the hazard.* Others wrote functions of quality assurance instead of benefits of the quality assurance system such as *inspection, Auditing, check final product, Ensure the recording of the hazard occurred and how we remove the problems.* Extract 2.2 is a sample of incorrect responses from one of the candidates.

2.	Benefits of Soft drinks industry.	
	a) It's a good source of income.	
	this is due to the soft drinks industries will help to create a market to the society through which people can buy and pay back money from the service they have been given so due to that this makes the manager to obtain money in a maximum profit to continue the business so this is one of the benefit of the industry.	
	b) Ensure constant supply of the soft drinks.	
	this is through when these sector produce the goods at a constant rate and number it ensure that the soft drinks are always provided to the society by preventing the drinks scarcity that may rise as though that this is one of the benefit of the industry.	

Extract 2.2: A sample of the incorrect responses to Question 2

In Extract 2.2, the candidate wrote the benefits of soft drinks industry instead of benefits of quality assurance system.

2.1.3 Question 3: Food Composition

This question measured candidates' competence on food composition. The question stated;

Propose three foodstuffs with their main nutrient contents that would help to prevent each of the following problems:

- (a) *Premature birth*
- (b) *Unstoppable bleeding of the mother after giving birth*
- (c) *Poor development of the brain and nervous system for the infant*
- (d) *Anaemia*

This question was attempted by 278 (100%) candidates. Out of them, 177 (63.70%) scored from 0.0 to 3.0 marks, 99 (35.60%) scored from 3.5 to 5.5 marks, and 2 (0.70%) scored from 6.0 out of 10.0 marks. The candidates' performance is summarised in Figure 3.

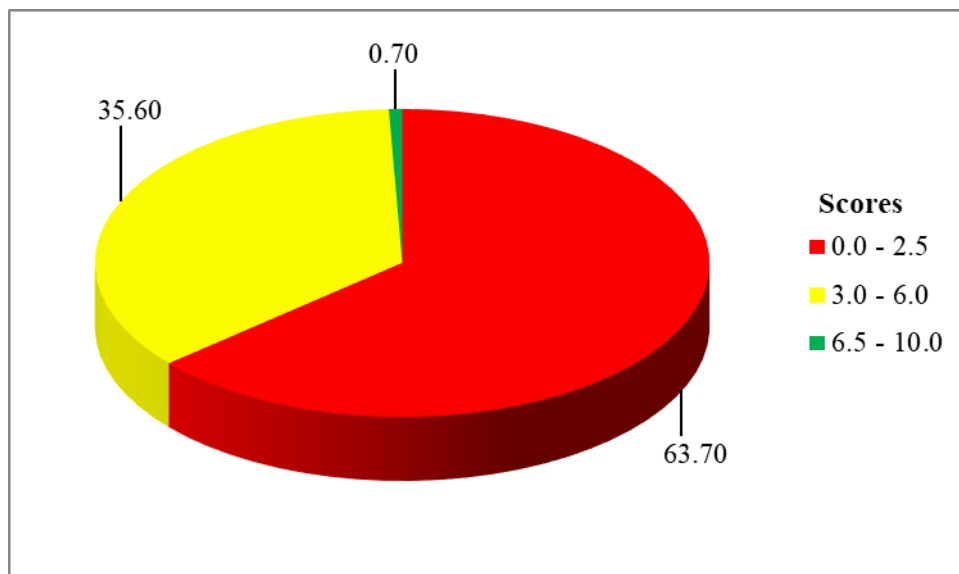


Figure 3: Candidates' Performance on Question 3

Figure 3 indicates that the candidates' general performance in this question was average since 36.30 per cent scored 3.5 marks or above.

The analysis indicates that 0.70 per cent of the candidates who scored high marks had adequate knowledge about composition of food stuffs and their main nutrient responsible for solving pre and post-natal problems to pregnant women. However, the candidates failed to score full allotted marks to this question because they did not provide the required number of points. Further, some failed to correctly provide the main nutrient or food stuff while others provided correct food stuff but failed to provide the main nutrient responsible for addressing the particular nutritional problem.

In part (a), some of the candidates were aware that vitamin E is the main nutrient that helps to prevent pre mature birth, and the nutrient can be found in green vegetables, milk, eggs, vegetable oil (sunflower), nuts. In part b, majority of the candidates correctly provided the main nutrient responsible for preventing bleeding of the mother after giving birth. They also managed to provide correct foodstuff such as, *main nutrient is vitamin K, food stuffs*

are cheese, egg yolk and tomato. Few candidates failed to provide the correct main nutrient responsible for blood clotting. Likewise, in food stuffs they mixed correct and incorrect responses. For example, one of the candidates wrote, *main nutrient is protein, food stuffs are egg yolk, meat and beans.*

In part (c), some of the candidates were aware that folate is responsible for good development of brain and nerves, and the nutrient can be found in oranges, potato, spinach, green vegetables, beans, okra, banana, grapes. Nevertheless, there were candidates who provided few correct food stuff and incorrect main nutrient responsible for addressing the respective nutritional problem, hence missed some marks.

In part (d), majority of the candidates provided correct main nutrient responsible for preventing anaemia (iron) and the food stuff. Few of them failed to provide correct responses and others mixed correct and incorrect foodstuffs.

On the other hand, the analysis indicates that majority of the candidates with weak performance had inadequate knowledge about composition of foodstuffs and their main nutrients which can help to prevent the stated problems in this question. In part (a), the candidates were not aware about foodstuff and main nutrients that prevent premature birth. Majority of them wrote different nutrients that the pregnant mother should consume in general such as, protein, carbohydrate and vitamins. In part (b), the candidates were not aware about foodstuff and main nutrients suitable for the patient with unstoppable bleeding after giving birth. Majority in this part wrote incorrect responses.

In part (c), the candidates failed to provide food stuffs and the main nutrient responsible to prevent poor development of the brain and nervous system for the infant. They provided guess responses such as; *protein, protein foods like maize, vitamin food like eggs and soup.* In part (d), the candidates were not aware about food stuffs and main nutrients responsible for prevention of anemia, hence provided incorrect responses such as; *protein is the main nutrient and food stuffs are food rich in protein, food rich in vitamins and plants food.* These candidates demonstrated inadequate knowledge on nutrition solution to pre- and post-natal problems to pregnant mother hence scored low marks. Extract 3.1 is a sample of incorrect responses from one of the candidates.

3.	a) Premature birth	
	→ The mother should consume food rich in protein.	
	→ The mother should consume carbohydrate.	
	→ The mother should avoid drinking of alcohol.	
	b) Unstoppable bleeding of the mother after giving birth	
	→ Consuming foods rich in protein so as to build up the body tissues.	
	→ Consuming food rich in minerals.	
	→ Consuming food rich in vitamins.	
	c) Poor development of the brain and nervous system for the infant.	
	→ The infant should highly consume food rich in protein example fish so as to enhance development of the brain.	
	→ The infant should avoid drinking alcohol which will prevent bone bone disallocation.	
	→ The infant should be given food rich in vitamin such as vegetable and fruits for protecting the body against infection.	
3	d) Anaemia.	
	→ To consume large amount of food rich in protein.	
	→ To consume large amount of food rich in vitamins such as beetroot.	

Extract 3.1: A sample of the incorrect responses to Question 3

In Extract 3.1 the candidate provided incorrect responses as she/he provided only the nutrients present in foods instead of food stuffs and the main nutrient to prevent pre and post-natal problems to pregnant women.

2.1.4 Question 4: Food Storage

This question measured the candidates' understanding on the concept of food storage. The question stated;

- (a) *In the areas where modern storage structures are not available, farmers are recommended to use traditional storage structures to keep their produce safe. Explain the two main types of the traditional storage structures that can be used.*
- (b) *Large farmers preferred modern to traditional storage structures in storing their food grains. Support this statement using six reasons.*

The question was attempted by 278 (100%) candidates who sat for the examination. The analysis shows that 79 (28.40%) candidates scored from 0.0 to 3.0 marks, of whom 9 (3.20%) scored 0.0. Moreover, 85 (30.60%) candidates scored from 3.5 to 5.5 marks and 114 (41.00%) scored from 6 to 10.0 marks. Figure 4 illustrates the performance.

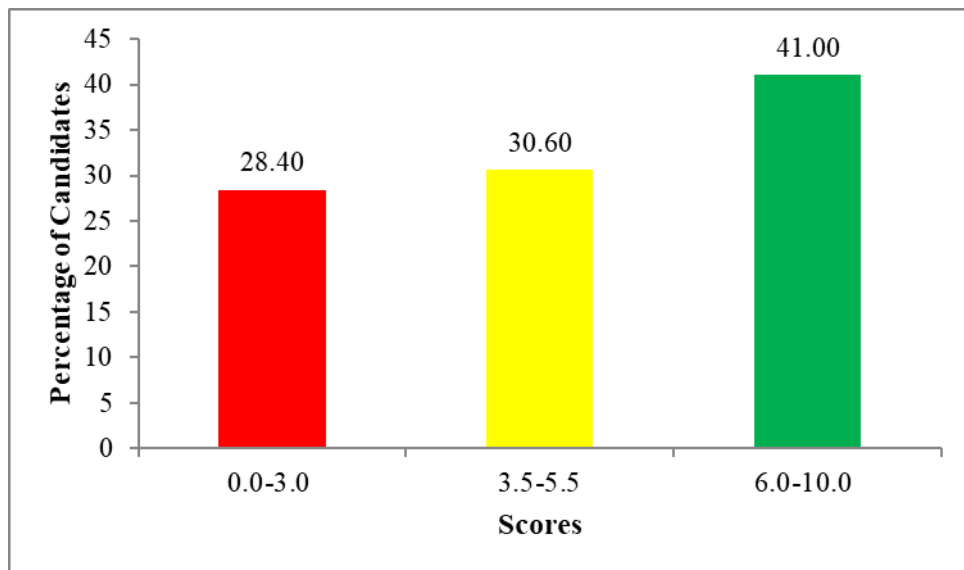


Figure 4: *Candidates' Performance on Question 4*

Based on the data in Figure 4, the general performance was good as 71.60 per cent of the candidates scored 3.5 marks or above.

The analysis of the candidates' responses indicates that the candidates (41.00%) with good performance were able to explain two main types of

traditional storage structures in part (a) namely, ventilated structures and non-ventilated structures and gave their examples. However, some candidates managed to provide only one correct response hence failed to score all marks allotted on this part.

In part (b), majority of the candidates managed to support the statement concerning large farmers to prefer modern to traditional storage structure in storing their food grains by giving six reasons. The responses were such as modern storage structure: *occupy large size, are not easy accessible to thief, are not affected by climatic condition, are constructed with well and good building materials, are easily to clean, have enough air circulation.* Nevertheless, few candidates managed to provide less points hence failed to score all marks allotted on this part. Extract 4.1 is a sample of correct responses from one of the candidates.

4a)	Two main types of the traditional storage structures
	res
	i) Non ventilated storage structure: These are storage structures that have no space for entry of air. these include underground storage and dams
	ii) Ventilated storage structure: are storage structures that allow the passage of air such raised platforms.

4	b) Importance of modern storage structures	
	i) They are easy to use : Modern storage methods are made using modern storage technology hence they are made in such a way that they are easy to use so that anyone can use them.	
	ii) They are durable : Modern storage structures are made from good materials and advanced technology hence they are durable and last for a long time than traditional storage methods.	
	iii) They have good ventilation : Modern storage method/ structures have good ventilation will hinder the entry of organisms hence the crops can be stored in them for much longer time than in traditional storage structures.	
	iv) They are easy to maintain : Modern storage structures are easy to maintain than traditional storage structures because most of them can easily be repaired and renovated they are also easy to clean and fumigate.	
	v) They are not easily affected by climatic changes : Most modern storage structures are made in such a way they can sustain in all climatic conditions example Godowns and warehouses but traditional storage structures can be affected by climatic changes such as rain.	
	vi) Have high storage capacity : modern storage structures have high storage capacity than	
4b	traditional storage structures. they can store more crops than traditional storage structures.	

Extract 4.1: A sample of the correct responses to Question 4

Extract 4.1 is a sample of responses from a candidate who correctly explained two main types of storage structures in part (a), six reasons on why large farmers preferred modern to traditional storage structures in storing their food grains in part (b).

Further, the analysis shows that 28.40 per cent of the candidates had weak performance. Most of these candidates had inadequate knowledge on food storage structures, while others misunderstood the demand of the question, hence provided irrelevant responses. For example, in part (a), some of the candidates provided examples of non-ventilated storage structure instead of types of traditional storage structure such as *drum, in ground storage, pit*. Others wrote incorrect types of traditional storage structure such as, *poor storage, lack of storage facilities, poor storage structure, poor food use, poor food security*.

In part (b), the majority of the candidates misinterpreted the question, hence failed to give reasons to why large farmers prefer modern to traditional structure instead, they provided importance of modern storage structure such as; *helps to prevent food loss, keeps grains to be used as seed, helps to retain maximum quality of the grain, prevents self-heating of grains, and prevent grain from destructive pest*. Few candidates managed to give 1 or 2 correct response(s) in this part but they failed to provide correct explanations. A number of them mixed correct and incorrect responses. This indicates that they had inadequate knowledge of the subject matter tested. Extract 4.2 is a sample of responses provided by one of the candidates under this category.

Qn 4b	Main types of traditional storage structure	
	(i)	
	Large storage structure for example	
	underground pit. This involve or ensure that	
	large amount of food can be stored without	
	affected or spoiled. and this can ensure	
	large space for the storage	
	(ii)	
	Small storage structure; for example plastic	
	bags. This involve storage of food for short	
	period of time with the small space. that	
	can store small amount of food.	

4(b)	(i) Traditional storage help to Prolong the shelf life of the food
	(ii) Traditional storage help to Prevent growth of micro-organism. by using traditional way like sunlight, smoking that kills micro-organism that cause food spoilage
4(b)	(iii) Traditional storage ensure storage of food, (help to store amount of food) Larger farmers uses traditional storage because it involve or they have space so that product can be stored.
	(iv) Traditional storage can not affected easily by environment where by in Modern storage when there is no electricity means that the food can not be stored. so Traditional can not be affected by environment
	(v) Traditional storage is more efficiency compared to Modern This is because in modern they can add chemicals that may alter the quality of nutrients so that can affect the food while in traditional there is no alteration of nutrients.
	(vi) Ensure and maintain quality and nutrient content inside the food. so that when there is no chemical in tradition means that the food can be maintained

Extract 4.2: A sample of incorrect responses to Question 4

In Extract 4.2, the candidate provided types of storage structure instead of types of traditional storage structure in part (a), and some importance of storage structure in part (b).

2.1.5 Question 5: Technology of Specific Products

This question tested the candidates' understanding on the concept of Biological raising agent (yeast). Particularly the causes for failure of rice bread to rise. The question stated;

Your neighbour baked sweet rice bread using bakers' yeast. However, the bread did not rise. Analyse two possible causes and two possible solutions for the problem.

This question was attempted by 278 (100%) candidates who sat for the examination. Data shows that 29 (10.40%) candidates scored from 0.0 to 3.0 marks, of whom 9 (3.20%) scored 0.0. The candidates who scored from 3.5 to 5.5 marks were 82 (29.50%) and 167 (60.10%) candidates scored from 6 to 10.0 marks. Figure 5 presents the distribution of the candidates' scores.

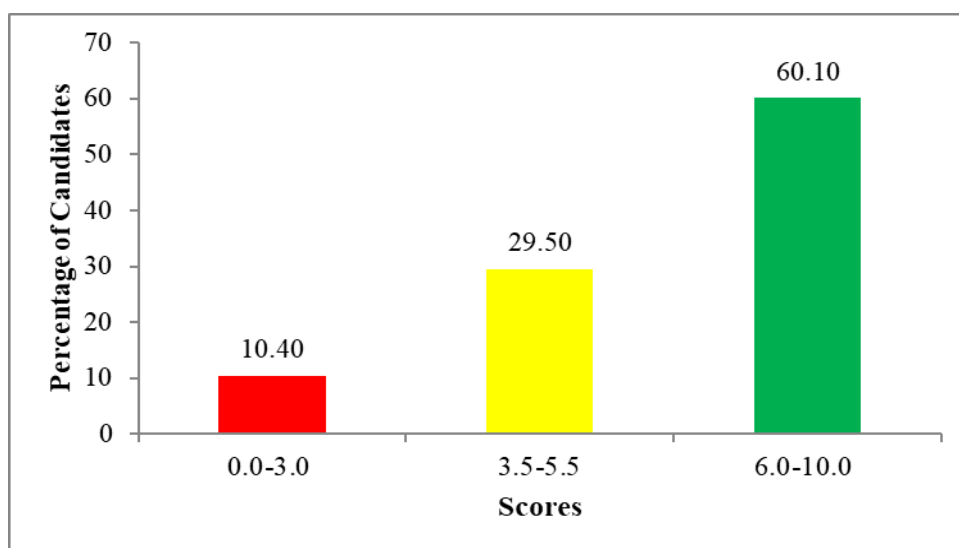


Figure 5: Candidates' Performance on Question 5

Based on the distribution of scores in Figure 5, the general performance of the candidates was good as 89.60 per cent had average and above scores.

The candidates (60.10%) who scored high marks understood the causes for failure of rice bread to rise when yeast is used as a raising agent. Some of the causes given were: *Absence of condition necessary for the yeast to ferment, the use of expired yeast, the use of inadequate amount of yeast,*

limited time before baking. The candidates also understood the solutions for the failure of rice bread to rise. Some of the correct responses given were: *there should be presence of all conditions necessary for the fermentation of yeast, the yeast used should be fresh, use correct amount of yeast, use correct type of yeast.* However, some of the candidates did not score all the 10 marks allotted as they provided few points or insufficient explanations. Extract 5.1 is a sample of responses from a candidate with good performance.

5.	possible causes	
	i) Absence of conditions necessary for the yeast fermentation. i.e. for the yeast to ferment there should be optimum temperature, food for yeast which is sugar, liquid either water or milk and adequate amount of yeast it should not be overloaded.	
	ii) The use of expired yeast and not in correct amount; The yeast should be in a correct amount and equal proportion and also should be in a fresh way and not in a expired time where it can be inactive from	
	possible solution.	
	i) There should be all presence of all conditions necessary for the fermentation of the yeast and also there should be a optimum temperature and also sugar and liquid	
	ii) The yeast used should be fresh and not expired and the correct amount should be maintained, don't over the amount or less.	

5	Causes for the bread did not rise
i)	The yeast that used does not grow well → The bread did not rise due to the not use use of proper grow yeast the yeast is not well allowed to grow
ii)	The yeast that used is expire → Also the bread did not rise may be due to the yeast that are used is expire is out of date so it does not give the gas to expand the bread.
	Possible solution
i)	To ensure the yeast used is grow well → Yeast grow well under this condition if will present if ensure the growth of yeast. Those condition are food which is sugar, Temperature, Moisture, Enzyme. That condition ensures the growth of yeast and hence will will give gas and the bread will rise
ii)	Check expire date of the yeast → Also you need to check for the expire date of that yeast that you use if it stay for a long time you should not use because it will not give the positive result during baking.

Extract 5.1: A sample of the correct responses to Question 5

In Extract 5.1, the candidate managed to provide all correct responses on possible causes and possible solutions for the failure of rice bread to rise. This indicates that the candidates had adequate knowledge on the yeast fermentation.

Regardless of the good general performance in this question, the analysis indicates that 10.40 per cent of the candidates scored low marks. The majority of them failed to understand the demand of the question, hence provided irrelevant responses. For example, one of them provided responses on characteristics of flour used instead of yeast fermentation such as *large particles of flour used, the flour used lack gluten*. Possible solution; *to use flour with small particles, to use wheat flour*. Few

candidates provided reasons that hinder baked products to rise such as *too much wheat flour, the use baking powder*. Other candidates failed to correctly explain the points they mentioned. These responses show that these candidates had inadequate knowledge about the concept tested. Extract 5.2 is a sample of responses provided by one of the candidates under this category.

05	two possible cause.	
	(i) The type and the kind of raising agent it's not suitable for baking bread: yeast it's a raising agent it's used to rise the dough but not in bread for baking	
	(ii) The type of flour: The type of the flour that she choose may not be in a good quality which can make the bread to not rise she'll choose the wrong flour for bread making	
	two possible solution for the problems:	
	(i) Choosing the correct and good raising agent: she'll should choose the raising agent which can be used for bread making like she'll can choose the Baking powder, Bicarbonate of soda so Baking powder can be used instead of Using yeast.	
	(ii) Choosing good type of the flour she'll must consider to choose the good choice of flour which are in good quality and also the flour are capable of baking baker's product not like bread because not all flour can be used in baking processing.	

Extract 5.2: A sample of incorrect responses to Question 5

In Extract 5.2, the candidate misinterpreted the question and stated things that facilitate baked product to rise.

2.1.6 Question 6: Nutrient Requirement

This question measured candidates' knowledge on nutrient requirements to solve nutritional disorder. The question stated;

Your ill-looking sister went to hospital where diagnosis revealed that she was suffering from osteomalacia. She then asked for nutritional advice from you:

- (a) *Explain four kinds of food you would recommend to be consumed.*
- (b) *Outline four functions of the minerals obtained from the food suggested in part 6(a).*
- (c) *Describe the effect of excess consumption of the minerals mentioned in 6(a).*

All 278 (100%) candidates attempted the question. The analysis shows that 22 (7.90%) candidates scored from 6.0 to 8.5 marks, 95 (34.20%) scored from 3.5 to 5.5 marks and 161 (57.90%) scored from 0.0 to 3.0 marks. Figure 6 summarises the distribution of the candidates' scores.

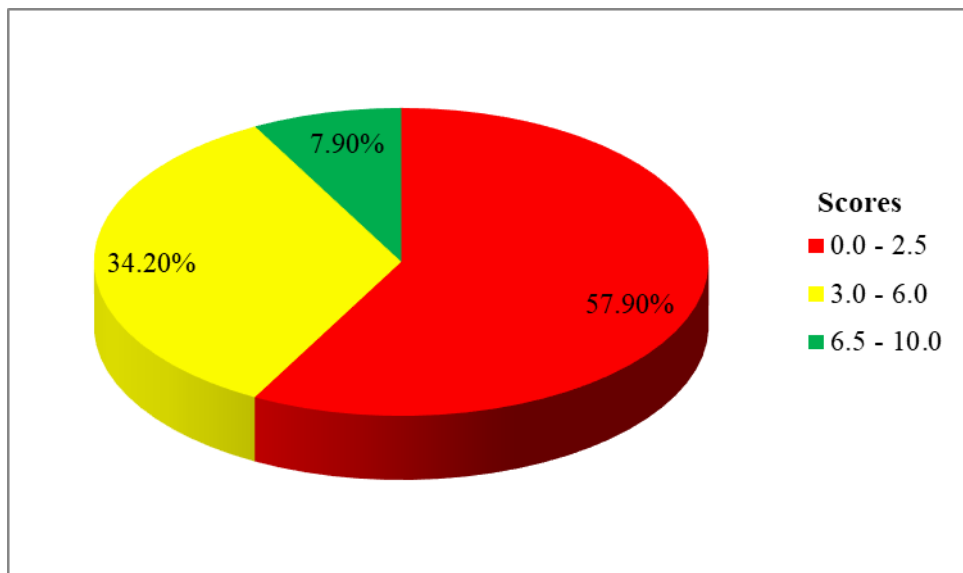


Figure 6: *Candidates' Performance on Question 6*

Figure 6 shows that the performance was average since 42.10 per cent of the candidates scored between 3.5 marks or above.

Out of all candidates, 7.90 percent had good performance. They demonstrated adequate knowledge about nutrients for a person who is suffering from osteomalacia. In part (a), majority of them managed to explain kinds of foods to be consumed by a person who is suffering from osteomalacia as those rich in calcium. Similarly, in part (b), they provided correct functions of calcium in the human body such as, *it strengthen bone and teeth, it helps absorption of nutrient in the body, regulates contraction and relaxation of muscles, facilitate transportation of oxygen*. However, some candidates failed to score all the 4 marks allotted in this part because they provided 2 to 3 correct responses instead of four as the question demanded.

In part (c), the candidates understood that, excess consumption of calcium can result to hypercalcemia which ends up with some health problems like kidney stone, kidney failure. This verify that they had adequate knowledge on effects of excess consumption of calcium. Extract 6.1 shows a sample of correct responses given by one of the candidates.

16.	a) Recommended foods:	
	- The patient lacks food rich in calcium thus why she suffers from osteomalacia. So she should consume food rich in calcium.	
	These includes:	
	i) Meat and poultry:	
	- These foods are rich in calcium and other important nutrients. Also fish.	
	ii) Milk and milk products. Example fresh milk, cheese and yoghurt also condensed milk.	
	iii) Vegetables and fruits. Example spinach, amaranth and cauliflower.	
	iv) Sea foods such as sardines and scale fish.	
16.	b) Functions of mineral (calcium).	
	i) It help to strengthen bones and teeth.	
	- Calcium help to strengthen bones as it is used to make bone marrow as well as teeth.	

06	c) Effects of excess consumption.	
	i) It may lead to fatigue and general body weakness.	
	ii) It may cause accumulation of excess of it in the kidney hence cause kidney stones.	
	iii) It may hinder absorption of other nutrients	

Extract 6.1 A Sample of candidates' correct responses to question 6

In extract 6.1 the candidate provided correct responses to parts (a) and (c) but for part (b) she/he provided only 1 point instead of 4 hence, failed to score all marks allotted to this question.

Conversely, 57.90 per cent of the candidates had weak performance in question 6. Some of them exhibited insufficient knowledge on nutrient requirements for a person who is suffering from osteomalacia while others misinterpreted the question. In part (a), some of the candidates provided nutrients instead of food rich in calcium. Some of the incorrect responses given were, *minerals, protein, carbohydrate, vitamins, lipids and amino acid*. Other irrelevant responses provided were such as, *energy giving foods, iodine, legumes, cereals*. These responses indicate that the candidates had inadequate knowledge on the area tested.

The analysis further indicates that in part (b) also the candidates provided irrelevant responses. For example, one candidate wrote down general functions of food in the human body instead of functions of minerals (calcium) like; *they protect the body, they build the body, they give energy to the body, and they help the body to fight against diseases*. Others provided irrelevant responses like, *it prevents the various disease like Anaemia, it helps to grow well the baby when breast feeding, help in the process of fortification of the food, provide energy and growth of the body, for increasing of blood volume example iron, help in formation of antibodies*. Other candidates skipped this part. This indicates that these candidates were not competent in understanding the nutrients for addressing various nutritional problems and their functions.

In part (c), some of the candidates provided the effects of excess consumption of other nutrients instead of calcium and phosphorus. Some of their responses were, *lead to presence of disease example heart failure,*

blood pressure, diabetes, it cause coronary disease, it cause high blood in the body. Other candidates provided irrelevant responses such as, lead to anaemia, lead to weak bones and result to sickle cell anaemia, lead to body weakness, they can cause constipation disease, they can cause diarrhoea disease, lead to under nutrition, lead to presence of goitre due to high consumption of iodine, blocking of oxygen uptake which caused by cyanide. These responses indicate that the candidates had inadequate knowledge on the excess consumption of calcium. Extract 6.2 is a sample of incorrect responses from one of the candidates.

6. (a) i/ I should take much mineral for strengthen is body	
ii/ Iron	
iii/ Iodine	
(b) i/ To strengthen her body to be normal.	
ii/ To protect the body from illness.	
iii/ To promote or to give her body energy to do work or to work good.	
iv/ To neutralize the nutrients lost from the body	
(c) The effect of excess consumption of the minerals	
The body weigh increase to the extend or we call it obesity and some of cells to fail to due to the presence of much minerals.	

Extract 6.2: A sample of incorrect responses to Question 6

In Extract 6.2, the candidate provided minerals which help to solve the problem of anaemia and goitre instead of osteomalacia in part (a). Likewise, in part (b), she/he outlined functions of other nutrients instead of calcium. Also in part (c), she/he provided the effect of excess consumption of carbohydrate.

2.1.7 Question 7: Nutrient Requirement

This question measured candidates' competence on nutrient requirement especially energy balance. The question stated;

(a) Describe the following terms as used in energy balance:

(i) *Specific Dynamic Action (SDA)*

(ii) *Basal Metabolic Rate (BMR)*

(iii) *Energy for physical activity*

(b) *Three persons, namely Mcheshi, a man aged 38 years and weighing 60 kg; Mpole, a woman aged 40 years and weighing 65 kg; and Mkali a woman aged 40 years and weighing 70 kg, performed different physical activities. The activities for each person are presented in three different tables as follows:*

Mcheshi

<i>Physical Activities</i>	<i>Time (Minutes)</i>	<i>Energy expenditure per activity (Kcal/Kg/min)</i>
<i>Sleeping</i>	<i>480</i>	<i>1.0833</i>
<i>Bathing</i>	<i>30</i>	<i>2.6667</i>
<i>Ironing</i>	<i>30</i>	<i>2.6667</i>
<i>Cleaning room</i>	<i>10</i>	<i>4.0000</i>
<i>Riding bike</i>	<i>15</i>	<i>2.6667</i>

Mpole

<i>Physical Activities</i>	<i>Time (Minutes)</i>	<i>Energy expenditure per activity (Kcal/Kg/min)</i>
<i>Climbing stairs</i>	<i>15</i>	<i>7.000</i>
<i>Attending lectures</i>	<i>240</i>	<i>2.6667</i>
<i>Sitting and chatting</i>	<i>60</i>	<i>1.6667</i>
<i>Attending Practicals</i>	<i>180</i>	<i>2.6667</i>
<i>Walking</i>	<i>50</i>	<i>2.6667</i>

Mkali

<i>Physical Activities</i>	<i>Time (Minutes)</i>	<i>Energy expenditure per activity (Kcal/Kg/min)</i>
<i>Having meal</i>	<i>120</i>	<i>1.6667</i>
<i>Watching</i>	<i>120</i>	<i>1.6667</i>

<i>television</i>		
<i>Physical exercises</i>	30	8.3333
<i>Standing</i>	60	1.6667
<i>Dressing</i>	10	1.8333

Use the factorial approach to calculate the total energy expenditure for each person. Compare the energy expenditure by Mcheshi, Mpole and Mkali.

The question was opted by 163 (58.60%) candidates. The analysis shows that 48 (29.40%) candidates scored from 12 to 20.0 marks, 37 (22.70%) scored from 7.0 to 11.5 marks, and 78 (47.90%) candidate scored from 0.0 to 6.5 marks. Figure 7 summarises the performance.

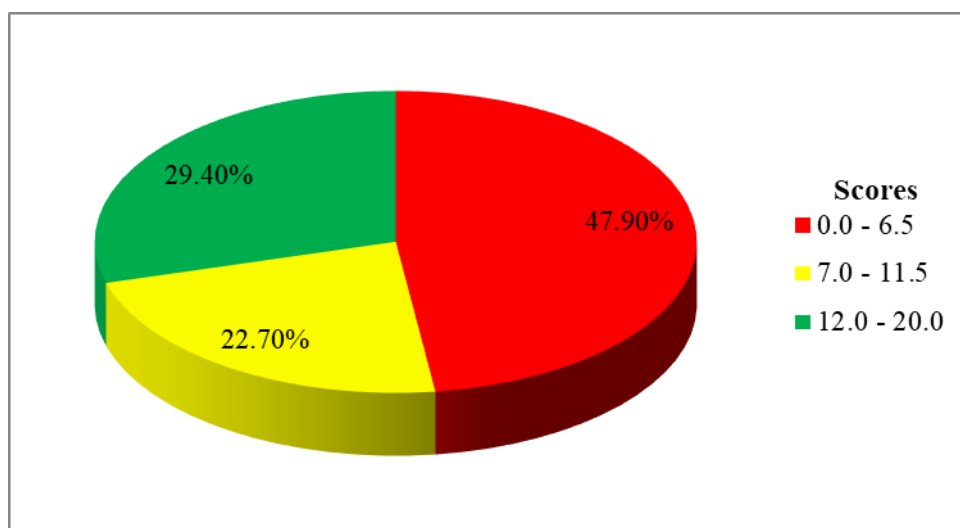


Figure 7: Candidates' Performance on Question 7

Figure 7 shows that the general performance of the candidates was average as 52.10 per cent of the candidates score 7.0 marks or above.

The analysis of the candidates' responses shows that the candidates (29.40%) who scored from 12.0 to 20.0 marks correctly described the given terms in part (a) as (i), Specific Dynamic Action (SDA) *Is the amount of energy used by the body for digestion, absorption and assimilation of the food*, (ii), Basal Metabolic Rate (BMR) *is the amount of energy used by the body for the involuntary activities like blood circular, heartbeat*, in part (iii), Energy for physical activities *is the amount of energy used by the body for voluntary activities which are done by a certain person*. They also

managed to calculate and compare the energy expenditure for Mcheshi, Mpole and Mkali in part (b). Extract 7.1 illustrates this performance.

7	a) i) Specific Dynamic Action (SDA)	
	Refer to the amount of energy required by an individual to perform certain activity.	
	It can be expressed mathematically as follow:	
	$SDA = \frac{10}{100} (BM + TECA)$	
	ii) Basal Metabolic Rate (BMR)	
	Is the amount of energy for an organism to perform different body metabolic activities like movement, respiration and reproduction.	
	- It may be affected by body size, age and health status of an individual.	
	BMR by maxwebber	
	$BMR = 70 \times W^{0.75}$	
	iii) Energy for Physical activity.	
	Is the total amount of energy required by an individual to perform different activities like walking, sleeping and writing.	

7	b)			
		2) Mehesh		
	Physical activities	Time (min)	Energy expenditure per activity	Energy expenditure for .
	Sleeping	480	1.0833	519.9984
	Bathing	30	2.6667	80.001
	Ironing	30	2.6667	80.001
	Cleaning room	10	4.0000	40.0000
	Riding bike	15	2.6667	40.0005
	Total energy ex			
	TECA = Total energy expenditure for all activities			
	= 519.984 + 80.001 + 80.001 + 40.000			
	+ 40.0005			
	= 759.9865 kcal/min			
	Also for Specific Dynamic Effect			
	$SDE = \frac{10}{100} \times (BM + TECA)$			
	$SDE = \frac{1}{10} \times (BM + TECA)$			
	but			
	BM by Maxweber			
	$BM = 70 \times W^{0.75}$			
	$BM = 70 \times 60 \text{ kg}^{0.75}$			
	$BM = 1509.07 \text{ kg}$			

7 b) Specific Dynamic Action (SDE)

$$SDE = 1 \times \frac{(BM + TECA)}{10 \times (1602.4 + 1458.351)}$$

$$SDE = 306.079 \text{ kcal}$$

Then

$$\text{Total Energy Expenditure} = BM + TECA + SDE$$

$$(TEE) = 1602.4 + 1458.351 + 306.079$$

$$TEE = 3366.83 \text{ kcal}$$

- The total Energy expenditure by mpoles
is 3366.83 kcal

iii / Mkal:

physical activities	Time (min)	Energy expenditure	
		per activity	per time taken
Having meal	120	1.6667	200.004 kcal/min
Watching television	120	1.6667	200.004 kcal/min
Physical exercises	30	8.3333	249.999 kcal/min
standing	60	1.6667	100.002 kcal/min
Dressing	10	1.8333	18.333 kcal/min

TECA = Total energy used for all activities
per time taken

$$TECA = 768.342 \text{ kcal}$$

7	b) BM by max webber	
	$BM = 70 \times w^{0.75}$	
	$BM = 70 \times 70 \text{ kg}^{0.75}$	
	$BM = 1694.03 \text{ kg}$	
	$(DE = 1 (BM + TECA)$	
	$\frac{10}{SDE = 1 (1694.03 + 768.342) \text{ kcal}$	
	$\frac{10}{SDE = 246.237 \text{ kcal}$	
	Total Energy Expenditure (TEE) = (BM + SDE + TECA)	
	$= (1694.03 + 768.342 + 246.237) \text{ kcal}$	
	$= 2708.609 \text{ kcal}$	
	\therefore The total energy expenditure by mkali is	
	2708.609 kcal	

Extract 7.1: A sample of the correct response to Question 7

In Extract 7.1, the candidate demonstrated adequate knowledge on Energy balance and calculation skills, thus provided correct responses in part (a) and (b).

Further, the analysis indicates that 47.90 percent of the candidates scored low marks (0.0 - 3.0) in question 7 of whom 3.70 percent scored zero. These candidates failed to describe and calculate the energy expenditure for each person and to compare their energy expenditure due to insufficient knowledge on energy balance. They provided incorrect meaning of terms given in part (a). For example, in part (a) (i), one of the candidates wrote; *specific dynamic action (SDA) is the amount of the energy that can be used found in the body (weights)*. In part (a) (ii), wrote, *basal metabolic rate (BMR) is the balance energy that the people used and eat in a day*. Likewise, in part (a) (iii), wrote, *energy for physical activity is the process of running and walking*.

In part (b), these candidates provided incorrect calculation due to inadequate knowledge of the tested concept. Extract 7.2 is a sample of responses from one of the candidates with weak performance.

07	<p>i) Specific dynamic Action (SDA) → This refers to the amount of energy taken or release during different activities are done in the bodies of the organism.</p> <p>ii) Basal Metabolic rate (BMR) → Amount of energy required or release during the life time that is required or taken from respiration of the body.</p> <p>iii) Energy for physical activities → Is the amount of energy required by the body.</p>
----	--

	<p>b) solution from the data Mcheshi have: 38 years old and 60 kilograms. Mpole have: 40 years old and 65 kilograms. Mkali have: 40 years old and 70 kilograms.</p> <p>From mcheshi:</p> $\Sigma \text{total energy expenditure} = 1.0833 + 2.6667 + 2.6667 + 4.000 + 2.6667$ $\Sigma \text{total energy expenditure} = 13.0834$
--	---

	<p>Mpole</p> $\Sigma \text{total energy expenditure} = 7.000 + 2.6667 + 1.6667 + 2.6667 + 2.6667$ $\Sigma \text{total energy expenditure} = 16.6668$
	<p>Mkali</p> $\text{The energy expenditure} = 1.6667 + 1.6667 + 2.3333 + 1.6667 + 1.2333$ $\text{The energy expenditure} = 15.1667$

	\therefore To know the exact total energy expenditure.	
	$= \frac{\text{Total energy} \times \text{Time} \times \text{Mass in kg.}}{100}$	
	Mchashi	
	$= \frac{13.0834 \times 560 \times 60}{100}$	
	$= 455.9919 \text{ kcal}$	
	Mpole	
	$= \frac{16.6668 \times 545 \times 65}{100}$	
	$= 947.9281 \text{ kcal}$	
	Mkali	
	$= \frac{15.1667 \times 340 \times 70}{100}$	
	$= 537.8394 \text{ kcal}$	

Extract 7.2: A sample of incorrect responses to Question 7

In Extract 7.2, the candidate provided irrelevant explanations on the terms given in part (a), and incorrect calculations in part (b).

2.1.8 Question 8: Food Processing and Preservation

This question tested the candidates' competence on the concept of food fortification. The question stated;

Evaluate nine limitations that hinder successful food fortification programme.

This question was opted by 205 (73.30%) of the candidates. Among them, 7 (3.40%) scored from 12.0 to 14.0 marks, 113 (55.10%) scored from 7.0 to 11.5 marks, and 85 (41.50%) scored from 0.0 to 6.5 marks. Figure 8 illustrates this performance.

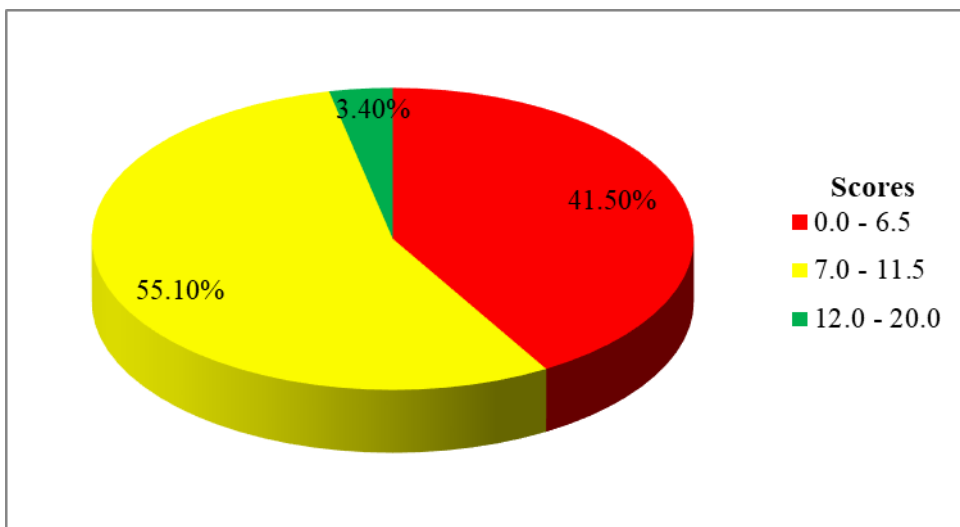


Figure 8: *Candidates' Performance on Question 8*

Figure 8 shows that the performance of the candidates in this question was average because 58.50 per cent scored 7.0 marks or above.

The analysis of the candidates' responses to this question shows that the candidates (3.40%) who had good performance demonstrated sufficient knowledge about food fortification especially limitations that hinder successful food fortification programme. Their responses were; *lack of government support, low income, lack of knowledge to consumer, price variation of ingredients, food habit and taboos, and increase of nutrient disorder*. Others are; *challenges in reaching all segments of the population, inadequate quality control and monitoring, loss of nutrients during processing or storage, limited reach to vulnerable populations, low purchasing power, and it is costly*.

However, the analysis indicates that these candidates failed to score all the 20 marks allotted to this question because they provided answers that were partially correct or fewer points than what the question required. Extract 8.1 is a sample of good responses from one of the candidates.

3.	<p>Food fortification: Is the way we add by some of nutrients are added in the food so as to replace the nutrients which are not available and also help to reduce rate of nutritional deficiency. The following are limitations that hinder successful food fortification programme.</p> <p>Poor government support: Lack of government support to this programme make the programme to not success. Hence the government must provide support so as the programme should succeed. Example by providing loan and aids so as they can be able to conduct well their programme and hence help to solve different problems. Such as nutritional deficiency.</p> <p>Lack of food fortification education; People have no education about food fortification hence they people won't be able to participate in the programme and hence cause the programme to not succeed since people won't participate in the programme. Lack of education cause the programme not succeed.</p> <p>Poverty; Since the food are fortified hence tend to increase the price of the food due to any increase of other nutrient such in margarine there is increase of vitamin A so as to help in preventing night blindness but also the price increase therefore people tend to not use. Due to increase in price and hence the programme not succeed.</p>
----	--

2	<p>Low level of science and technology; tend to make the programme due to some of problems occurs due to low level of science and technology where by some people fail or show to fortify the products and some cause problems to the users and hence cause the programme not succeed.</p>
	<p>Social, cultural believe; one of the limitation that hinder successful food fortification programme. because some of society or cultural tend to have some food they not tend to use hence in case of the fortification of those food those cultural don't use the product hence lack nutrient fortified and end cause the problem of an successful program. Example must village prefer^{not} using white flour instead tend to use wholemeal flour and the industries tend to fortify white flour there the programme not suitable.</p>
	<p>Low food production; the food production is very low hence the fortification industries tend to have insufficient of the food to be fortified and hence cause the program to not succeed.</p>
	<p>Lack of community participation; due to lack of community participation tend to cause the programme to fail since the programme is must presented to the community since community are the ones using the food hence the programme must be introduced to people in the community.</p>

8.	Lack of education; the program require skilled people so as to help to the food fortification there fore due to lack of education tend to cause the programme to not succeed in the community due to lack of education.
	Lack of time and venue; for conducting their programme. In order to succeed in the programme they must be proper time and venue to meet so as to make everyone idea about the programme so lack of time cause the programme not succeed.
	Apart from limitations that hinder successful food fortification programme also there is importance of food fortification. It include help to improve nutrients value, help to represent nutrients which are not available, help to prevent most of nutritional deficiency.

Extract 8.1: A sample of the correct responses to Question 8

In Extract 8.1, the candidate provided correct limitations that hinder successful food fortification programmed, though he/she mixed correct and incorrect response hence failed to score all marks allotted to this question.

Despite the average performance on this question analysis shows that 85 (41.50%) candidates had weak performance. In this category some candidates misunderstood demand of the question. They wrote factors to consider when planning food fortification instead of limitation that hinder successful food fortification programme. For example, one of the candidates wrote; *identification of the nutrient deficiency in the society, wide consumption of the food to be fortified, no substantial increase in price, limited number in manufacture, technical feasibility, Range of consumption, registration of the manufacture.* Others wrote characteristics of fortified food instead of limitations that hinder successful food fortification programme such as *fortified food should be available to most people, it should be cheap, it must be nontoxic, it must be stable under climatic condition, it should not change color and texture.* A sample of incorrect responses is shown in Extract 8.2.

8.	<p>Food fortification is the process of adding nutrient lost during the food processing so as to produce the more quality food. The food fortification programme may be hindered by the limitations to fortification.</p>	
	<p>The following are limitations hinders successful food fortification programme.</p>	
	<p>The fortified food should be available, means that most of all people in the society must have an access of getting it at any time and any where.</p>	
	<p>The fortified food should be cheap, it must be cheap so as peoples in the society to be easy for them to afford it.</p>	
	<p>The fortified food be non toxic to be non toxic means that it should have any bad side effect to the body.</p>	
	<p>The fortified food should not affect the food consumption pattern of the people that means the consumption pattern of the people should be normal as usual.</p>	
	<p>The fortified food should be stable under different climatic condition such as it means that it should be not affected by humidity and temperature changes of the environment.</p>	
	<p>The fortified food should be not change its colour, texture and flavour. The colour and flavour of the fortified food should be normal as usual.</p>	

8.	the fortified food should contain be only required nutrient to be added. In the food fortification the lost nutrient are only added in the food.	
	The fortified food should be attractive: It means that to be attractive to consumers so as to improve the appetite to them.	
	The fortified food should be have the good fortificant quality that is the fortificant used to fortify food should have a good quality so as to ensure the required nutrients are added into the previous food.	
	By conclusion the food fortification can have many limitations which can affect the successfulness of the food fortification programme. But those limitation helps to ensure the provision of more quality and nutritious food in the society.	

Extract 8.2: A Sample of candidates' incorrect responses to question 8

In Extract 8.2, the candidate misinterpreted the question, as he/she provided characteristics of fortified food instead of limitations that hinder successful food fortification programme.

2.1.9 Question 9: Food Storage

This question tested candidates' competence on the food storage especially on pesticide formulation. The question stated;

- (a) Assume that you are invited by the agricultural officer of Makutano village to educate farmers on spray pesticide formulation. Recommend seven forms of formulations you would present to the farmers.
- (b) Determine the two purposes of pesticide formulation.

This question was opted by 188 (67.60%) of the candidates. Among them, 7 (3.70%) scored from 12.0 to 16.0 marks, 27 (14.40%) scored from 7.0 to 11.5 marks, and 154 (81.90%) scored from 0.0 to 6.5 marks. Figure 9 summarises the candidates' performance.

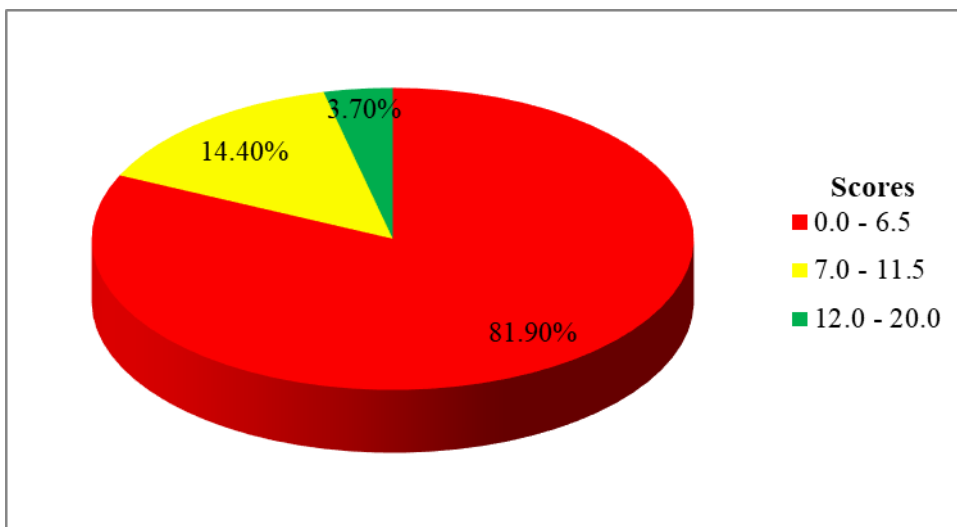


Figure 9: *Candidates' Performance on Question 9*

Figure 9 shows that the performance of the candidates in this question was weak because only 18.10 percent scored between 7.0 marks or above.

The analysis of candidates' responses in this question reveals that 3.70 percent of the candidates who scored high marks had sufficient knowledge about food storage especially on pesticide formulation. In part (a), the candidates were aware that spray pesticide formulation is found into different forms and can be either solid like wettable powders, soluble powders, dry flowables or liquid like flowables, microencapsulates, emulsifiable concentrates, solutions. They are commonly used because they can be easily mixed with water and applied with various types of spray equipment, ensuring good coverage on target surfaces.

In part (b), the candidates managed to provide purposes of pesticide formulation. Such responses include; *to increase the safety of the user of the pesticide during application, optimizing pest control, broadening spectrum of activity, minimize environmental impact, making them easier to store and transport without degradation or loss of effectiveness, making pesticides easier to use.*

On the contrary, 154 (81.90 %) candidates had weak performance. most of these candidates misinterpreted the question and provided irrelevant responses. For example, in part (a), they provided the ingredients of bait formulation instead of forms of spray pesticide formulation. For example, one of the candidates wrote, *bait base, Binder, Dye, Bait.*

Extract 9.1 is a sample of responses from one of the candidates with weak performance.

9.0	<p>Pesticide formulation; is the process of formulating pesticides by using locally material example binder, rodent bait and others.</p> <p>Pesticide help to kill large number of insects which can cause destruction of food.</p> <p>The following are seven forms of formulation of pesticides;</p> <p>Powder form; is the one of the form of pesticide in which is in powder form. In which this added to different crops which kill different pest that can enter in different food.</p> <p>Spray form; is the another form in which used to spray to the food crops which help to kill large number of pest because they sprayed in different parts.</p> <p>Solution form; is the another form of pesticide in which is added to the food crops which we want to kill different pest. This mixture added with some amount of water then are added.</p> <p>Crystal form; is the another form of pesticide in which is in crystal which used to kill large number of pest in area. This absorb water to the insect and make it dry.</p> <p>Fumigants; is the another form of pesticide which added to the area which has pest to kill different pest. By fumigation different pest are killed.</p> <p>Generally these are form of pesticide which used to kill different pest which cause harmful destruction to the product especially food product.</p>	
-----	--	--

9.b.	The following are purpose of pesticide formulations: 1) To kill different pest which cause destruction → The main idea of pest formulation is to kill different pest which cause destruction example fruit and other.	
	4) To help in greater production of food. → The purpose of pesticide formulation to decrease no. of pest which destroy food hence to increase food production example Maize which destroyed by different pest.	

Extract 9.2: A sample of incorrect responses to Question 9

In Extract 9.1, the candidate explained types of pesticide formulation instead of forms of spray pesticide formulation in part (a). In part (b) the candidate managed to provide only one correct purpose of pesticide formulation.

2.2 155/2 FOOD AND HUMAN NUTRITION PAPER 2

This paper consisted of two Sections A and B. Section A comprised six short answer questions (1 - 6) which carried 10 marks each. Section B comprised three essay questions (7 - 9) which carried 20 marks each. The candidates were required to answer all questions in section A and two questions in section B.

2.2.1 Question 1: Malnutrition

This question measured the candidates' competence in mineral deficiency disorders. The question stated;

Most of the people with inadequate nutritional education consume mineral deficiency foods. Identify five types of nutritional disorders they are likely to suffer from.

The question was attempted by 278 (100%) candidates who sat for this paper. The analysis shows that 86 (30.90%) candidates scored from 6.0 to 10 marks, 128 (46.10%) scored from 3.5 to 5.5 marks, and 64 (23.00%) scored from 0.0 to 3.0 marks. Figure 10 shows the distribution of this data.

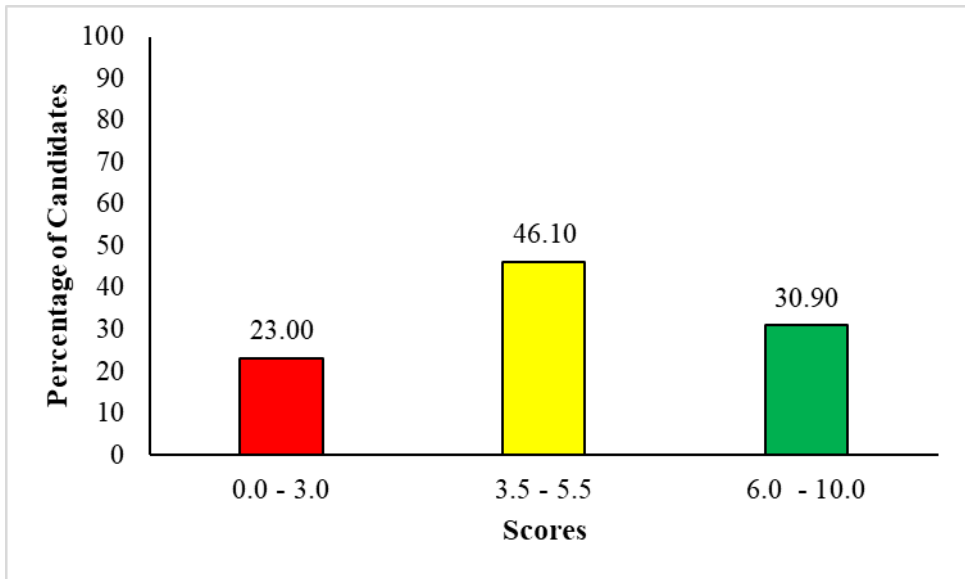


Figure 10: *Candidates' Performance on Question 1*

Figure 10 indicates that the general performance on this question was good because 77.00 per cent of the candidates scored 3.5 marks or above.

The analysis shows that most of the candidates with good performance, understood the demand of the question as they managed to identify five nutritional disorders as required. Some of the responses were *Goiter – due to lack of iodine; Nutritional anemia - due to lack of iron; Osteomalacia - due to lack of phosphorus and calcium; Rickets and tooth decay - due to the lack of calcium*. These candidates were aware of the effects of consuming mineral deficiency foods that it can lead to mineral deficiency disorders. Extract 10.1 is a sample of the correct responses from the script of one of the candidates.

01. Mineral deficiency disorders.

(i) Goitre

- Is the one among malnutritional disorders which is caused by the consumption of mineral deficiency foods, example of mineral which when is insufficient may lead to goitre is iodine mineral, therefore it affects the thyroid.

(ii) Anaemia

- Is the nutritional disorder from consuming mineral deficiency food which is facilitated by lack of iron in the body, iron helps the formation of blood and therefore, no iron no blood formation hence anaemia which is the decrease or lacking of much blood in the body.

(iii) Rickets

- This is the one among the nutritional disorders from the consumption of mineral deficiency foods in which is facilitated by the deficiency of calcium minerals in the body, it is characterised by the weakening of bones and may result to bow legs, this occurs to children.

	(iv) <u>Osteomalacia.</u>
	- This is also the mineral deficiency food consumption disorder which occurs in adults caused by the lack of calcium and phosphorus minerals in the body.
	- It is characterized by weakening and paining of bones
	(v) <u>Teeth decay.</u>
	This also is mineral deficiency disorder which caused by the lack of fluoride

Extract 10.1: A sample of the correct responses to Question 1

In Extract 10.1, the candidate correctly identified the types of mineral deficiency disorders which one is likely to suffer if consumes mineral deficiency foods. Hence, he/she scored high marks.

Furthermore, the analysis shows that 64 (23.00%) candidates had weak performance. Analysis of their responses revealed that some of them had inadequate knowledge about the tested concept hence, provided incorrect responses. It also shows that some of them misunderstood the demand of the question. For example, one candidate provided the general food nutrients deficiency disorders such as; *Marasmus and kwashiorkor protein energy Malnutrition*, and another candidate provided disorders caused by vitamins deficiency instead of that caused by minerals deficiency such as *night blindness - Vitamin A deficiency disorders; scurvy - vitamin C deficiency and beriberi – vitamin B1 deficiency*. Other incorrect responses were such as *vitamin D deficiency disorders, obesity, protein and human nutritional deficiency disorder* instead of mineral deficiency disorders. Extract 10.2 is a sample of incorrect responses from the script of one of the candidates.

01. i. Kwashiorkor

→ when the individuals consume mineral deficiency foods only they will be suffering from kwashiorkor due to lack of protein in the body because of consuming only one type of food due to their different reasons mostly is that they lack nutritional education on how to consume balanced diet.

ii. Marasmus

→ They will be suffering from marasmus due to the lack of all foods in the body even by they do not consume other kind of food they just consume only one type of food that lead them to suffer from marasmus due to lack education of the proper balanced diet in the body.

iii. Keratomalacia

→ This is a disease disorder associated with eyes even by is caused by the lack of vitamin A in the body even by it help an individual to see properly to have a good vision even by when they do not consume the foods they will suffer from Keratomalacia and make them to have low vision.

iv. Anorexia nervosa

→ This is a kind of disease caused due to the lack of all nutrients in the body due to that an individual consume only one type of food so his or her body would be weak because of not consuming enough and balanced food for the body so they should be given education on how to maintain the body with the balanced meals.

Q1	Q. Security
	→ This is a nutritional disorder caused by lack of
	minerals because by the individuals need to consume
	some fruits but they do not have the education
	that fruits are important in our body due to build
	the body provide immunity to the body and make
	us that are free from diseases. so they should be
	educated. so as to make them free from nutritional
	disorders to consume a balanced diet.

Extract 10.2: A sample of incorrect responses to Question 1

In extract 10.2 the candidate wrote the general food nutrients deficiency disorders instead of type of minerals deficiency disorders. Hence, she/he scored low marks.

2.2.2 Question 2: Nutritional Programme Planning and Intervention

The question measured the candidates' competence in waste management.

The question stated;

Waste management aims at ensuring proper health of people in the community.

(a) *Describe the waste management process.*

(b) *Identify four benefits of waste management to the community.*

All (100%) candidates who sat for this paper attempted the question. The analysis shows that 70.50 per cent of the candidates scored from 6.0 to 10 marks, 27.00 per cent scored from 3.5 to 5.5 marks, and 2.50 per cent scored from 1.0 to 3.0 marks. Figure 11 summarizes this data.

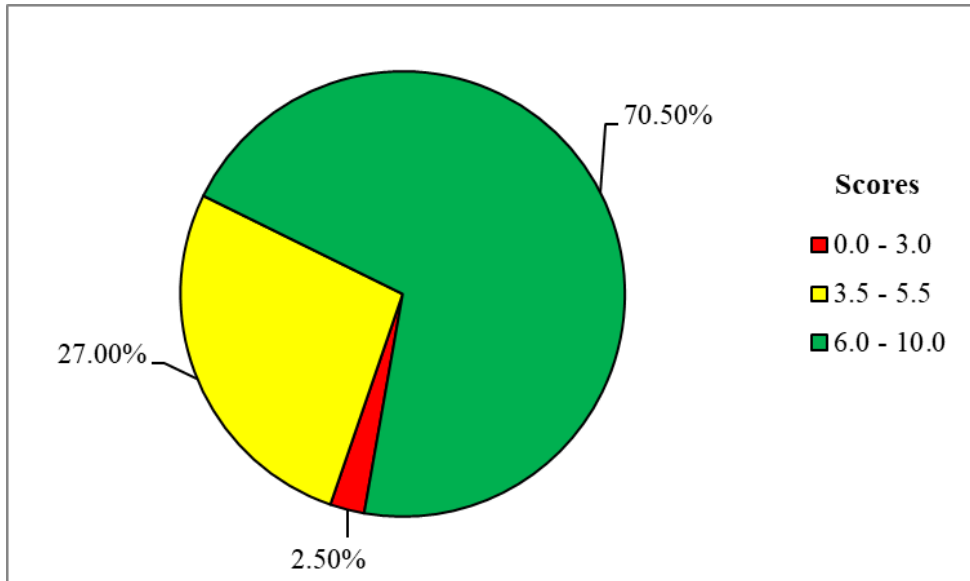


Figure 11: *Candidates' Performance on Question 2*

Figure 11 shows that the general performance on this question was good since 97.50 per cent of the candidates who attempted this question scored 3.5 marks or above. These candidates had adequate knowledge about waste management in the community.

The analysis indicates that, most of the candidates managed to correctly described the waste management process in part (a), they understood that; Waste management process involves all the activities concerning to keep the environment cleaning such as controlling noise pollution, air pollution, and environmental pollution. Similarly, in part (b), they managed to identify correctly the benefits of waste management to the community, such as *helps to make the environment clean, reduces the risk of communicable diseases, reduces the risk of accidents, leads to the formation of different products example organic manure, helps to reduce environmental pollution, improvement of living condition, prevents eruption of diseases and provides employment opportunities*. However, the candidates who failed to score all marks in this question did not provide all the required points as per question demand. Extract 11.1 is a sample of the correct responses from the script of one of the candidates.

02.	(a) Waste management refers to the process of ensuring proper waste disposal and maintain the clean and safe environment which support good and health life of individuals. Example of Waste management process is recycling of waste, Reusing, Burning of waste, Incineration.
	(b) The following are the benefits of Waste management to the community.
	(i) Waste management helps to ensure health living of people in the society. When waste are properly disposed it help to ensure good health of people in the society because waste can cause diseases through contamination of food
	(ii) Waste managements process provide employment to people on the community. - In the process of management of waste people are needed to perform different process forexample collecting of waste plastic in the recycling industries people are employed.
	(iii) Waste management help to make the environment clean and attractive because waste products makes the surround to look dirty so through waste management it ensure that the environment is clean
	(iv) Through waste management it provide raw material to industries. Forexample recycling industries obtain their raw materials from waste products collected

Extract 11.1: A sample of the correct responses to Question 2.

In Extract 11.1 the candidate responded correctly to both parts (a) and (b) hence, he/she scored high marks.

On the contrary, the analysis shows that 7 (2.50%) candidates who scored low marks had insufficient knowledge about waste management process. In

part (a), the candidates failed to describe waste management process and to identify benefits of waste management to the community in part (b). For example, one candidate provided irrelevant benefits as follows; *It provide education to the people on the importance of waste management, it reduces unwanted desire which are not necessary to get, it is the source of good personal hygiene.* Others provided the methods of removing wastes instead of benefits of waste management such as *land filling, burning and recycling.* Other incorrect responses were such as, *it ensures food security in the certain community, it helps to maintain the ecology in the community, helps to reduce mortality rate in the community, it helps to prevent environment problems, it protects ecosystem, it provides knowledge about good managing of waste, it ensures good security of the community, avoiding environmental scarcity, increase number of biodiversity and it helps in food hygiene.* These responses indicate that the candidates were not aware that some benefits of waste management could be ‘economic’, ‘social’, ‘environmental’, and ‘inter generation - equity’. Hence scored low marks.

2.2.3 Question 3: Malnutrition

This question measured the candidate’s competence in the concept of malnutrition crisis brought about by the increase in fuel and food prices which affect the economics of the developing countries. The question stated;

The global increase in fuel and food prices affect the economies of developing countries; some of which end up with malnutrition crisis. Briefly explain this situation based on the conceptual framework of malnutrition.

The question was attempted by 278 (100%) candidates who sat for this paper. Figure 12 illustrates candidates’ performance in this question.

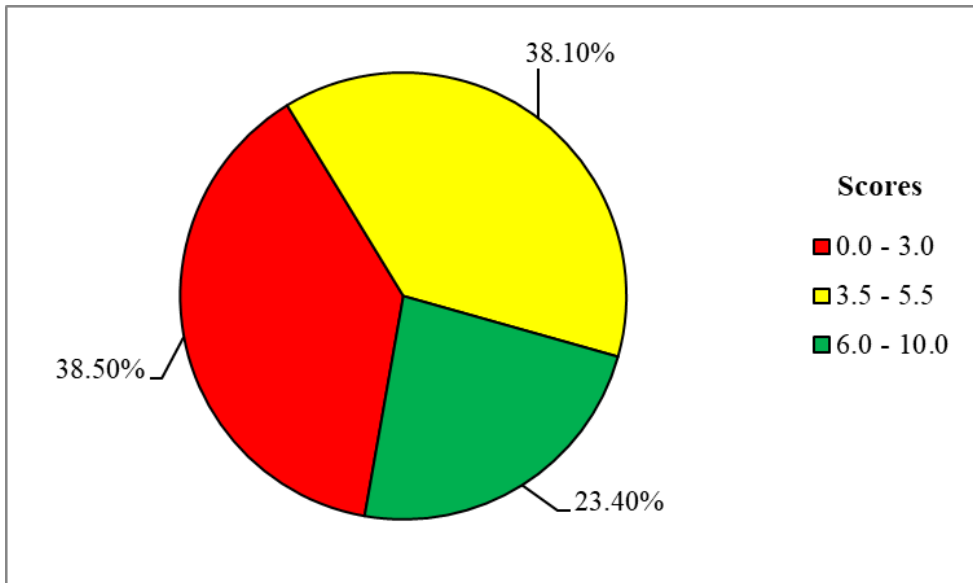


Figure 12: *Candidates' Performance on Question 3*

Figure 12 indicates that the general performance for this question was good because 61.50 per cent of the candidates scored 3.5 marks or above. These candidates had sufficient knowledge on malnutrition crisis due to increase of fuel and food prices.

The analysis indicates that, most of the candidates who scored high marks were able to briefly explain this situation based on the conceptual framework of malnutrition. They were able to associate the increase of fuel and food prices with the conceptual framework since there is a relationship between limited access or lack of food and malnutrition. High price of fuel increases the production cost hence raising the food prices as a result, it can lead to all three causes of malnutrition. However, there was no candidate who scored all marks allotted to this question because could not manage to get all points correctly.

Extract 12.1 is a sample of the correct responses from the script of one of the candidates.

Immediate causes

i) Inadequate food intake.

- This leads to malnutrition and manifestation because the body does not get required nutrients for good body health to avoid malnutritional disorder like marasmus.

03 ii) Diseases.

- (1) the condition of the body to be un-well, diseases cause the body to do not get the required nutrients and makes the body to be weak.

Underlying causes.

i) Insufficient food household supply.

- This is due to lack of food supply in the household level whereby it leads to malnutrition to the family members because the family have no enough money to buy the food.

ii) Inadequate maternal and child care.

- This leads to malnutrition and even death because mothers on the society have no education about child care that are suppose to eat healthy foods to avoid malnutrition.

iii) Insufficient health services.

- Because have no enough hospitals where people can get good health services in order to avoid death of people and to provide nutritional education to people.

	Basic causes:
vii.	Poverty. - Is the situation whereby a person is not able to afford his or her needs whereby it leads to malnutrition because the body does not get the required nutrients.
viii.	Food taboos. - Some of the society does not allow women and children to eat some of foods because of their poor beliefs. This leads to death of children because they do not get required nutrients in their body for growth and development of their bodies.
ix.	Conflicts and wars. - This leads to malnutrition because people migrate from one place to another to get a place to settle this causes low production of food cause the farms are left empty without the crops on the farms.
x.	Poor social services. - This is because some of the societies have no hospitals and to provide provide for people to get health services.

Extract 12.1: A sample of the correct responses to Question 3.

In extract 12.1, the candidate managed to explain some of correct points as per question demand. However, he/she failed to score the full marks because of mixing correct and incorrect responses.

On the other hand, analysis shows that among the 38.50 per cent of the candidates who scored low marks, some had inadequate knowledge while some failed to understand the demand of the question. For example, one candidate provided the definition of the terms; *Malnutrition*, *Diseases* and *Dietary intake* instead of briefly explaining malnutrition crisis based on the conceptual framework of malnutrition. There were also some candidates who drew the conceptual framework of malnutrition without giving

relevant explanations and ended up scoring zero in this question. Extract 12.2 is a sample of incorrect responses from a script of one of the candidates.

3. Malnutrition refers to where a body receives low or high amount of food nutrients.

A DIAGRAM SHOWING CONCEPTUAL FRAMEWORK OF MALNUTRITION.

```

graph TD
    Malnutrition --> Inadequate[Inadequate food intake]
    Malnutrition --> Over[Over-food intake]
    Malnutrition --> Other[Other associated disease]
    
    Inadequate --> Kwashiorkor
    Kwashiorkor --> Marasmus
    Marasmus --> Rickets
    Rickets --> Marasmic[Marasmic Kwashiorkor]
    Marasmic --> Night[Night blindness]
    
    Over --> Obesity
    Obesity --> Heart[Heart failure]
    Heart --> Intestinal[Intestinal discomfort]
    Intestinal --> Kidney[Kidney failure]
    
    Other --> Stunting
    Stunting --> Retarded[Retarded growth]
  
```

- This chart explains more about low food intake, high food intake and other associated disease. It shows more on effects of low food intake, over food intake and other disease which may be associated with malnutritional disorder.

Extract 12.2: A sample of incorrect responses to Question 3.

In Extract 12.2, the candidate misinterpreted the demand of the question. He/she provided the diagram showing the conceptual framework of malnutrition instead of briefly explaining the malnutrition crisis due to global increase in fuel and food prices which affects the economies of developing countries.

2.2.4 Question 4: Nutrition Programme Planning and Intervention

This question measured the candidates' competence in alternative infants feeding methods. The question stated that;

It is difficult to care for infant whose mothers have died during child birth. Briefly explain four alternative methods and challenges of feeding those infants and four challenges they are likely to face when applying the methods.

The question was attempted by 278 (100%) candidates. Figure 13 summarises performance of the candidates.

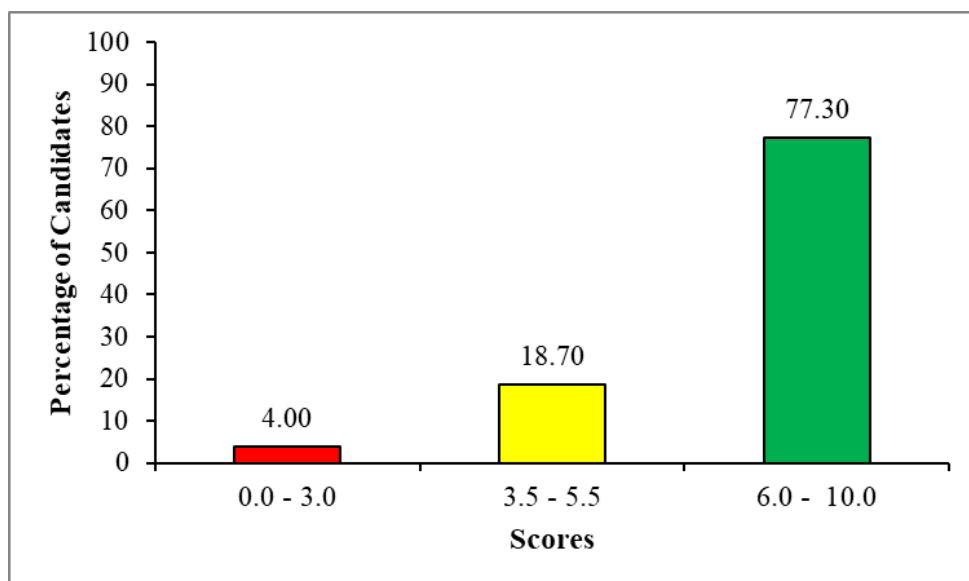


Figure 13: Candidates' Performance on Question 4

Figure 13 indicates that the general performance in this question was good because 96.00 per cent of the candidates who attempted this question scored 3.5 marks or above. This implies that these candidates had sufficient knowledge on alternative or artificial infants feeding methods. For example, one of the candidates wrote; *the use of animal milk, bottle feeding, using milk from another mother, using soft food (weaning foods).*

Other responses were, *lactogen milk feeding, relative breast feeding, early introduction weaning foods.*

These candidates also managed to provide appropriate challenges *of feeding those infants* using artificial or alternative infant feeding methods such as; *they may be infected if the food given is contaminated, they may lack some nutrients, they may end up with weak immunity system, they lack the close bond between the mother and child during breast feeding.* Other correct responses were such as *lack of knowledge on the proper measures of feeding the infant* and *contamination due to poor hygiene.* These responses indicate that the candidates had sufficient knowledge that enabled them to respond correctly to the question. Extract 13.1 is a sample of the correct responses from the script of one of the candidates.

Qp Alternative methods and their challenges of feeding infants out of mother's milk.

Ⓐ Bottle feeding

This is the way that can be used to feed a child by using milk of animal such as cow so a baby cannot feed through bottle that is why it is called bottle feeding.

It's challenge.

- It is costly since need to buy milk
- It does not have constant temperature needed by the body
- A child may not like the milk.

Ⓑ Breast feeding a baby by milk of another woman.

A nearby woman may be a relative of a child and her mother if she breast feeds she can also breast feed a child as normal so that is the way that can be used to feed infant.

It's challenge.

- A child can get disease due to different type of milk that maybe needed in his/her body.

Ⓒ Weaning

Is the introduction of new food to baby. Is another method that can be used to feed infant for example start to feed liquid feed, semi-liquid up to solid.

It's challenge

- Can cause digestive problems to the child.

<p>op: The following are the challenges that are likely to occur when applying the methods:</p> <p>(i) It is costly. For example bottle feeding need money also when wearing a baby the money used to buy those wanted foods so that is the challenge that likely to occur.</p> <p>(ii) Time consuming. It consume time especially time needed for preparation also time for taking care of the child so that is the challenge of that.</p> <p>(iii) Can cause Disease / Malnutrition to a child. A child can be malnourished because the food may be received by her/his body may be not enough or it is bulky so that also is the challenge.</p> <p>(iv) Can cause death of a child. Also due to that a child can die due to diseases especially Indigestive system so that is the challenge that is likely to occur.</p>

Extract 13.1: A sample of the correct responses to Question 4

In Extract 13.1, the candidate explained correctly the alternative methods of feeding infants, challenges of feeding infants and challenges they are likely to face when applying alternative methods of feeding infants.

Furthermore, the analysis indicates that few candidates (4.0%) scored low marks. Some of these candidates misinterpreted the question while others had inadequate knowledge of the concept tested. For instance, some candidates provided the method of assessing nutritional status of individual instead of alternative method for feeding a baby. For example, one candidate wrote; *giving balanced food, Anthropometric methods and dietary survey. Medical checkup for infant, support from WHO institution and any other organization.* Another candidate wrote; *Feeding the baby with fresh juice from fruits to enable to get vitamin nutrients, making sure that infants get all balanced diet in order to prevent illness and by donate from another person who want to care the infants without blood group or relative family.* Other incorrect responses were *uses of functional foods,*

applying of fortification methods and immunization. Also, some candidates provided incorrect challenges of feeding infants by alternative feeding methods. For example, one candidate wrote; *you have to feed them with happy and comedy face in order to make them eat. The infants must be given vitamin B tablets or syrup that can enhance him/her to eat and giving a fortified food.*

Furthermore, these candidates also failed to provide challenges they are likely to face when applying alternative methods of feeding infants. For example, one candidate wrote; *women workload, they can cause the baby not to get other nutrients in their body, the baby can get constipation, can cause disease for infants due to eating convenience food.* Another candidate wrote; *when used artificial feeding infant does not get nutrients, it makes accumulation of nutrients.* These responses show that the candidates had insufficient knowledge about artificial infants feeding methods. Extract 13.2 is a sample of incorrect responses from the script of one of the candidates.

4. a) The methods of feeding these infants.
i) giving balanced food for giving energy and and growth.
ii) Anthropometric methods and Dietary Survey
- Medical check up for infants
iii) Supporting to the Institution like WHO and any Organizations
iv) Hospitals friendly for attending clinic and Used of balanced food and showing love & care.
b) Challenges
- Lack of funds / food aid
- In adequate of food
- Price at hospital before
- Care for infants to ensure doesn't take
challenges they are likely to face when applying
- It take time for applying
- Some of your things must be Cancel for dealing with infants only
- Some basic need that you likely to have failed they don't give have.
- loses of some weight and you can become slim thick because you are breast feeding

Extract 13.2: A sample of incorrect responses to Question 4

In Extract 13:2, instead of giving alternative methods of feeding an infant, the candidate gave methods of assessing nutritional status of an individual and other incorrect response. He/she also gave incorrect challenges of feeding infants using alternative methods and challenges that are likely to be faced when applying alternative methods of feeding an infant.

2.2.5 Question 5: Catering and Institutional Feeding

This question measured the candidates' competence in explaining the street food vendors' hygienic practices when handling food.

The question asked;

Most of the street food vendors do not adhere to hygienic practices when handling food. If you were to intervene, briefly explain five hygienic practices you would advise them to abide to.

All 278 candidates who sat for this paper attempted the question. Figure 14 summarises their performance.

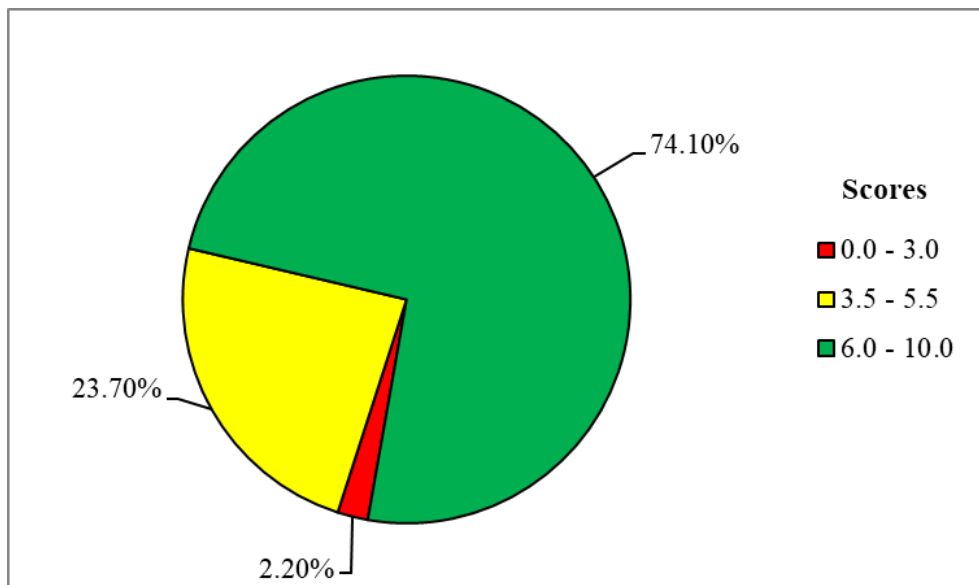


Figure 14: Candidates' Performance on Question 5

Figure 14, shows that the general performance in this question was good because 97.80 per cent of the candidates scored 3.5 marks or above.

The analysis shows that the candidates with good performance had sufficient knowledge about the concept tested which enabled them to correctly explain hygienic practices which should be adhered by the street food vendors. For example, one candidate wrote; *Proper personal hygiene; Utensils used should be clean; The kitchen should be clean; Food should*

be covered during storage; Raw foods should be stored separate from cooked food. Another candidate wrote; avoid cross contamination by separating raw foods from cooked during the preparation and serving; the kitchen and its surrounding should be clean to prevent insects and breeding of harmful bacteria; use clean and safe water in food preparation, cooking, serving and washing of utensils; use the waste bin for keeping wastes; and food handlers must observe the proper hygiene when handling food.

These responses shows that the candidates were aware that proper hygiene and cleanliness are important to be practiced by street food vendors so as to avoid the outbreak of infectious diseases as a result of poor hygiene. Extract 14.1 is a sample of the correct responses from the script of one of the candidates.

5	The following are hygiene practices to be followed in street food vendors. OR
	i) The use of clean water in preparation of the food. This is because most of people who prepare food at street they do not use treated water in preparation of the food. Thus to cause the microorganism in the food thus cause food poisoning to the user. But they required to treat water so as to make safe.
	ii) To tie their hair during preparation of food. During food preparation hair must covered so as to prevent hair to enter in the food. This is because when hair enter in the food cause food to be unsafe to consume. Thus why they recommended to tie it.
	iii) To use clean utensils in preparation and preservation of food. This is because in the dirty utensils there are microorganisms. Therefore if that utensil used in preparation and storage of food result to microorganisms to enter in the food thus to cause food contamination. Thus affect health condition of the user.

5	<p>i) To clean kitchen before preparation, wash hand by clean water and wear apron.</p> <p>ii) If the kitchen environment are not clean result to food contamination. This is because, there is harmful insects such as house fly and cockroach which can cause microorganism to enter in the food. Therefore kitchen must be clean, also hand in order to prevent microorganisms in the food.</p>
	<p>v) Avoid cross contamination between raw and cooked food.</p> <p>This is because raw containing microorganisms but cooked food those microorganisms are die, therefore due to cross contamination result to movement of microorganisms from raw food to cooked food, and must be separated even in area of storage.</p>

Extract 14.1: A sample of the correct responses to Question 5

In Extract 14.1 the candidate correctly explained the hygienic practices which the street food vendors are supposed to adhere.

On the other hand, the analysis indicates that, few candidates (2.20%) who had weak performance, some of them lacked knowledge of the concept tested as they provided irrelevant responses. For example, one candidate wrote; *use proper equipment for food preparation, the cooked food should be pre-heated before storage, prevent the food from animals such as dogs, using chopping board when preparing food and eating cooked food immediately.* Other candidates repeated the same point more than once. Hence scored low marks.

2.2.6 Question 6: Food Microbiology

This question measured the candidates' competence in food microbiology particularly bacterial food poisoning. The question stated;

- (a) Explain the meaning of food poisoning.
- (b) Examine how the following bacterial agents cause food poisoning;
 - (i) *Salmonella*
 - (ii) *Staphylococcal aureus*
 - (iii) *Clostridium botulinum*
 - (iv) *Clostridium perfringens*

The question was attempted by 278 (100%) candidates who sat for this paper. Figure 15 summarises the performance of the candidates.

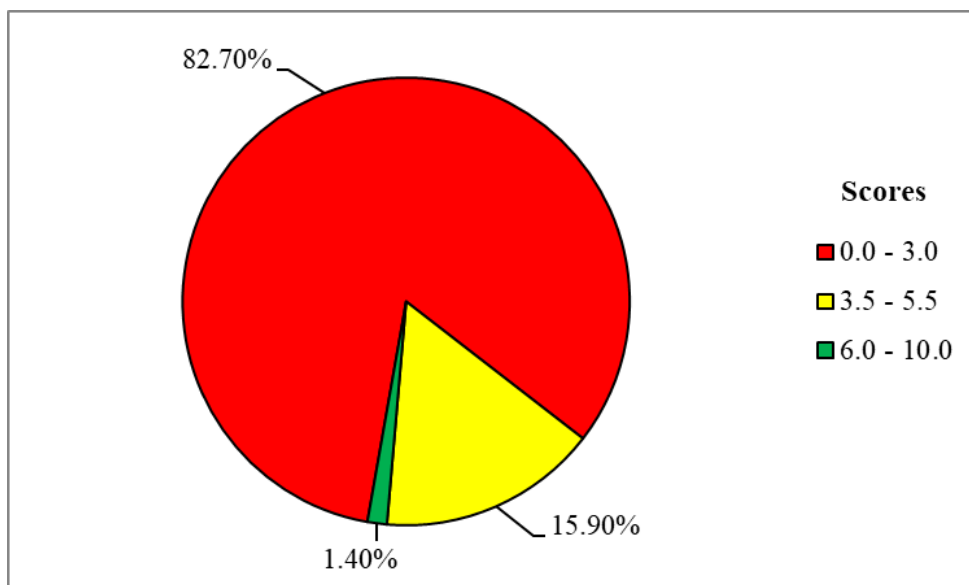


Figure 15: *Candidates' Performance on Question 6*

Figure 15, shows that the general performance in this question was weak because majority (82.70%) of the candidates scored below 3.5 marks. These candidates had insufficient knowledge about the content tested.

The analysis of the candidates' responses shows that, majority of the candidates did not understand the demand of the question in part (a). For example, some of the candidates provided the meaning of food contamination instead of food poisoning. One candidate wrote; *Refer to the contamination of food that make it to be unfit for human consumption.* Another candidate wrote; *Is the type of food in which the growth of bacterial micro-organisms is present.* Other responses were, *Is the food which organism growth inside the food and change the smell, test of the food and colour of the food and food poisoning are poisoning that can be found in a food like honey.*

Furthermore, the analysis shows that most of the candidates failed to examine how the given bacterial agents causes food poisoning in part (b). Hence, they provided incorrect responses. For example, one of the candidates wrote;

- (i) *Salmonella; cause tuberculosis also causes deterioration of milk.*

- (ii) *Staphylococcal aureus*; causes food poisoning by cooking the food in small amount of temperature so that micro-organism can survive.
- (iii) *Clostridium botulinum*; causes food poisoning through using wrong method of cooking food.
- (iv) *Clostridium perfringens*; causes food poisoning when the food is stored in wrong temperature.

The candidate who scored low marks had insufficient knowledge of food micro-biology particularly bacterial food poisoning. Extract 15.1 is a sample of incorrect responses from the script of one of the candidates.

6	(a) Food poisoning. There are poisoning that can be found in a food like honey etc.
6b	(i) Salmonella. This will cause food poisoning when a bacteria are inserted with food like vegetable etc. So this will cause the food poisoning because we can be they can be multiplying and to get a large amount in a food.
	ii) Staphylococcal aureus; These are the bacterial agents that can be cause the food poisoning by the presence of enterotoxin producing by staphylococcal bacteria in a food.
	iii) Clostridium botulinum; Presence of food and favourable condition in which bacteria can be grow, so this will be cause the food poisoning by a bacterial agent.
	iv) Clostridium perfringens; Also this can be agent of food poisoning. So this will cause food poisoning by the presence of the food that a better will grow and favourable pH condition can be grow.

Extract 15.1: A sample of incorrect responses to Question 6

In Extract 15.1, the candidate provided incorrect responses in both parts (a) and (b).

On the other hand, the analysis of the candidate's responses shows that few candidates 17.30 per cent who scored high marks, managed to explain food poisoning in part (a) as an illness caused after consumption of the food which has been contaminated by either micro-organism or food handlers themselves. However, in part (b) most of them provided two to three correct points out of five on how the bacterial agents cause food poisoning as question demanded. The correct responses were such as,

- (i) *Salmonella: - causes food poisoning by infecting the digestive system with bacteria that can be found in various foods, particularly those from animals.*
- (ii) *Staphylococcal aureus: - Staphylococcus aureus food poisoning is caused by ingesting food contaminated with toxins produced by Staphylococcus aureus bacteria, not the bacteria itself.*
- (iii) *Clostridium botulinum: - This is the bacterial agent that also cause food poisoning in foods like eggs, meat and milk. This causes food poisoning due to production of toxins which is called neurotoxin which cause effect in the body. The neurotoxin destructs nerve cells and nervous system.*
- (iv) *Clostridium perfringens: - This is the bacterial food poisoning occurs when you eat food contaminated with the bacteria, which then produce a toxin in the intestines. After someone swallows the bacteria, it can produce a toxin that causes diarrhoea.*

These responses indicate that the candidates were aware of the causes of food poisoning from the bacterial agents given.

2.2.7 Question 7: Catering and Institutional Feeding

This was an essay question which measured the candidates' competence in menu design. The question asked;

You are designing a menu which will be displayed using varieties of menu cards for a class party that will be held after the completion of the Form Six examination.

- (a) Analyse four things you should be familiar with before designing a particular menu.*
- (b) Suggest five features of a good menu card.*

The question was attempted by 157 (56.47%) candidates who sat for this paper and 121 (43.53%) did not attempt it. Figure 16 illustrates this data.

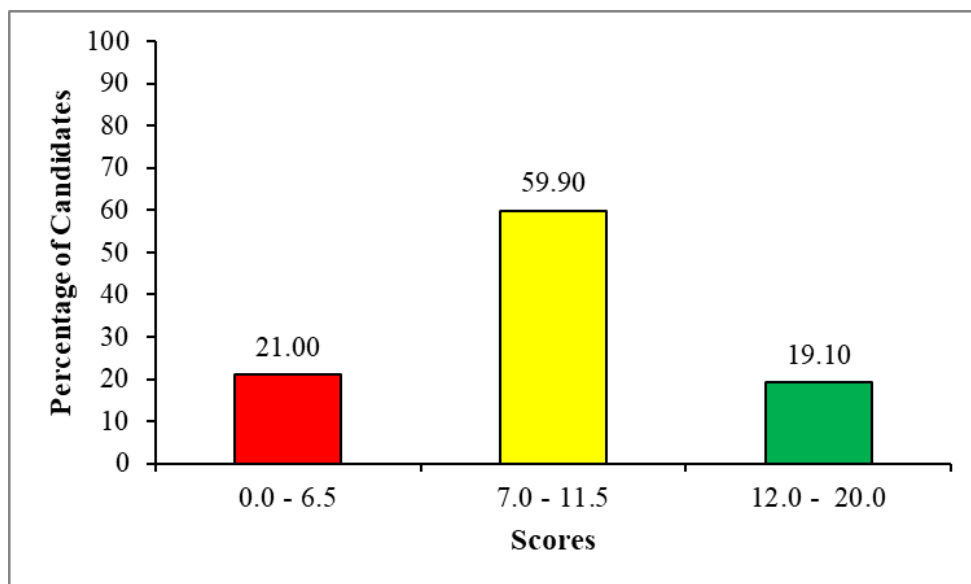


Figure 16: *Candidates' Performance on Question 7*

Figure 16 shows that the general performance of this question was good, since 124 (70.00%) of the candidates scored 7.0 marks or above.

The analysis of the candidates' responses shows that, the candidates who had good performance managed to analyse things which should be familiar with before designing a particular card in part (a). Some of the responses provided were such as, *type of customers, availability of materials, considering type of food to be prepared, cuisine style, the time of the day, consider religious and beliefs of the people, consider likes and dislikes of customers, cost of the food provided, consider varieties of meals.*

In part (b) of the question, these candidates provided correct features of a good menu card, as one candidate wrote; *A good menu card consists a list of dishes to be offered, A good menu card is attractive, A good menu card has fixed size and length, A good menu card should contain price of the food and A good menu card should use proper language.* Another candidate wrote; *Language used should be simple and easy understood, should be attractive with food pictures/images, should contain types of foods prepared, should show the type of foods in their groups i.e. breakfast, lunch and dinner/supper, should be protected by covering it to avoid spoilage.*

These responses indicate that the candidates were familiar with menu and its specifications. Extract 16.1 is a sample of the correct responses from the script of one of the candidates.

OF.	Menu. is the Means of communication information which inform the caterer what he/she should prepare also inform the customer what is available. Menu can be cyclic menu or static menu.
	The following are things to consider before designing a particular menu.
	Type of customer, when designing menu we should consider on the type of customer who are going to consume the product. it will be expected to the menu offered.
	Food trends, before designing menu you should do a research and find what kind of food are mostly liked by many people:
	Seasonal of the year, in designing menu seasonal of the year should be considered so as to ensure offering of different of food according to the season. for example during winter season offer hot drinks like tea and soup. and during summer season offer cold drink like juice and ice cream.
	Ingredient- availability, during designing a menu we should consider on the availability of ingredient and the cost of the ingredient so as to ensure availability of different kind of food in your area. Also ensuring portion control by considering the type of customer, Buying price of the food and quality of the food.

07	The following are features of a good Menu card.
	Language used, a good menu card can be determined by different language. when planning menu card you should introduce a good language which can be easily understood by every customer. Mostly prefer the language which because there are its applicable in all the country.
	presentation, a good menu card should be able to introduce itself or what kind of food are available to the establishment.
	length, a good menu card should be long enough so as customer should not get bored on the available foods.
	Attractiveness with good colour, a good menu card should be attractive so as to influence many people to come in your restaurant or Hotel.
	A good menu card should be easily understand to all people so as the consumer will be able to order the type of food he/she like.
	Generally menu card is important to be available in the establishment because it inform the consumer what is available also it inform the caterer what to prepare in appropriate time.

Extract 16.1: A sample of the correct responses to Question 7

In Extract 16.1, the candidate managed to analyse four things to be familiar with before designing a particular menu in part (a). He/she also suggested five features of a good menu card in part (b). However, this candidate failed to score the full marks because he/she mixed correct and incorrect responses in both parts.

Contrary, the analysis indicates that 33 (21.00%) candidates who scored low marks had insufficient knowledge of the question's demand. Some wrote the feature of the good menu card instead of analysing things to be familiar with before designing a particular menu in part (a). For example, one candidate wrote, *Length, Language, Presentation Design*. Another candidate wrote; *income level of people, quality material design, affordability of a designed menu*.

In part (b) some of the candidates mixed the responses, they provided the things to be familiar with before designing a particular menu instead of features of a menu. Others provided the features of invitation card instead of a menu card. For example, one of the candidates wrote; *the card should show who gave the invitation to the party, should show the time taken of the party, should show the place of the party, should show the main theme of the party (wedding, graduation or anniversary)*. Extract 16.2 is another sample of incorrect responses from the script of one of the candidates.

7.	<p>Menu - is the list of dishes when the catering establishment used. There are different kinds of menu but all they can be used example of that menu, table d'hôte. The following are the things to be considered before designing a menu include:</p> <p>Personal like and dislike - When you want to prepare that menu you must consider that good people can be handle when they can use or not because it can make disturbance between caterer and customer. So before your planning a menu you must consider people like and dislike in that menu.</p> <p>Taboo and custom per traditional way. When you need to prepare the good menu to the catering establish next you must know the traditional way of prepare because it can be easily controlled by all people who are able to use that food.</p> <p>Income of the people: When the people make the kind of that menu they must know their money value because you are able to choose any food which your willing of it. Due to that you must consider the income level in your menu needed.</p> <p>Healthy status - When the caterer need to prepare that menu they must know health condition of the people in order to prepare little amount of ingredient next in the food. The need of knowing and to consider the healthy status is due to the preparation good menu which you prepare of customer.</p> <p>The following are the features which the caterer consider a good menu card include:</p> <p>Consider balanced diet. In your menu card you must that the menu is well balanced because</p>
----	---

	<p>7) It contains all nutrients which are required by the body in order to build up the body. Example protein, carbohydrate, fat and vitamins and minerals all these nutrients must be there in your menu.</p> <p>A good should have flavour, texture and colour. The menu which the people use to design a card must ensure these food have good texture, colour and flavour where by they can contribute to increase customers and to have good way of eating because these food have good appearance and good varieties.</p> <p>Season of the year. A good menu card must have the food which is in season because some people need those food and some need out of season due to the seasons of the year the food must be well prepared in order people to use that kind of foods.</p> <p>Traditional and religious belief. When you make a good card you must ensure traditional and religious belief of the people because you can't plan your menu which people they can't use due to the believes. The presentation of that should be the caterer to consider it in order to make a good menu card.</p> <p>Demand of the people. A good menu card should cover all essential food which are well balanced in the demand of the people, you must choose the menu which you can demand on it because the payment of the menu are different because also menu are different.</p> <p>Generally All in all apart from things to consider and practice there are importance of menu include source of good body, source of money to the catering establishment to service just a few.</p>
--	---

Extract 16.2: A sample of incorrect responses to Question 7

In Extract 16.2, the candidate mixed correct and incorrect responses in part (a). Moreover, he/she provided incorrect responses in part (b).

2.2.8 Question 8: Nutrition Programme Planning Intervention

This was also an essay question measuring the candidates' competence on factors to consider for the successful nutrition programme. The question stated;

The Changamoto village leader is planning a nutrition intervention programme to eradicate the problem of Iron deficiency in the village. Describe six factors he has to consider for the successful programme.

The question was attempted by 210 (75.50%) candidates who sat for this paper and 68 (24.50%) did not attempt it. Figure 17 summarises the performance of the candidates in the question.

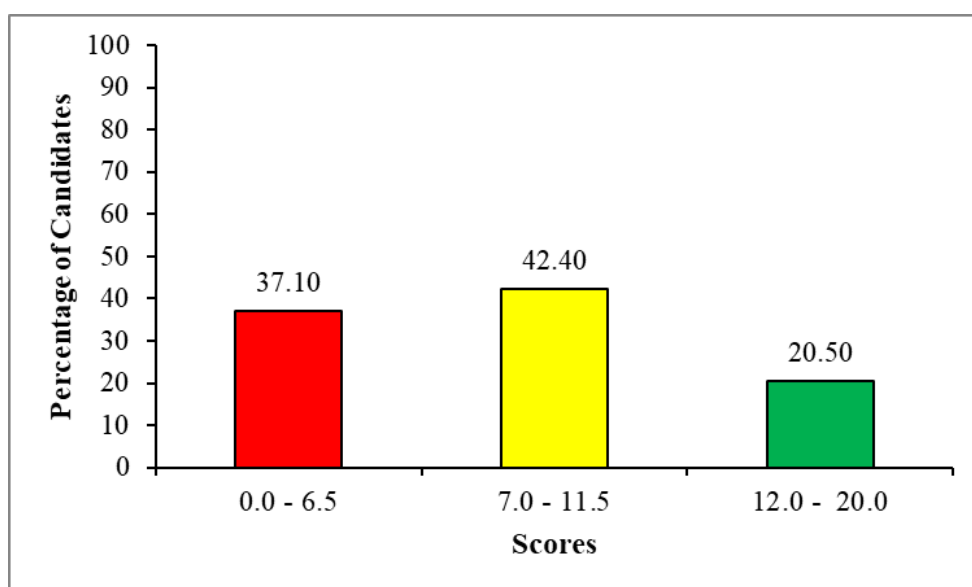


Figure 17: *Candidates' Performance on Question 8*

Figure 17 shows that the general performance of this question was good since 132 (62.90%) of the candidates scored 7.0 marks or above. These candidates had sufficient knowledge about factors to consider for the successful nutrition programme. The item response analysis shows that the candidates with high scores, managed to describe factors to consider for the successful Nutrition Intervention Programme. Some of the responses provided were such as; *Target group, Problem analysis, Political commitment, Sustainability of the programme, Community participation, Availability of resources, The cost of the programme, National policy, and Effect of the programme to the environment.* These responses indicate that the candidates were aware of the nutritional intervention programmes and

what should be considered before implementing such programmes. Extract 17.1 illustrate one of the correct responses from the script of one of the candidates.

8.	<p>Nutrition intervention programme is an act or plan for a program which will interrupt or prevent malnutrition in the community. for example fortification programme and school feeding programme. This nutrition intervention programme is essential to eradicate the nutrient deficiency problem. So as to eradicate the problem of iron deficiency in Changanoto village, the following factors should be considered for successful programme.</p> <p>Problem analysis; This is done to analyse how big is the iron deficiency problem, the magnitude and the source of the problem. By analysing the problem will help to know the basis of the problem. for example the cause of the problem is due to inadequate intake of iron in the diet, this enable to find out the measures for the problem. hence will led to a successful programme.</p> <p>Targeted group; The nutrition intervention programme should consider, the group of people which has been targeted for the programme for instance the children under five years and pregnant mothers. This is due children and women who are pregnant are in need of iron much, for children iron required for proper growth and women to prevent still birth hence led to a successful programme.</p> <p>Community participation; The programme should involve the community, where by the people should be involved from the planning to the evaluation, so as eradicate the iron deficiency, the village should be involved</p>
----	--

8	<p>on nutrition education so as to get knowledge on nutrients value and ^{effect on missing so} to play their role on prevent the iron deficiency on the village hence a successful programme.</p>
	<p>Sustainability of the programme; This is due to the programme should be long lasting this means should stay for a long time Foristance instead of using iron supplements, there should encourage of home garden et so as to plant vegetables where by the vegetable contain vitamin C, which inhance the absorption of iron in the body. hence will help to prevent iron deficiency in the village</p>
	<p>Use of appropriate technology; This is due to the programme, the technology which should be available and affordable, this involve in provision of nutrition education by teaching methodology. This will help to eradicate the iron deficiency without high cost due to the affordability and availability.</p>
	<p>Impact on the environment; Due to the nutrition intervention programme, there should be no negative impact to the environment such as environmental pollution, the programme should ensure the environmental conservation so as to avoid eruption of disease in the village: this will enable to eradicate iron deficiency.</p>
	<p>The nutrition intervention programme is very necessary and beneficial to the community due to it alleviate the problem of nutrients deficiency, which is a big problems to the people hence should be conducted widely.</p>

Extract 17.1: A sample of the correct responses to Question 8

In Extract 17.1, the candidate managed to provide the correct responses. However, the candidate could not score full marks allotted because she/he mixed correct and incorrect factors to consider for a successful nutrition intervention programme.

On the other hand, 37.10 per cent of the candidates who scored low marks had insufficient knowledge of the concept examined. Likewise, some few candidates misinterpreted the question by providing methods for eradicating malnutrition instead of factors to consider for a successful Nutrition intervention programme. For example, one of the candidates wrote; *Provision of Nutritional education. The promoting and ensuring of material and child care, Provision of improved agriculture, Ensuring environmental sanitation.*

Others provided irrelevant responses. For example, one of the candidates wrote; *Types of energy used, local materials available, traditional and customs, eating pattern of the people.* Another wrote; *Medium of communication or language, Food fortification, Economic status, and Provision of clean water and sanitation.* These responses indicate that the candidates were unaware of the nutritional intervention programmes. Extract 17.2 is another sample of incorrect responses from the script of one of the candidates.

8 Pilot test: This occur first at area like in the specially village seen that suffer of lack of iron deficiency and provide the education and then may be given the medical in order to treat their peoples that can get this disease (for treatment).

Research development: After the few day are go at this village ~~then~~ provide the medicine to recover their medicine are performed worked well (function well) and seen the development of village first and after use.

Implementation: You seen in small areas this treatment you provide are let the benefits like proceed the benefits go another stage in order to be treated another large area.

Monitoring and Evaluation: This stage provide treatment for large areas like larger society in order to make the treatment for larger peoples.

Public education: This stage provide the education for the peoples that suffer of this problem for example. In this stage provide the education and encourage the peoples the way of prevent of this problem the way of treat this problem and effects that can get when get this problem of iron deficiency.

There fore, there are among of the factors that consider when successfully the programme. Peoples and Government together the deficiency of the food in the body are dangerous error because led to cause negative effect of ~~the~~ our body. So should make sure their diet balance diet food in order to prevent this error to occur.

Extract 17.2: A sample of incorrect responses to Question 8

In Extract 17.2, the candidate misinterpreted the question. He/she provided the methods of conducting a research instead of the factors to consider when planning a nutrition intervention programme.

2.2.9 Question 9: Food Microbiology

This question measured the candidates' competence on food poisoning specifically food intoxication. The question stated:

Explain three causes of food intoxication and three measures to control it.

The question was attempted by 189 (68.00%) candidates and 89 (32%) did not attempt it. The performance is illustrated in Figure 18.

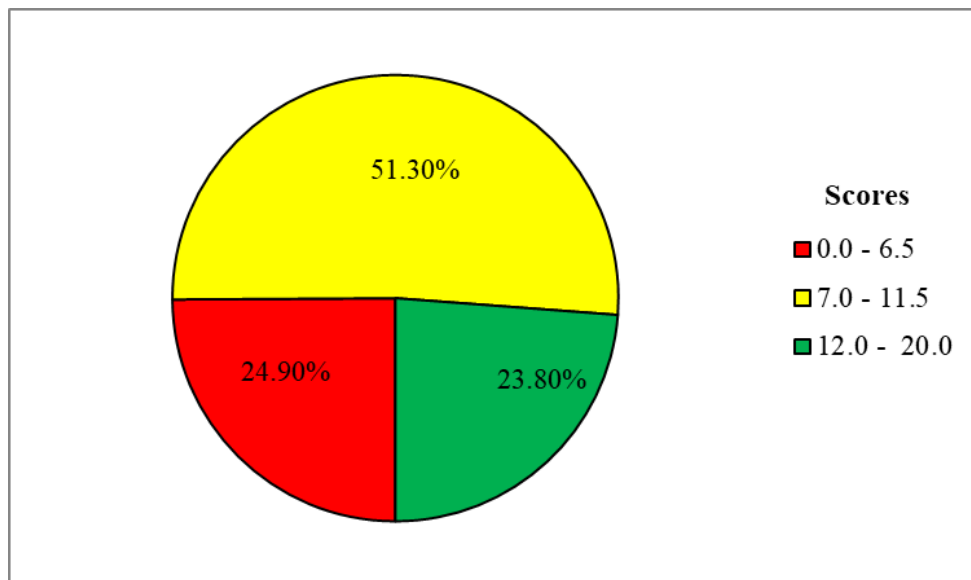


Figure 18: *Candidates' Performance on Question 9*

Figure 18 shows that the general performance of this question was good, 75.10 per cent of the candidates scored between average and above.

The analysis indicates that the candidates who scored high marks managed to provide the correct responses based on the question demand. For example, one of the candidates wrote; *presence of microorganisms, Natural toxins in food, and chemicals like pesticides*. Another candidate wrote; *improper drying of food crops (eg. Groundnuts), cross contamination of food, and poor hygiene in the kitchen and its surroundings*.

Furthermore, these candidates managed to provide control measures of food intoxication. For instance, one candidate wrote; *Ensure proper food hygiene and sanitation, proper food storage, proper preparation and cooking food at correct temperature*. Another candidate wrote; *improve sanitation around the kitchen and into the storage of the food and food products so microorganism does not grow, avoid contamination of food by*

microorganisms, ensuring hygienic condition during food preparation. These responses indicate that the candidates were aware of the food intoxication and how to control.

On the other hand, the analysis shows that 24.90 per cent of the candidates scored low marks. Some of them provided causes of food contamination instead of causes of food intoxication. For example, one of the candidates wrote; *Improper washing of food during preparing, cross contamination during preparation, improper handling of the food.* Another candidate wrote; *poor personal hygiene, favourable food for growth of microbial insufficient of heat treatment.* The analysis also reveals that some of them provided the symptoms of food poisoning instead of causes of food intoxication such as *vomiting, diarrhoea, stomach pain, fever, headache and stomach upset.* Other incorrect responses provided were such as *wearing gloves and apron during the food preparation in the kitchen.* An example of incorrect responses is shown in Extract 18.1.

9.	<p>Food intoxication; Refers to the food which contain toxic material thus being unacceptable to consume. Food toxin in the food can cause acute pain in the stomach. There are different causes of food intoxication, as follow.</p> <p>Microorganism; These are small organisms which can transmit the food. Example bacteria which allow food spoilage, thus make that food unacceptable to consumer, fungi also cause food spoilage that food are not able to consume.</p> <p>Incorrect recipe ratio during food processing; During food processing example during cooking process. The incorrect ratio of ingredient such as pillar mix cause food toxin, thus if the someone consume that food, can able to get stomach pain and diarrhoea.</p> <p>The use of expired ingredient; The spices which are responsible to be used must not be outdated. Because the use of outdated spices can cause food toxic.</p> <p>The following are measures to prevent food intoxication</p> <p>1) Re-heat or leftover food in order to prevent the action of microorganism to cause contamination and toxin in the food, thus why make that food safe to consume.</p> <p>The use correct recipe rather during food preparation; During the process of food contamination the good recipe ratio should be used so as to prevent the poison on the food and toxin.</p> <p>Read instruction before use of ingredient; This is done in order to prevent the use of outdated ingredient in the food thus cause food toxin.</p>
----	---

Extract 18.1: A sample of incorrect responses to Question 9

In Extract 18.1, the candidate misinterpreted the question as he/she provided some of the factors which can cause poor quality of the prepared meal (cooked food) instead of the causes of food intoxication. Moreover, the candidate provided responses on the measures to prevent food spoilage instead of controlling food intoxication.

2.3 155/3 FOOD AND HUMAN NUTRITION PAPER 3

This paper comprised 3 practical questions. The candidates were required to answer all the questions. Question 1 carried 20 marks while questions 2 and 3 carried 15 marks each. The questions were constructed from the following topics: *Food Composition, Technology of Specific products, and Processing and Preservation*. The following section provides the analysis of candidates' performance for each question:

2.3.1 Question 1: Food Composition

This question tested the candidates' ability on the concept of food composition, in particular, on food test and solubility. The candidates were provided with chemical reagents which are Benedict's solution, Iodine solution, Copper II Sulphate solution, Dilute Hydrochloric Acid, Sodium Hydroxide Solution and Distilled Water. Candidates were also provided with sample A - Glucose, B - Sucrose, C - Starch, D - Milk powder, Y - Fresh cow's milk, Z - Lime or Lemon juice, J - Adipose tissue of animal, K - Lime water. Then they were instructed to perform Experiment I, II, III, IV and V by following the given procedures and respond to the question given. The question stated;

In Experiment I

Mix 1 g of each of the samples A, B, C and D with 6 cm³ of water in separate test tubes then shake thoroughly. Leave the mixtures for 3 minutes.

Question

Briefly explain the changes observed after adding water to each sample in the given procedure.

Experiment II

(i) *Put 2 cm³ of a mixture of food sample A prepared in Experiment I into a test tube and then add 2 drops of iodine solution.*

(ii) *Put 2 cm³ of a mixture of food sample A into another test tube and then add equal volume of Benedict's solution then heat gently to boil.*

Questions

(a) *Record your observations and give explanations for each procedure.*

(b) *Why was the mixture boiled after the addition of Benedict's solution?*

Experiment III

- (i) Put 2 cm³ of a mixture of food sample **B** prepared in Experiment I into a test tube and then add equal volume of sodium hydroxide solution. Shake well then add 2 drops of 1% copper II sulphate solution.
- (ii) Put 2 cm³ of a mixture of food sample **B** into another test tube then add equal volume of Benedict's solution and heat gently to boil.
- (iii) Put 2 cm³ of a mixture of food sample **B** into another test tube thereafter, add 1 cm³ of dilute hydrochloric acid and boil. Then, cool under tap water. Add 2 cm³ of sodium hydroxide solution, shake the mixture well and add 2 cm³ of Benedict's solution, heat gently to boil.

Questions

- (a) Briefly explain what was observed in procedure (i).
- (b) State the role of dilute hydrochloric acid and sodium hydroxide solution in procedure (iii).
- (c) Briefly explain the importance of boiling and cooling the mixture after the addition of dilute hydrochloric acid in procedure (iii).

Experiment IV

- (i) Put 2 cm³ of a mixture of food sample **C** prepared in Experiment I into a test tube then add equal volume of Benedict's solution. Heat gently to boil.
- (ii) Put 2 cm³ of a mixture of food sample **C** into another test tube, boil the mixture then cool. Add 2 drops of iodine solution.

Questions

- (a) Briefly explain the observations and inferences in experiment IV.
- (b) Why was the mixture containing food sample **C** boiled and cooled before adding iodine?

Experiment V

Put 2 cm³ of a mixture of food sample **D** prepared in Experiment I into a test tube then, add equal volume of sodium hydroxide solution followed by 2 drops of 1% copper II sulphate solution. Write your observation.

Question

What does Experiment V demonstrate?

The question was attempted by 278 (100%) candidates. Among them 148 (53.20%) scored from 12.0 to 18.5 marks, 103 (37.10%) scored from 7.0 to

11.5 marks and 27 (9.70%) scored from 2.0 to 6.5 out of 20 marks. Figure 18 illustrates this performance.

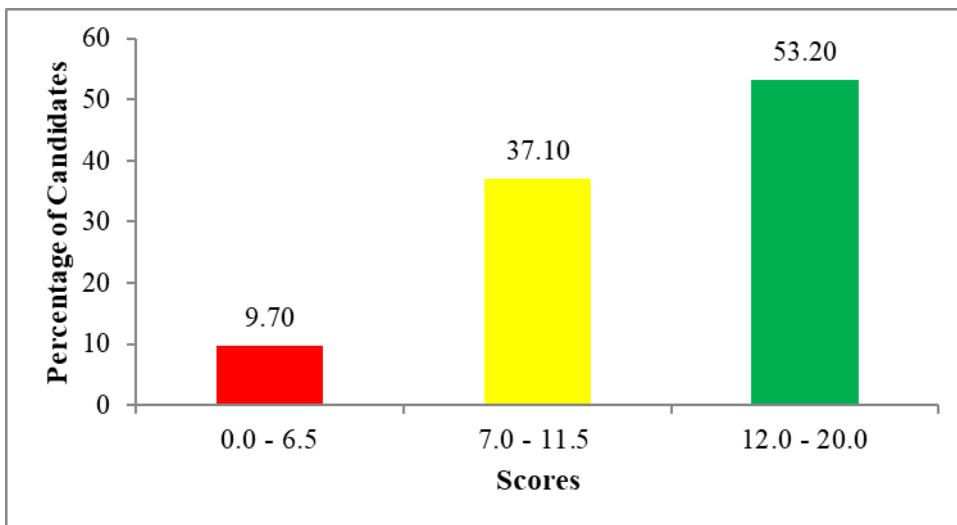


Figure 18: *Candidates' Performance on Question 1*

Based on the analysis in Figure 18, the general performance in this question was good, since 90.30 per cent of the candidates passed by scoring 7.0 or above.

The analysis indicates that some of the candidates with good performance (53.20%) knew how to identify types of nutrients present in the food samples given. The candidates were able to; observe the changes that took place during the experiment and give correct explanations. In Experiment I, candidates managed to provide correct responses because they understood that when water added to food samples they will dissolve differently according to their solubility. For example, one of the candidates wrote, *Sample A is soluble in water, sample B soluble in water, sample c is practically soluble in water, sample D is soluble in water*. Others mixed up correct and incorrect responses. For example, one of the candidates wrote, *sample A soluble in water, sample B did not soluble in water, sample c soluble in water, sample D soluble in water*.

In Experiment II, candidates observed correctly that there is no colour change even after the addition of iodine solution in procedure (i). They managed to provide correct explanation due to adequate knowledge they had on food test. They were aware that iodine solution in food test is used to confirm the presence of starch. Therefore, when they observed no color

change they conclude that starch is absent in a given food sample. For example, one of the candidates wrote; *When 2 drops of iodine solution added in food sample A, the food mixture retained the color of iodine solution, showing that starch is absent.* Likewise, in procedure (ii), candidates observed series of color change from blue to green, yellow, orange and finally brick red. For example, one of the candidates wrote, *the mixture was changes the color from blue, green, yellow, orange and brick red. Showing the reducing sugar present.* Moreover, the candidates managed to provide reason(s) why was the mixture boiled after addition of Benedict's solution. They understood that heat speed up the chemical reaction. For example, one of the candidates wrote, *the mixture was boiled in order to activate the benedicts' solution to work properly.*

In Experiment III, candidates correctly observed no colour change even after the addition of sodium hydroxide solution followed by drops of copper II sulphate solution in food sample B in procedure (i). They managed to provide correct explanation due to adequate knowledge they had on food test. They were aware that sodium hydroxide and 1% copper II sulphate solutions in food test is used to confirm the presence of protein. Therefore, when they observed no color change they conclude that protein is absent in a given food sample. For example, one of the candidates wrote, *the mixture of sample B retain the color of coper II sulphate showing protein is not present.*

Further analysis shows that candidates were able to state the role of dilute hydrochloric acid and sodium hydroxide solution in procedure (iii). For example, one of the candidates wrote, *Hydrochloric acid to break the complex sugar into simple sugar. Sodium hydride to neutralize the acid.* However, the analysis shows that these candidates managed to explain the importance of boiling and cooling the mixture after the addition of dilute hydrochloric acid in procedure (iii). They understood that boiling helps to break up the bond between the disaccharide while cooling helps in adjusting the temperature. For example, one of the candidates wrote, *the mixture was boiled to break up the bond and cooling of mixture helps in controlling the temperature of the solution.*

In experiment IV, the candidates correctly observed no colour change even after the addition of Benedict's solution in food sample C in procedure (i). They managed to provide correct explanation due to adequate knowledge

they had on food test. They were aware that Benedict solution in food taste is used to confirm the presence of reducing sugar. Therefore, when they observed no color change they conclude that reducing sugar is absent in a given food sample. For example, one of the candidates wrote, *observation when a mixture of sample c was heated gently after addition of benedicts' solution the mixture of sample c retained the color blue of benedicts' solution. The inferences showing that reducing sugar was absent in food.* In procedure (ii), they managed to provide correct observation and explanation on why the mixture boiled but failed to provide the reason why the mixture cooled before adding iodine solution. They were aware that boiling of the starch granules cause them to burst and release starch paste.

Moreover, in experiment V, the candidates correctly observed colour change when sodium hydroxide solution was added in food sample D followed by 2 drops of 1% copper (II) sulphate solution. They managed to provide correct explanation due to adequate knowledge they had on food test. They were aware that sodium hydroxide solution and 1% copper (II) sulphate solution in food test is used to confirm the presence of protein. Therefore, when they observed color change to purple or violet they conclude that protein is present in a given food sample. For example, one of the candidates wrote, *when 2 cm³ of sodium hydroxide solution was added in 2cm³ of food sample D followed by 2 drops of 1% copper (II) sulphate solution. The food mixture turned into violet.* However, some candidates misunderstood the demand of the question in some parts, hence they failed to score all the 20 marks allotted in this question.

In contrast, 9.70 per cent of the candidates had weak performance as they scored low (2.5 - 6.5) marks. The majority of the candidates in this category misinterpreted the experiment, hence they provided incorrect responses to some procedures and questions. In Experiment I – V, some candidates managed to report the observation correctly but failed to provide correct explanations. For example, one candidate provided irrelevant explanation like; *water become swell and burst* in Experiment I. Another candidate provided only the changes observed in Experiment II without responding to question (a) and (b), hence lost some marks. In Experiment (iii), some candidates provided incorrect observations and role of dilute hydrochloric acid and sodium hydroxide solution in procedure (iii). For example, one of the candidates wrote, *the sample B was added sodium hydroxide and copper II sulphate solution which make the blue colouration*

to be observed. The role of hydrochloric acid and sodium hydroxide is to determine the presence of non-reducing sugar in the food. Likewise, in Experiment IV, some candidates failed to write down their observations and explanations. Instead, they provided response to the questions only. For example, one candidate wrote; *the mixture containing food sample C boiled and cooled before adding iodine to enhance the release of starch granules and maintain the temperature.* In Experiment V, the candidates provided incorrect responses as they observe no color change and absence of food nutrient. For example, one of the candidates wrote, *no color change due to presence of starch, starch is colourless.* These candidates provided a mixture of correct and incorrect responses, hence scoring low marks. Others skipped this part. This implies that the candidates lacked enough knowledge about food composition specially food test. Extract 19 is a sample of responses from a candidate who scored lower marks.

Q1. Briefly explain what ^{changes} was observed in procedure & after adding water				
I	Experiment	Procedure	Observation	Explanation to observation
	sample A	- Mix 1 g of sample A with 6 cm ³ of water (H ₂ O) in a test tube, then shake it thoroughly - Then leave the mixture for 3 minutes	sample A dissolved completely	- The sample A dissolved completely in cold water after 3 minutes because the sample is soluble in H ₂ O
	sample B	- Mix 1 g of sample B with 6 cm ³ of water in a test tube, then shake the mixture thoroughly - Then leave the mixture for 3 minutes to settle	sample B dissolved completely	- The sample B dissolved completely in cold water after 3 minutes. This is because sample B is soluble in water (H ₂ O)
	sample C	- Mix 1 g of sample C with 6 cm ³ of water in a test tube then shake the mixture thoroughly - Then leave the mixture for 3 minutes to settle	sample C did not dissolve in cold water completely	- The sample C did not dissolve in H ₂ O completely because sample C is insoluble in water.
	sample D	- Mix 1 g of sample D with 6 cm ³ of water in a test tube then shake the mixture thoroughly - Then leave the mixture for 3 minutes	sample D dissolved completely	- The sample D dissolved completely because it is soluble in water.

01 EXPERIMENT I			
Experiment	Procedure	Observation	Explanation to observation
sample A	i. Place 2cm ³ of a mixture of food sample A prepared in experiment I into a test tube then add 2 drops of iodine solution	- It changed its colour to brownish blue	- The sample A changed its colour due to the addition of the iodine solution
	ii. Put 2cm ³ of mixture of food sample A into another test tube and then add equal volume of benedict's soln then heat gently to boil	- colour changed from blue to pale green, then to yellow finally to orange	The sample A changed its colour due to the presence or addition of benedict's soln

Q Why was the mixture boiled after addition of Benedict's soln
 => To test the presence of the reducing or non-reducing sugar present in the sample substances

EXPERIMENT II

Experiment	Procedure	Observation	Explanation to observation
sample B	i. Put 2cm ³ of a mixture of sample B then add NaOH shake well then add 2 drops of 1% of CuSO ₄ soln	- The solution changes the colour from nearly colorless to blueish colour and the white ppt were formed	- The colour change after the addition of NaOH sodium hydroxide then followed by CuSO ₄ copper II sulphate with the formation of white ppt.

Q1 a	Experiment	Procedure	Observation	Explanation to observation
		P, Put 2cm ³ of mixture of food sample B into another test tube	-The solution changed from blue to green	-The solution changed from blue to green due to the addition of Benedict's soln and presence of heat.
		add 1cm ³ of dilute Benedict's soln and boil.		
		-Cool under tap water		
		-with NaOH soln, shake well		
		R, Put 2cm ³ of mixture of food sample B into another test tube, add dilute HCl and boil	-The solution changed its colour from blue to green, then followed to yellow finally to brown.	-The solution changed its colour due to presence of HCl, NaOH and Benedict's solution with presence of heat.
		Then cool under tap H ₂ O, Add 2cm ³ of NaOH (sodium hydroxide) and shake the mixture.		
		add 2cm ³ of Benedict's soln, heat gently to boil		
	b) Role of dilute HCl and NaOH			
	⇒ They act as acidic value and basic value which used to increase the reaction the sample solution and decrease the reaction due presence of NaOH which has low pH value.			
	c) Importance of boiling and cooling the mixture after addition of HCl			
	⇒ Boiling the mixture to observe the changes in the solution and cooling mixture to reduce effect which may occur due to the presence of HCl.			

Q1 EXPERIMENT IV				
Experiment	Procedure	Observation	Explanation to observation	
sample c	Put 2cm ³ of a mixture of food sample c then add equal volume of benedict's solution -	- Both changed its colour from white to blue, then after heating effervescence occurred	- The sample c solution changed its colour due to the presence of benedict's solution	
	- Heat gently to boil			
	- Put 2cm ³ of a mixture of food sample c into another test tube, boil the mixture then cool - then add two (2) drops of iodine solution	- The sample c solution changed from white to blue black	- The sample c solution changed from white to blue black which shows that starch is present in the sample c solution	
b) => it was boiled then cooled before adding iodine so as to have better test of starch solution				
EXPERIMENT V				
Experiment	Procedure	Observation	Explanation to observation	
sample D	Put 2cm ³ of sample D into a test tube then add NaOH followed by 2 drops 1% of CuSO ₄ solution.	- The sample D changes its colour from white to light purple colour	- The sample D solution changes its colour from white to light purple colour due to presence of NaOH and CuSO ₄	

Extract 19: A sample of incorrect responses to Question 1

In Extract 19, the candidate failed to provide correct response in all parts of the four Experiment except for Experiment I where she/he managed to provide some correct observations.

2.3.2 Question 2: Technology of Specific Products

This question tested the candidates' understanding of the concept of raising agents specifically baker's yeast. The question stated as follows;

You are provided with white wheat flour, sugar and baker's yeast. Perform the experiment by following the given procedures and answer the questions that follow.

Experiment I

Procedures:

- (i) Heat 250 ml of tap water in a beaker to about 37 °C.*
- (ii) Pour 10 ml of water from procedure (i) into a plastic beaker. Dissolve 1 tea spoon of yeast followed by 2 tea spoons of sugar then mix using stirring rod. Leave the mixture to stand for ten minutes.*
- (iii) Sieve 250 g of white wheat flour into a small mixing bowl then add a pinch of salt.*
- (iv) Put the mixture obtained in procedure (ii) and the warm water prepared in procedure (i) into the mixing bowl containing 250 g of white wheat flour.*
- (v) Mix the contents quickly to form a soft dough which is elastic and pliable.*
- (vi) Knead the dough vigorously by hand.*
- (vii) Place the mixing bowl containing the dough into a bigger bowl that contains warm water about (25-30)°C then cover the dough with a muslin cloth. After 30 minutes, observe the changes that take place.*

Questions

- (a) State the types of raising agents that are demonstrated in this experiment.*

- (b) Briefly explain four methods that were involved in incorporating air into the flour mixture in the process of making dough in this experiment.
- (c) What is the importance of procedure (vi) in making bread and buns?
- (d) Briefly explain the next procedure to be followed in order to obtain the final product.
- (e) Name and write the chemical equations of the processes taking place in the reactions demonstrated in procedure (ii) – (vii).
- (f) Give one benefit of each end product obtained in this process.

The question was attempted by 281 (100%) candidates. Analysis shows that, 134 (47.70%) candidates scored from 9.0 to 15.0 marks, 60 (21.30%) scored from 5.5 to 8.5 marks and 87 (31.00%) scored from 0.0 to 5.0 marks. Figure 19 is a summary of this performance.

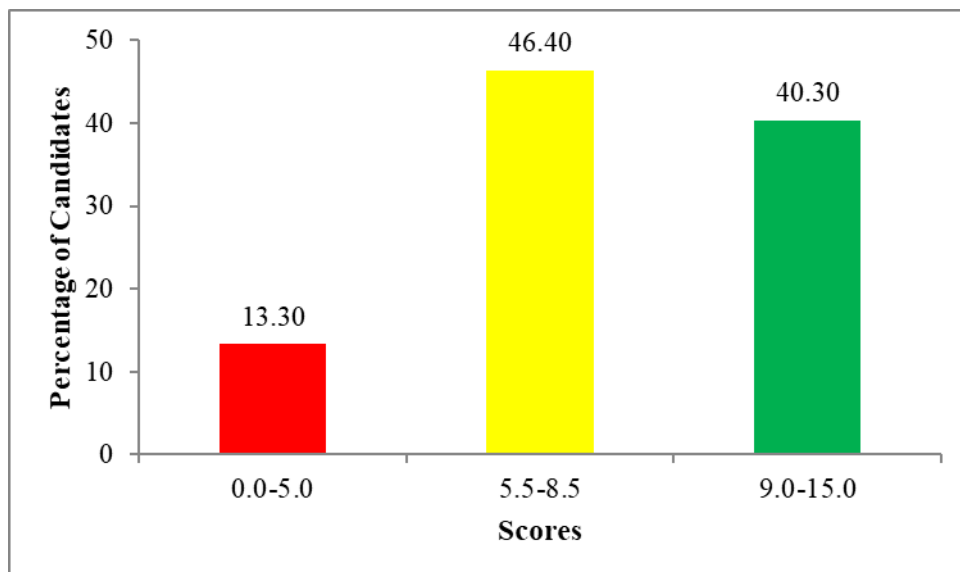


Figure 19: Candidates' Performance on Question 2

Figure 19 shows that the general performance in this question was good because 86.70 per cent of the candidates scored 5.5 or above.

The analysis of the candidates' responses shows that the candidates (40.30%) who scored from 9.0 to 15.0 marks demonstrated adequate practical skills and understanding on raising agents. In step (i) – (vii), the candidates managed to perform the experiments, record the changes that

took place and provide correct explanations. They observed changes in size when yeast was added to the dough. For example, one of the candidates wrote, *the flour dough has raised due to the production of the carbondioxide gas by yeast*. Another candidate wrote, *after 30 minutes the dough raised up, yeast ferment to produce CO₂ and alcohol, CO₂ produced act as raising agent which help the dough to rise*.

Further analysis shows that the candidates correctly responded to the questions asked. Majority of them wrote biological raising agent for question (a). For example, one candidate wrote, *biological raising agent*. However, few candidates were able to provide all types of raising agents that were demonstrated in the experiment which are mechanical and biological raising agents. Likewise, in question (b), some of the candidates correctly explained four methods that were involved in incorporating air into the flour mixture. For example, one candidate wrote, (i) *setting the sponge - mix yeast and sugar together, air is incorporated in the mixture*. (ii) *Sieving - when flour is sieved, air is trapped between its particles*. (iii) *Mixing - mixing allows air to be incorporated into the flour mixture*. (iv) *Kneading - allows the distribution of air more evenly throughout the mixture thus, making gluten to absorb moisture and stretch for better volume and gas retention*. Other candidates provided two to three methods instead of four hence scored less marks.

In question (c) candidates correctly provided the importance of kneading in making bread and buns. They understood that kneading ensures a thorough distribution of yeast in the dough and also helps to strengthen gluten and make it more elastic. For example, one of the candidates wrote, *when kneading the dough make gliadin and glutenin (protein) to combine to form matrix like or gluten which help to trap air and raising of product such as bread and buns to rise well*.

In question (d) candidates correctly explained the next procedure to be followed in order to obtain final products. They managed to provide correct explanation because they are aware about the procedures for making bread/buns. These candidates understood that kneading is not the last procedure, there are other procedures like re-kneading, shaping, proving- and lastly baking. For example, one of the candidates wrote, *Baking, during baking heat is applied and CO₂ gas produced by raising agents rise the dough and the color changes to brown*.

Moreover, the candidates managed to provide the reaction and the chemical equation for fermentation process in question (f). For example, one of the candidates wrote, *the name of the reaction is fermentation and the chemical equation is $C_6H_{12}O_6(aq) \longrightarrow 2C_2H_5OH(aq) + 2CO_2(g) + 2ATP$.*

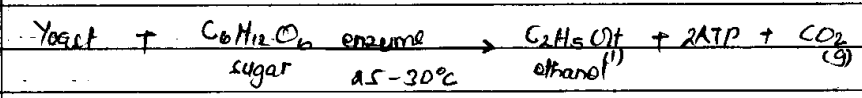
In question (f) the candidates managed to provide the benefit of the end product obtained in the process. For example, one of the candidates wrote, *CO₂ produced used as raising agent, help to raise the dough. Ethanol produced contributed to the aroma of the product and ATP this help to provide energy to the living organisms.* Extract 20.1 is a sample of correct responses under this category.

2.	
	Answers.
	(a) The type of raising agents that are demonstrated in this experiment are
	i. Biological raising agent, that is yeast
	ii. Mechanical raising agent, through sieve wheat flour
	(b) Methods that were involved in incorporating air are.
	(i) Sieving.
	- The wheat flour when sieved with a pinch of salt, will help in incorporating the air to the flour.
	(ii) Kneading.
	- Through kneading a dough, air incorporated into the flour mixture that help it to raise.
	(iii) Creaming.
	- During the mixing of yeast with sugar, this help to the incorporation of air into the flour
	(iv) Mixing
	- when mixing the content of yeast, sugar and wheat flour help in the incorporating the air

(b) Importance of procedure (vi) are
 i. It help in mixing a dough.
 ii. It help to develop the gluten that found in wheat flour that hold the carbon dioxide gas and cause the flour mixture to raise.

2. (d) The next procedure to be followed to obtain final product is Baking. This procedure involves the application of heat on the dough made. This is done in an oven, this procedure help to get the product that is easy to digest and brown in colour.

(e) The process is Fermentation
 - Yeast ferment under the presence of sugar, enzyme and optimum temperature, to produce alcohol, ATP and CO₂ gas.



(f) Benefit of
 (i) Ethanol
 - This is alcohol produced in fermentation that used in brewing industries in manufacturing of beer and wine.

(ii) Carbon dioxide gas (CO₂)
 - This help in the raising of the dough, CO₂ used produced is then holded by the gluten in wheat flour and cause to expand to increase the volume.

(iii) ATP
 - This help in the providing energy to the living organisms, as the energy is a carrier of energy in the body.

Extract 20.1: A sample of the correct responses to Question 2

Extract 20.1, illustrates a sample of responses from the candidate who provided correct responses in all questions but leave question (f) unattended hence failed to score all 15 marks allotted for this question.

On the other hand, the candidates who scored below 5.5 marks had inadequate knowledge about raising agents. Hence, they failed to respond correctly to the questions. Some of these candidates recorded incorrect observations and therefore, provided incorrect explanations. Others skipped observation and explanation part. Majority of the candidates mixed correct and incorrect responses hence failed to score high marks. For example, one candidate wrote, *type of raising agent used is yeast* in question (a). In part (b) *methods used are collecting ingredients, collecting tools, washing hands, mixing the ingredients.* (c), *it is important to knead the dough* (d) *baking* (e) C_6HO —————> C_2H_5O , (f) *help in baking*. Some of the responses provided by the candidates under this category imply that the candidates had inadequate knowledge on raising agents and bread making procedures while other candidates misinterpreted the question. Extract 20.2 is a sample of responses from one of the candidates with weak performance.

29	In experiment I
	Observation:
	After placing the mixing bowl which containing the dough into a bigger bowl that contains warm water about 25-30°C then cover the dough with muslin cloth after 30 minutes the dough will formed have ability to be moulded into different shapes and also the colour which is cream colour is formed on the upper surface of the dough.
a)	The types of raising agents that are demonstrated in this experiment is baker's yeast and bicarbonate of soda.
b)	The following are the methods which used to incorporating air into the flour mixture in the process of making dough in this experiment is
i)	Sieving process: This is the process whereby during sieving of wheat flour it allow air to trap in the flour hence aid the dough to rise.

2bii	Beating of an egg - during beating of the eggs into the mixture of sugar and fat it allow air to trap in into the mixture hence the air will incorporating into the flour mixture during dough making.
iii	Whisking process: This is the process which involve the whisking of the flour mixture in order to incorporate the air in the flour mixture during dough making.
iv	spreading process: This is the process whereby during spreading of the dough it allow air to incorporate in the flour mixture during dough making.
c)	The importance of procedure (vi) in making bread and buns is to make the dough to rise and be moulded into different shapes.
d)	The next procedure to be followed is rising the dough in order to be moulded into different shapes in order to obtain the final product.
e)	The following are the chemical equation: $\text{glucose} + \text{yeast} \xrightarrow{28-30^{\circ}\text{C}} 2\text{CO}_2 + \text{C}_2\text{H}_5\text{OH} + \text{energy (ATP)}$
	This is the reaction of glucose and yeast under presence of 28-30°C temperature which form carbon dioxide, alcohol and energy.
f)	The benefit of each product obtained in this process is
i)	It act as a source of food.
ii)	It aid in fermentation process.

Extract 20.2: A sample of incorrect responses to Question 2

In Extract 20.2, the candidate provided correct and incorrect responses to experiment but most of the responses were incorrect in this question which lead the candidate to score low marks

2.3.3 Question 3: Food Processing and Preservation

This question tested the candidates' competence on food processing and preservation. The question stated;

You are provided with 80 ml of food sample Y (cow's milk), solution Z (lime or lemon juice), a cooking pot or a sauce pan and a source of heat. Perform the experiment by following the given procedure and answer the questions that follow.

Experiment I

Procedure:

- (i) Put 50 ml of sample Y in a sauce pan and heat it uncovered at high temperature (70⁰ C and above) until it boils. Continue heating for 5 minutes and remove it from the heat source. Observe and record changes in volume and appearance. Leave it to cool for 10 minutes and record your observations.*
- (ii) Take 5 ml of sample Y from the cooled sauce pan in procedure (i). Put it into a porcelain dish and heat to boil at high temperature (70⁰ C and above) until it starts burning. Remove from the heat source and record your observation.*
- (iii) Put 10 ml of sample Y into a beaker and add equal volume of solution Z. Leave the mixture to stand for 5 minutes. Observe and record.*

Questions

- (a) Identify sample Y.*
- (b) Briefly explain the basis of the observed changes in procedures (i) and (ii).*
- (c) Name the reaction demonstrated in procedure (ii).*
- (d) Briefly explain what was observed when solution Z was added into the beaker containing sample Y in procedure (iii).*
- (e) Name the starter culture which is used to ferment sample Y and write the chemical reaction involved in this process.*

(f) State the form of sugar that is present in sample Y.

The question was attempted by all 278 (100%) candidates. The analysis shows that 4 (3.60%) candidates scored from 9.0 to 11.0 marks, 160 (57.60%) scored from 5.5 to 8.5 marks, and 108 (38.80%) scored from 1.0 to 5.0 marks. Figure 20 summarises the distribution of their scores.

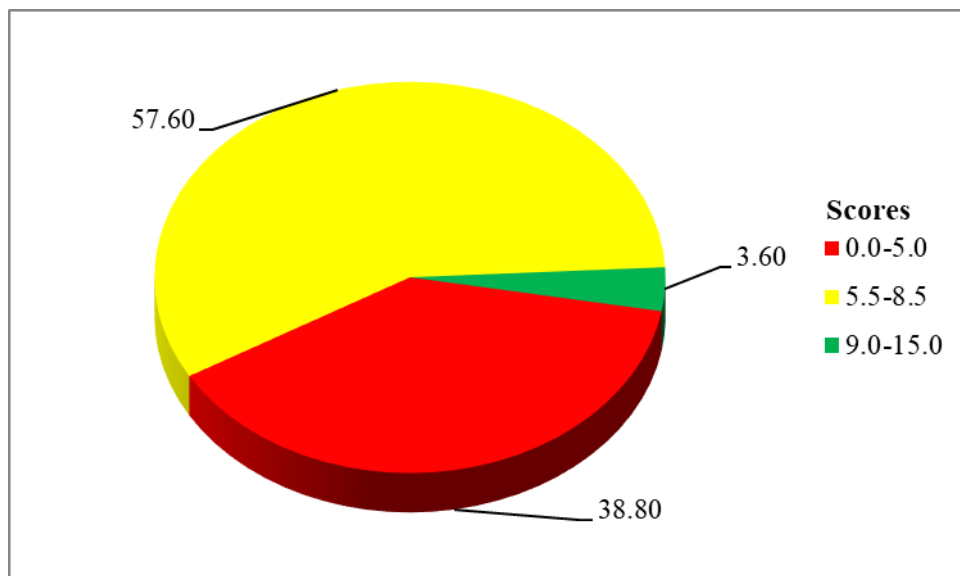


Figure 20: Candidates' Performance on Question 3

Figure 20 shows that the general performance in this question was good because 61.20 per cent of the candidates scored 5.5 or above.

The analysis of the candidates' responses indicates that the candidates (3.60%) who performed well in this question had adequate knowledge about food processing and preservation. These candidates managed to provide correct responses for each question. They managed to identify sample Y as they stated that sample Y is fresh cow's milk in question (a). For example, one of the candidates wrote, *Fresh cow's milk*. Another wrote, *Fresh milk* and others wrote, *milk*. In question (b), the candidates managed to provide explanation based on observed changes in procedure (i). They observed decreased in volume of sample Y due to evaporation of water from the sample. They observed formation of skin layer on top of the cooking sauce pan due to concentration of casein after evaporation of water. In procedure (ii), the candidates managed to provide correct explanation as they wrote brown colour observed was due to reaction between lactose and amino acids present in milk. For example, one of the

candidates wrote, upon further heating of sample Y at high temperature of above 70°C , Sample Y started burning turning brown in color with a sweet smell and fumes of burnt features indicating presence of animal protein in sample Y. Furthermore, in equation (c) candidates managed to provide correct response that the reaction is called Maillard reaction. In equation (d) procedure (iii) some of the candidates managed to provide correct observation and explanation when lime/lemon juice mixed with milk. They observe coagulation of milk due to the reduction of stability of casein micelles. These candidates understood that adding acid to milk decreased its stability and make it curdle. For example, one of the candidates wrote, *milk coagulate forming whey and curd since sample Z is acidic in nature.*

Moreover, in question (e), they managed to name the starter culture which is used to ferment milk, and correct chemical reaction involved in the process of fermentation. For example, one of the candidates wrote, *starter used was the culture of lactobacillus. Equation; milk + lactobacillus _____ curd + whey.* In equation (f) the candidates managed to state correctly form of sugar that is present in milk. They understood that milk contain Lactose sugar. However, some candidates failed to provide observation and explanation to procedure (i) while, others misinterpreted some parts of the question. Hence, they failed to score all the 15 marks allotted in this question. Extract 21.1 is a sample of responses from one of the candidates under this category.

3	Observation
→	The volume of sample Y had reduce due to the evaporation of water during heating of the sample.
→	When the sample was left to cool for ten minutes it formed a yellow layer on top. of the the which is a fat layer

In procedure I
When the sample Y was heated its volume had decrease due to evaporation of water and it appeared into milky colour.
In procedure II
It produces a sugar like burning smell since that
3 the sugar that was present in sample Y was burning.
In procedure III
The mixture sample Y had coagulate due to the addition of sample Z which is acidic in nature.
a) Sample Y is milk.
b) The basis was the formation of layer. layer on top of the milk and the burning of sugar that is present in milk.
c) The reaction was millard reaction.
d) The solution Z when was added to the milk it had make the milk to coagulate thus forming the whey and curd, since because the sample Z is acidic in nature thus cause the milk to coagulate.
e) The starter culture is bacteria that is used to form nt sample Y
f) The form of sugar is lactose sugar.

Extract 21.1: A sample of the correct responses to question 3

In Extract 21.1, the candidate provided correct responses. The responses provided indicated that the candidate had adequate knowledge on the tested area.

On the other hand, 108 (38.80%) candidates who scored low marks had inadequate knowledge about food process and preservation. The majority of them managed to identify sample Y correctly in question (a) but some failed to do so. For example, one candidate wrote, *sample K is white liquid*. A few candidates misunderstood question (b), procedure (i) hence provided irrelevant responses. For example, one of the candidates provided the function of acid such as; *lime juice cause milk to curdle*. Others skipped this part. Likewise, in question (c), the candidates failed to provide correct responses as they provided wrong reaction. For example, one of the candidates wrote, *brown reaction*. Others wrote, *Test for protein*. This reveals that these candidates lacked knowledge on non-enzymatic browning.

In question (d), some of the candidates correctly report what they observed, but failed to provide correct explanation. For example, one of the candidates wrote, *when solution Z was added in the beaker containing sample Y it makes the sample Y to undergo fermentation*. Most of the candidates in question (e) misunderstood the question, hence they provided irrelevant responses. For example, one candidate wrote down the sample used in this experiment such as: *The starter culture which used to ferment sample Y was lime water, chemical reaction is $6CO_2 + 3H_2O$* . Others wrote, *Starter culture used to ferment sample Y is Acid, chemical reaction is Milk Yeast whey + curdle*. In question (f), the candidates were not aware that milk contains lactose sugar hence provided irrelevant responses. For example, one of the candidates wrote, *white sugar*. Another wrote, *sucrose*. Extract 21.2 is a sample of responses from one of the candidates under this category.

03. Experiment I

Observation for procedure (i)

- When sample X was left to boil, the volume of the sample X after boiling it was decreased and the appearance of the sample X after heating changed to less cloudier.

Observation for procedure (ii)

- When 5ml of sample X from the condensed sauce pan was heated until it starts burning it produces out the flame of the burning feathers which shows that sample X contain the protein of animal origin sugar and left the ashes which could not burn away.

QUESTIONS

a) Sample X is ^{fresh} Milk.

b) When fresh milk in procedure (i) was left to boil, the heat broke down the hydrogen bonds present in sample X which made the milk to come to boil.

- After boiling the kinetic energy present in sample X increased moving which also increases the volume.

c) The reaction demonstrated in procedure (ii) is Caramelization.

3:	d) When solution 2 was added into the beaker containing sample Y in procedure (iii) coagulation occurred in which the sample Y separated into two parts which are whey and curds.
	e) The starter culture which is used to ferment sample Y is yeast ^{acid} enzyme
	Milk $\xrightleftharpoons{\text{Yeast}}$ Whey + Curdle
	f) The form of sugar that is present in sample Y is Monosaccharide

Extract 21.2: A sample of incorrect responses to Question, 3

In Extract 21.2, the candidate provided incorrect responses to other questions except question (a) and (d) hence he/she scored low marks. This shows that the candidate had inadequate knowledge on food processing and preservation.

3.0 ANALYSIS OF CANDIDATES' PERFORMANCE PER TOPIC

The 155 Food and Human Nutrition examination 2025 was constructed from 11 topics with the total of 21 questions.

The candidates performed well on the topics of *Food quality and safety* (89.90%), *Catering and Institutional Feeding* (88.40%), *Technology of Specific Products* (88.25%), *Nutrition Program, Planning and Intervention* (85.47%), *Malnutrition* (69.25%), *Food Storage* (65.05%) and *Food Composition* (63.30%). The good performance in these topics is an indication of candidates' adequate knowledge of the concepts of the subject matter, understanding of the requirements of the respective questions and sufficient practical skills.

The candidates had average performance on the topics of *Food Processing and Preservation* (51.35%), *Nutrient Requirement* (47.10%) and *Food Microbiology* (46.30%).

The candidates who performed averagely had relatively adequate knowledge about the concepts of the subject matter. They provided partial responses and lacked clarity in explanations of the mentioned points. Furthermore, *Food Production (7.90%)* topic had weak performance. Candidates with weak performance had inadequate knowledge about the concepts of the subject matter. They provided partial responses and lacked clarity in explanations of the mentioned points

Topic-wise comparison of the candidates' performance in the year 2024 and 2025 shows that the candidates' performance in the ACSEE 2025 topics has improved in some topics, decreased in other topics, and remained the same in a few others. The candidates' performance has improved from weak to good in the topic of *Nutrition Program Planning and Intervention*, average to good in the topics of *Food Storage* and *Technology of Specific Products*. In addition, the candidates maintained good performance on four topics namely; *Food Quality and Safety*, *Malnutrition*, *Catering and Institutional Feeding*, and *Food Composition*; whereas the candidates maintained average performance on the topic of *Nutrient Requirement*. Furthermore, the candidates' performance has decreased from good to average in *Food Processing and Preservation* and *Food Microbiology* topics. In addition, candidates' performance has decreased from good to weak on the topic of *Food Production*. This comparison is presented in Appendix B.

4.0 CONCLUSION

This section provides an overall analysis of candidates' performance in the Food and Human Nutrition subject in the 2025 ACSEE examination. Based on the analysis made in this report, the general performance was good because 99.64 per cent of the candidates who sat for this examination passed. However, 0.36 per cent of the candidates scored low pass grades.

An analysis of the candidates' responses indicates that those who attained high scores possessed a thorough understanding of the assessed concepts and exhibited strong practical skills in addressing the questions. This enabled them to respond correctly to the questions and meet the requirements of the questions in the theory and practical examinations.

On the other hand, the low marks obtained by some candidates were attributed to factors such as inadequate knowledge of the subject matter, which led to partially correct responses; incorrect answers to some parts of

the questions; providing fewer points than required; and a general failure to understand the demands of the questions. Moreover, the candidates demonstrated inadequate practical skills, which led to their failure to correctly follow procedures in the practical examination. Weak performance on individual questions was observed in those drawn from the topics of Food Production and Food Microbiology in paper 1 and 2, respectively.

5.0 RECOMMENDATIONS

To improve the candidates' performance in the Food and Human Nutrition subject, the following are recommended:

- (a) Ministry of Education, Science and Technology should bring together and/or coordinate experts to prepare the text book (s) as well as a practical guide for Food and Human Nutrition subject for Advanced Secondary Education. These are important tools in the teaching process to enable uniformity and ensuring quality in the transfer of knowledge and application of practical skills.
- (b) Teachers should guide students to carry out enough practical lesson on different topics. A practical lesson helps to implement theory in real life activities, hence sufficient practical lessons will help students master the topics.
- (c) Teacher should invite guest speakers to explain about the concept of food and human nutrition in order to increase students understanding on food microbiology and food production concepts. This may help to engage students in broadening their knowledge, hence improving the performance on the topics of Food Microbiology and Food Production.
- (d) Teachers should organise study tours to various Food and Nutrition institutions for the students to learn more about food composition specifically on laboratory analysis of different food staffs, food processing and preservation and food microbiology. This will provide practical along with theoretical knowledge hence, improve their understanding and increase performance on those topics.
- (e) Students should be given exercises, test, and assignment regularly as these will motivate them to learn and familiarize in answering questions. Likewise, teachers should provide timely feedback as it improves students learning.

- (f) Students should build the habit of reading each question carefully to ensure that they clearly understand its requirement before attempting it.
- (g) Students should concentrate on their studies and solve various questions in the Food and Human Nutrition subject to ensure that they internalize the concepts taught under each topic.

Appendix A: Summary of Candidates' Performance per Topic in ACSEE 2025

S/N	Topic	Number of questions	The average of percentage of candidates who scored 35% or above	Remarks
1.	Food quality and safety	1	89.90	Good
2.	Catering and Institutional Feeding	2	88.40	Good
3.	Technology of Specific Products	2	88.25	Good
4.	Nutrition Program, Planning and Intervention	3	85.47	Good
5.	Malnutrition	2	69.25	Good
6.	Food Storage	2	65.05	Good
7.	Food Composition	2	63.30	Good
8.	Food Processing and Preservation	2	51.35	Average
9.	Nutrient Requirement	2	47.10	Average
10.	Food Microbiology	2	46.20	Average
11.	Food Production	1	7.90	Weak

Appendix B: Comparison of Candidates' Performance per Topic between 2024 and 2025

S/N	Topic	2024			2025		
		Number of questions per topic	The average percentage of candidates who scored 35% or above	Remarks	Number of questions per topic	The average percentage of candidates who scored 35% or above	Remarks
1.	Food quality and safety	1	95.36	Good	1	89.90	Good
2.	Food Production	1	76.52	Good	1	7.90	Weak
3.	Food Processing and Preservation	2	72.74	Good	2	51.35	Average
4.	Food Microbiology	2	71.22	Good	2	46.20	Average
5.	Malnutrition	2	71.16	Good	2	69.25	Good
6.	Food Composition	2	64.64	Good	2	63.30	Good
7.	Catering and Institutional Feeding	2	63.04	Good	2	88.40	Good
8.	Nutrient Requirement	2	57.77	Average	2	47.10	Average
9.	Food Storage	2	55.52	Average	2	65.05	Good
10.	Technology of Specific Products	2	35.78	Average	2	88.25	Good
11.	Nutrition Program, Planning and Intervention	3	24.06	Weak	3	85.47	Good

Appendix C: Comparison of Candidates' Performance in ACSEE between 2024 and 2025

