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 EXAMINATION (ACSEE) 2021

FOOD AND HUMAN NUTRITION

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) 2021

155 FOOD AND HUMAN NUTRITION

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

TABLE OF CONTENTS

FOREWORD

The National Examinations Council of Tanzania is pleased to issue this report on Candidates' Item Response Analysis (CIRA) on the Advanced Certificate of Secondary Education Examination (ACSEE) 2021. This report has been prepared for the purpose of providing feedback to educational administrators, school managers, teachers, students, school quality assurers and other educational stakeholders on the performance of the candidates who sat for Food and Human Nutrition examination. Particularly, the report intends to show the weaknesses and strengths of the candidates who sat for this examination.

The Advanced Certificate of Secondary Education Examination measures the effectiveness and efficiency of the educational system in general, and educational delivery in particular. Basically, the candidates' responses to the examination questions show how the teaching and learning objectives were achieved in the classroom. It also shows the extent to which Food and Human Nutrition learning competencies were attained in their two years of advanced secondary education.

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

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

The National Examinations Council of Tanzania is grateful to examination officers and all other stakeholders who provided valuable assistance in the preparation of this report in their various capacities.

Dr. Charles E. Msonde
EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report analyses the performance of the candidates who sat for the 2021 Advanced Certificate of Secondary Education Examination (ACSEE) for Food and Human Nutrition paper 1, 2 and 3. The examination was set in accordance with the 2019 ACSEE Food and Human Nutrition format which is based on the 2009 ACSEE Food and Human Nutrition syllabus.

Food and Human Nutrition paper 1 and 2 were both theory papers consisting of two sections namely; A and B. Section A consisted of six (6) short answer questions and the candidates were required to answer all the questions. Section B had three (3) essay questions and the candidates were required to answer only two (2) questions.

Food and Human Nutrition paper 3 consisted of three (3) practical questions. The candidates were required to answer all the questions.

The number of candidates who sat for this examination was 292. Among them, 287 (98.29%) candidates passed and 5 (1.71%) failed the examination. The performance in 2021 has decreased by 0.05 per cent compared to 2020's performance which had 181 candidates of which 178 (98.34) passed while 3 (1.66%) failed. The comparison of the candidates' performance between 2020 and 2021 is illustrated in Appendix C.

The three categories of performance have been used in the analysis of the candidates' performance per question or topic. The performance is considered as good if the percentage of the candidates who passed ranges from 60 to 100, average if ranges from 35 to 59 per cent, and weak if ranges from 0 to 34 per cent. The candidates' performance has been summarised in the figures, tables, and appendices whereby green colour represents good performance while yellow and red colours stand for average and weak performances respectively.

The analysis of the candidates' performance in each question and topic was done so as to provide feedback to educational stakeholders on the performance of the candidates who sat for this examination. The report will be useful to all educational stakeholders and will enable teachers and students to improve the teaching and learning process in the Food and Human Nutrition subject.

2.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE IN EACH QUESTION

The performance of the candidates in each question in Food and Human Nutrition Paper 1, 2 and 3 has been analysed. The candidates' performance in each question is presented by indicating the task of each question, the expected responses, and how the candidates responded. Samples of responses extracted from the candidates' scripts have been attached in order to show how the candidates responded. In addition, figures and tables that indicate the distribution of candidates' scores are inserted for illustration. The analysis of each question is provided under the following sub-sections:

2.1 155/1 FOOD AND HUMAN NUTRITION PAPER 1

This paper consisted of two sections namely: A and B. Section A comprised 6 (1 - 6) short answer questions which carried 10.0 marks each. Section B comprised 3 (7 - 9) essay questions which carried 20.0 marks each. The candidates were required to answer all the questions in Section A and two questions from Section B. The pass mark in each question in Section A was 3.5, and 7.0 in Section B.

2.1.1 Question 1: Food processing and preservation

This question has two parts namely, (a) and (b). Part (a) required the candidates to briefly explain the principles involved in (i) vacuum packing and (ii) freezing methods of food preservation. Part (b) required the candidates to briefly explain the effects of dehydration on food nutrients.

The question was attempted by 290 (99.3%) candidates, while 2 (0.7%) candidates skipped it. Data shows that 60 (20.7%) candidates scored from 6.0 to 8.5 marks and 116 (40.0%) scored from 3.5 to 5.5 marks. Furthermore, 114 (39.3%) candidates scored from 0.0 to 3.0 marks. This performance is summarised in Figure 1.

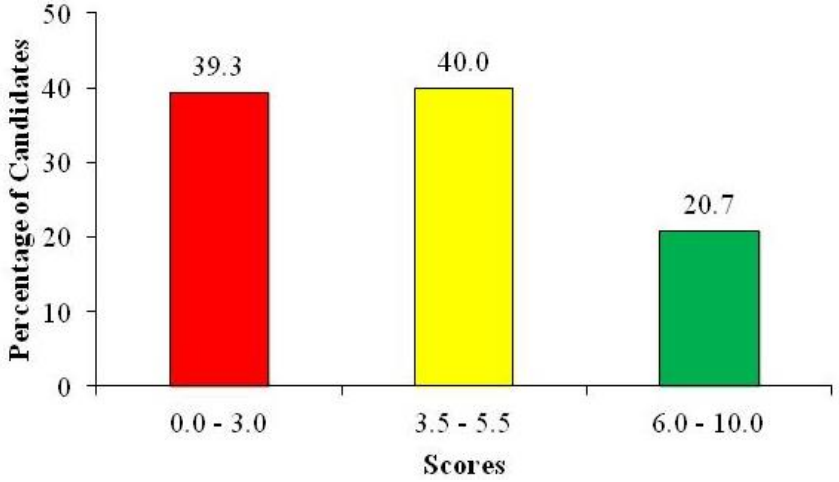


Figure 1: *The percentage of candidates' performance in question 1*

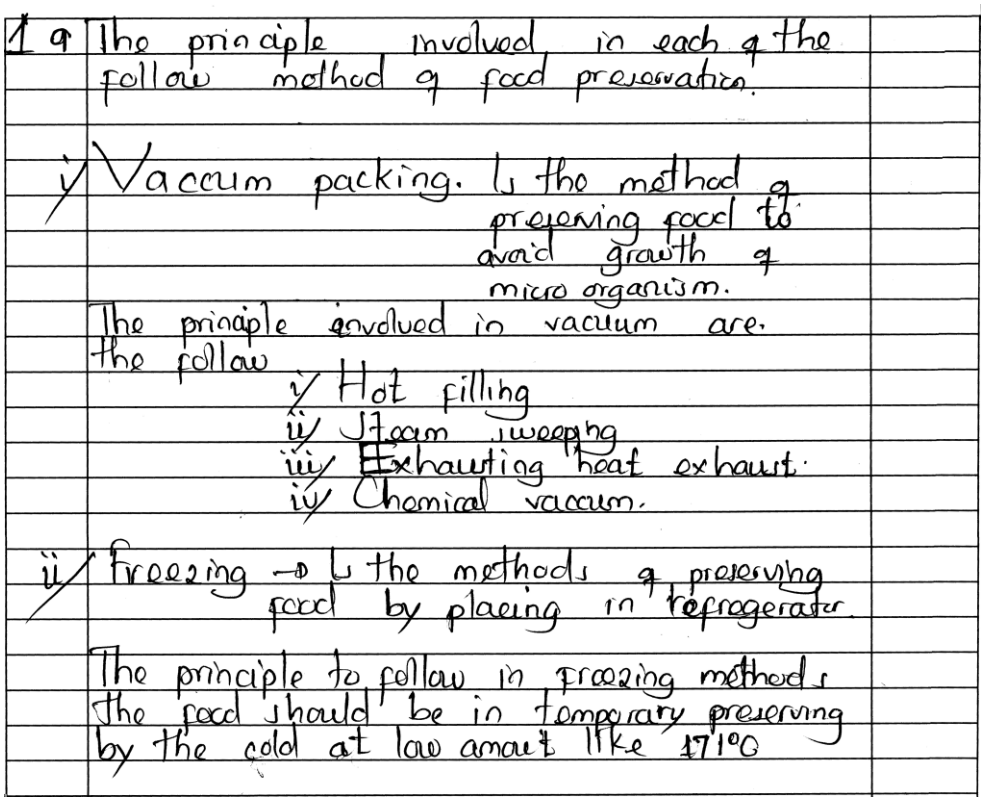
Figure 1 shows good performance since 60.7 per cent of the candidates passed by scoring from 3.5 to 8.5 out of 10.0 marks.

The candidates with average and good performances had adequate knowledge of the methods of food preservation. They were aware that, in vacuum packaging, the oxygen gas is removed from the container so as to prevent or stop growth of aerobic micro-organisms and activities of enzymes in part (a) (i). In part (a) (ii), they understood that, the principle involved in freezing is the reduction/lowering of the temperature of the food to the extent that the microorganisms and enzymes cannot grow.

In part (b), the candidates correctly gave the effects of dehydration on food nutrients. However, these candidates in this category failed to score full marks because they provided partial responses in part (b), thus deserved 3.5 to 8.5 marks. Some of them repeated one or two points. For example, one candidate wrote: *loss of water soluble vitamins such as B complex vitamins during washing* and *blanching process* and *oxidation of carotene and ascorbic acid* as two different points. Another one wrote: *dehydration decreases the moisture content of the food* and *it leads to increase in the concentration of nutrients*. These candidates failed to understand that decrease of the moisture content of the food results into the increase of the concentration of nutrients such as carbohydrates, proteins, and fats. Others provided insufficient or incorrect explanations to some of the correctly mentioned points.

Furthermore, the analysis indicates that the candidates who scored low marks provided incorrect responses to all items of part (a) of the question. In part (a) (i), the candidates provided incorrect principle of vacuum packaging. For example, one candidate wrote, *the principle of vacuum packing is prevention of contamination of the food, prevent oxidation and does not cause loss of weight of the food,* which are the advantages of vacuum packing. Another candidate provided the wet methods of preserving food by applying hot temperature as he/she wrote, *boiling food, canning process, blanching* and *pasteurisation*. In part (a) (ii), they provided incorrect principles of freezing such as, *preservation by using freezers, is steaming sweeping of air, is cold preservation process, avoid head spacing, there is no bulging of the container, a low heat preservation of food* and *not much change in colour and flavour in low temperatures*.

In part (b), majority of the candidates managed to provide 1 to 2 correct effects of dehydration on food nutrients. Others mentioned the effects instead of explaining or providing incorrect explanations to a correctly mentioned point. Extract 1 is a sample of responses from one of the candidates with weak performance.

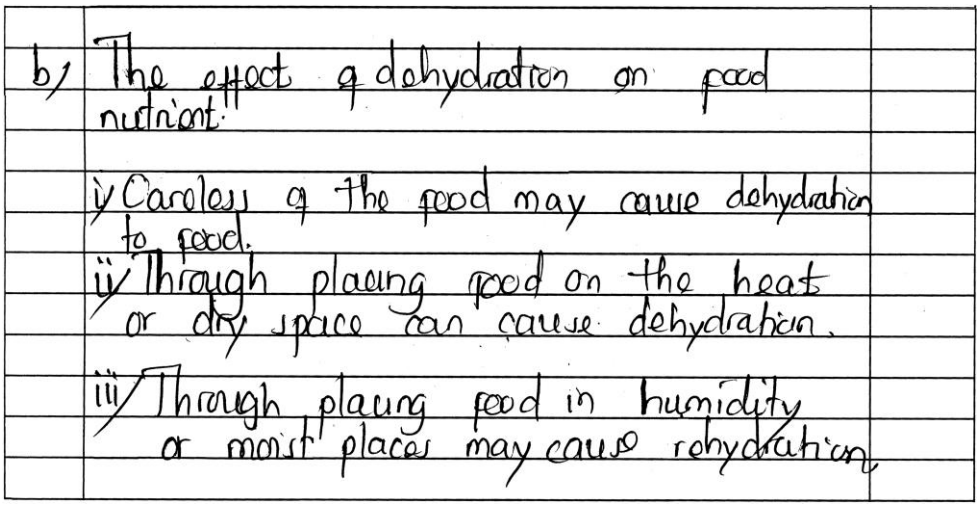

1 a The principle involved in each of the follow method of food preservation.

i/ Vaccum packing. is the method of preserving food to avoid growth of micro organism.

The principle involved in vacuum are. the follow
- i/ Hot filling
- ii/ Steam sweeping
- iii/ Exhausting heat exhaust.
- iv/ Chemical vaccum.

ii/ Freezing → is the methods of preserving food by placing in refrogerator.

The principle to follow in freezing methods the food should be in temporary preserving by the cold at low amount like 17°C



Extract 1: *A sample of candidates' incorrect responses in question 1*

In Extract 1, the candidate mentioned the types of vacuum creation instead of the principal involved in vacuum packing and unrelated principle involved in freezing in part (a). In part (b), the candidate tried to give the causes of dehydration and rehydration of food instead of the effects of dehydration on food nutrients.

2.1.2 Question 2: Food storage

The candidates were required to explain briefly the problems associated with the use of pesticides in part (a) and to give the practices that should be used to avoid the problems associated with the use of pesticides in part (b).

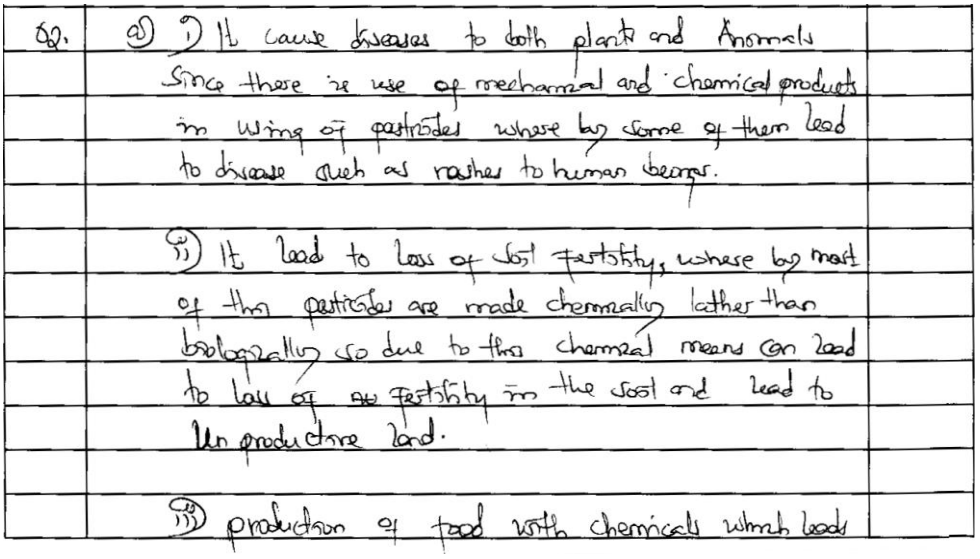
The question was attempted by 290 (99.3%) candidates. The analysis indicates that, 288 (99.3%) candidates scored from 0.0 to 3.0 marks, among them 58 (20.0%) scored zero. However, the candidates who scored from 4.0 to 4.5 marks were 2 (0.7%) and none of the candidates scored above average (5.5) marks. Table 1 illustrates this performance.

Table 1: The percentage of candidates' performance in question 2

Scores	No. of Candidates	Percentage
0.0-3.0	288	99.3
3.5-5.5	2	0.7
6.0-10.0	0	0.0

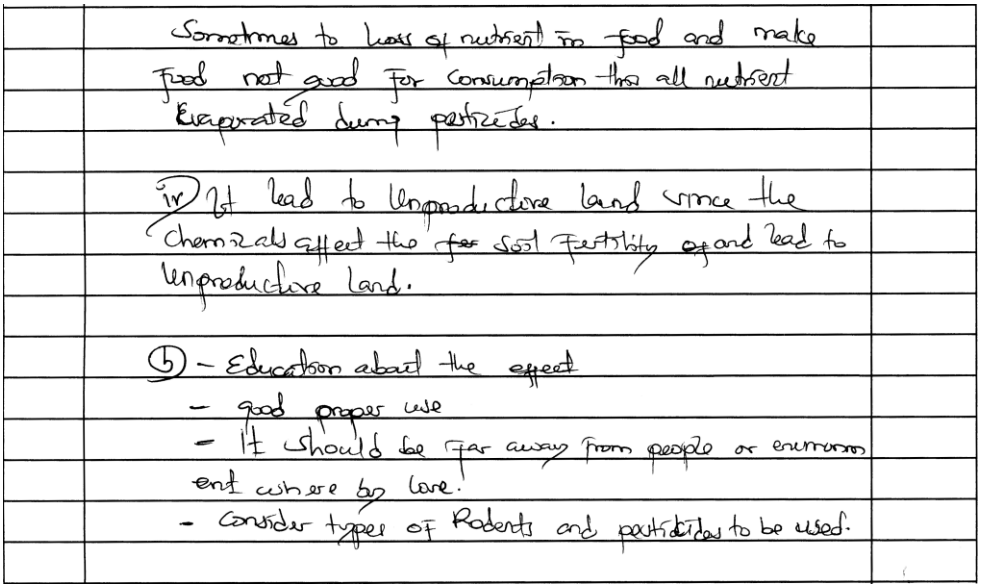
Table 1 shows that the general performance of the candidates was weak, since 99.3 per cent scored below average (5.5) marks.

The analysis indicates that the majority of the candidates with weak performance (0.0 to 3.0 marks) had either little or no knowledge of the use of pesticides which led them to provide the incorrect responses to all parts of the question. In part (a), most of the candidates explained the circumstances under which human poisoning may occur instead of the problems which are associated with the use of pesticides. In part (b), the candidates mentioned the rules to follow when applying pesticides instead of the practices that can be used to avoid the problems associated with the use of pesticides. For example, one candidate wrote, *Do not eat, drink or smoke when handling or applying pesticides, wear gloves or other protective clothes while handling pesticides, keep all pesticides out of reach of children* and *read the instructions and follow the recommended safety precautions*. Other candidates provided responses which are not related to the use of pesticides. Extract 2.1 illustrates such responses.


Q2. a) i) It cause diseases to both plants and Animals since there is use of mechanical and chemical products in using of pesticides whose by some of them lead to disease such as rashes to human beings.

ii) It lead to loss of soil fertility, whose by most of the pesticides are made chemically rather than biologically so due to this chemical means can lead to loss of the fertility in the soil and lead to Un productive land.

iii) production of food with chemicals which lead


Sometimes to loss of nutrient in food and make food not good for consumption thus all nutrient Evaporated during pesticides.

iv) It lead to Unproductive land since the Chemicals affect the soil fertility and lead to Unproductive land.

(b) - Education about the effect
- good proper use
- It should be far away from people or environment where by love.
- Consider types of Rodents and pesticides to be used.

Extract 2:1: *A sample of candidates' incorrect responses in question 2*

In Extract 2.1, the candidate provided incorrect responses to all parts. This indicates that the candidate lacked knowledge about the use of pesticides.

Further analysis indicates that the candidates who scored average (4.0 - 4.5) marks were aware that, the problems associated with the uses of pesticides are due to wide use of the broad spectrum types of pesticides including organochlorides. This enabled them to provide some correct problems associated with their use in part (a). However, the candidates failed to score full marks in this part because they failed to provide the required number of correct points. Others provided incorrect explanations to the correctly mentioned problems associated with the use of pesticides.

In part (b), a few candidates managed to provide 1 to 2 correct practices that can be used to avoid the problems associated with the use of pesticides. The incorrect problems provided by the candidates include: *avoid burning of container which may explode, proper storage of pesticides after use, use of local materials from plants to control pests, wash well the fruit and vegetable before storage* and *cook well the food products such as vegetables to destroy residues of pesticides*. Extract 2.2 is a sample part of average responses in this question.

2(a) Problem which are associated with the use of pesticide.

(i) Consuming small amount of pesticide which remain in the food.

When pesticides is applied in the food grain some of the small amount remain the food grain in which when a person take in food can cause the accumulation of these pesticides to the body of the human and therefore can cause disease such as cancer.

(ii) Killing of non targeted organisms.

Another problem of the pesticides is to kill non targeted organisms which have no any harmful to the food substance therefore when applied other organisms can be killed off.

(iii) Loss of the effectiveness.

Pesticide may loss their effectiveness when the pest build resistant to the pesticides therefore when these pest building of resistant the application of this pesticides could not be effectively kill pest and therefore these is the problem which are mostly occur in the farm when these pesticides are applied regularly

(iv) Killing of the natural enemis which could fight against pests.

Pesticide cause killing of these natural enemis which could fight against pests therefore when these natural enemis are killed off so there will be the occurance of other pests more than ever before.

Extract 2.2: *A sample part of candidates' average responses in question 2*

In Extract 2.2, the candidate provided insufficient explanations to some of the correctly mentioned problems associated with the use of pesticides, thus scored averagely.

2.1.3 Question 3: Food composition

The candidates were required to identify the potential users of Tanzania Food Composition Tables in part (a) of the question. In part (b), they were required to give the procedure of calculating the nutritive value of a meal recipe by using a food composition table.

This question was attempted by 285 (97.6%) candidates, of which 201 (70.5%) scored from 0.0 to 3.0 marks, 81 (28.4%) scored from 3.5 to 5.5 marks, and 3.0 (1.1%) scored from 6.0 to 9.5 out of 10.0 marks. The performance is summarised in Figure 2.

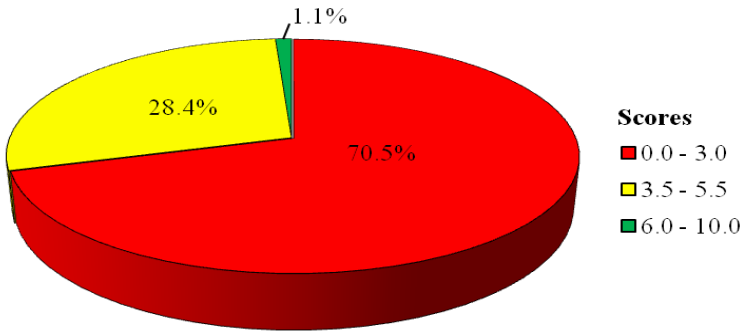


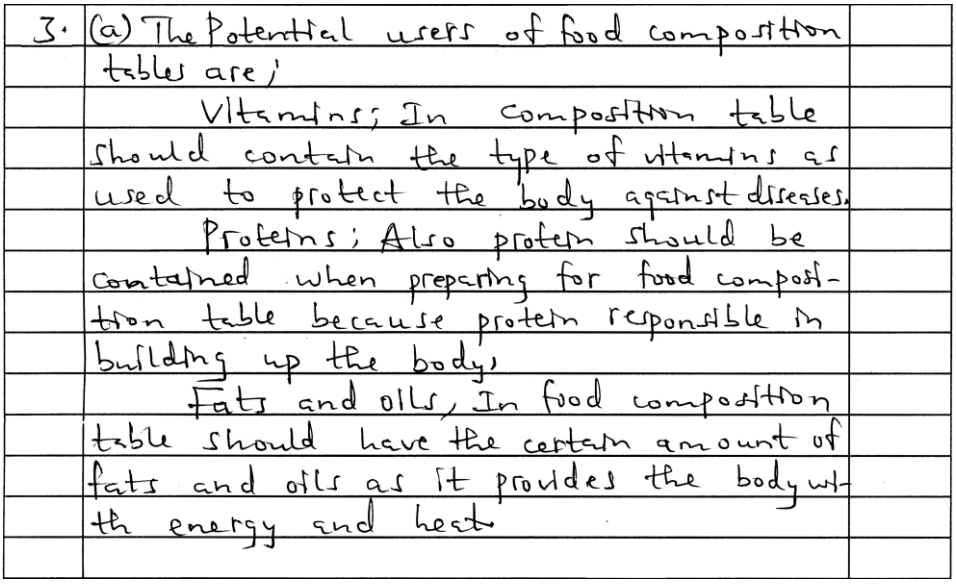
Figure 2: *The percentage of candidates' performance in question 3*

The trend of performance indicated in Figure 2 shows that the performance of the candidates was weak, since 70.5 per cent scored below 3.5 marks.

The analysis shows that, the majority of the candidates with weak performance did not have adequate knowledge of composition of food stuffs. Others provided incorrect responses due to failure to understand the demands of all parts of the question. In part (a), some of the candidates provided vulnerable groups of people in the society as potential users of food composition table. They wrote: *young children, sick, elderly, adolescents* and *pregnant and lactating mothers*. Other candidates identified the uses of food composition tables. For example, one candidate wrote, *Food composition tables are useful for dietary calculations for different institutions, for the assessment of nutritional status of the*

community, in meal planning for individuals and *in food balance sheet.* Others identified the institutions which use food composition tables for dietary calculations such as, *nutritional rehabilitation centres, hospitals, prisons* and *boarding schools and colleges.* A few candidates managed to give 1 to 2 correct potential users of Tanzania Food Composition Tables thus, scored 1.0 to 3.0 marks.

In part (b), most of the candidates failed to provide the correct procedure for calculating the nutritive value of a meal recipe due to misinterpretation of the question's demands. For example, one candidate wrote: *time available for food preparation, income level of the family, personal interests of members* and *different nutritional needs of family members* which are the factors that affect meal planning in a family. Other candidates gave irrelevant responses. For example, one candidate wrote, *Collect a data of each nutrient available on the table, convert the percentage total value of the nutrients into grams* and *calculate the value by using the table that indicates that a person would require*. Others skipped this part. These responses indicate that the candidates had inadequate skills of calculating the nutritive value of meals. Extract 3 is a sample of responses of the candidates from this category.

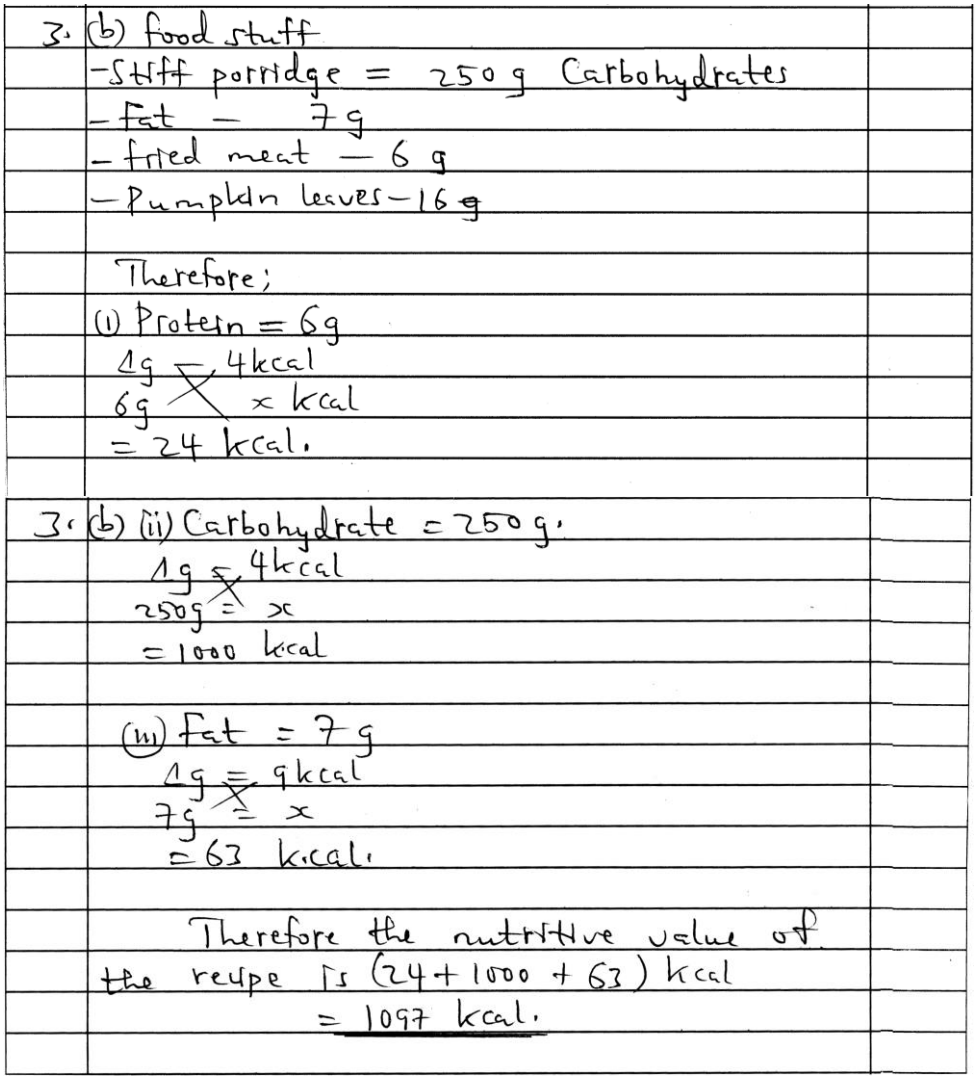


3. (a) The Potential users of food composition tables are;

Vitamins; In composition table should contain the type of vitamins as used to protect the body against diseases.

Proteins; Also protein should be contained when preparing for food composition table because protein responsible in building up the body.

Fats and oils, In food composition table should have the certain amount of fats and oils as it provides the body with energy and heat.



Extract 3: *A sample of candidates' incorrect responses in question 3*

In extract 3, the candidate perceived food composition table as nutrient contents of food so, he/she provided food nutrients in part (a). In part (b), the candidate composed a meal recipe then calculated its energy content instead of providing the procedure for calculating the nutritive value of a meal recipe.

Further analysis shows that, the majority of the candidates with average and good performances had adequate knowledge of composition of food stuffs. In part (a), the candidates were aware that, the Tanzania Food Composition Tables are commonly used for different purposes by the agricultural sector,

nutritionists and food technologists in the food processing industries, economists, planners and consumer-protection personnel, nutrition researchers, medical sector, nutrition and health educators and policy makers. However, the candidates failed to score all 6.0 marks allocated to this part because they provided 2 to 3 correct points out of the required 4. Other candidates mentioned the uses instead of the users of Tanzania Food Composition Tables. For example, one candidate wrote; *Calculating the nutritive values of foods, to manufacture food according to nutrient composition required* and *planning menus in hospitals and schools*. Another candidate wrote, *to ensure food quality and safety*.

A few candidates managed to give the correct procedure for calculating the nutritive value of a given meal recipe in part (b). Some of the candidates failed to score full marks in this part because they mixed the steps or wrote them incorrectly. For example, one candidate wrote, *Take the list of ingredients to be used and their provided quantities, compare the quantities in grams of nutrients in the food composition table and those in the given recipe, calculate the quantities of each nutrient in each ingredient* and *by adding the quantities of each nutrient to find the total content.* In this response, the second point is incorrect. Other candidates failed to write the procedure sequentially.

2.1.4 Question 4: Nutrient requirement

This question had two parts namely (a) and (b). In part (a), the candidates were required to identify the factors that determine the quantity of protein an individual requires for structural and regulatory functions and for energy. Part (b) required them to argue against the statement "excessive intake of protein is beneficial to health".

This question was attempted by 291 (99.7%) candidates who sat for the examination. The analysis shows that, 222 (76.3%) candidates scored from 0.0 to 3.0 marks, of whom 35 (12.0%) scored 0.0. However, 55 (18.9%) candidates scored from 3.5 to 5.5 marks and 14 (4.8%) scored from 6 to 8.5 marks. Figure 3 illustrates the performance.

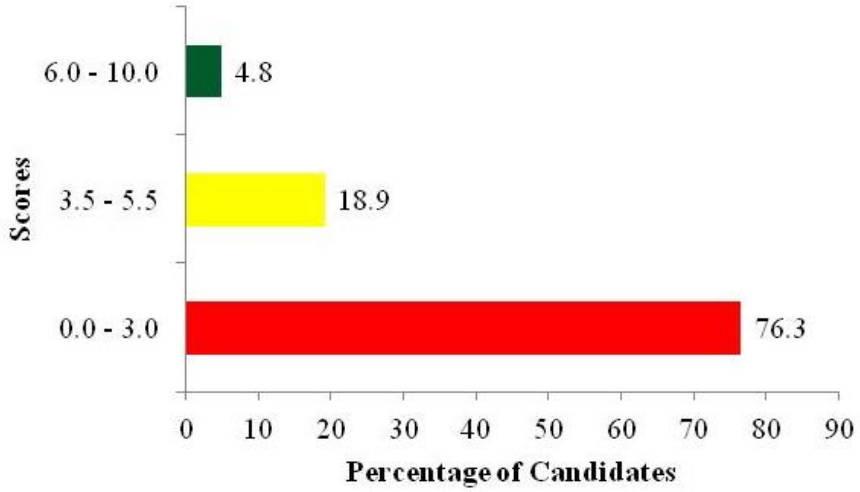


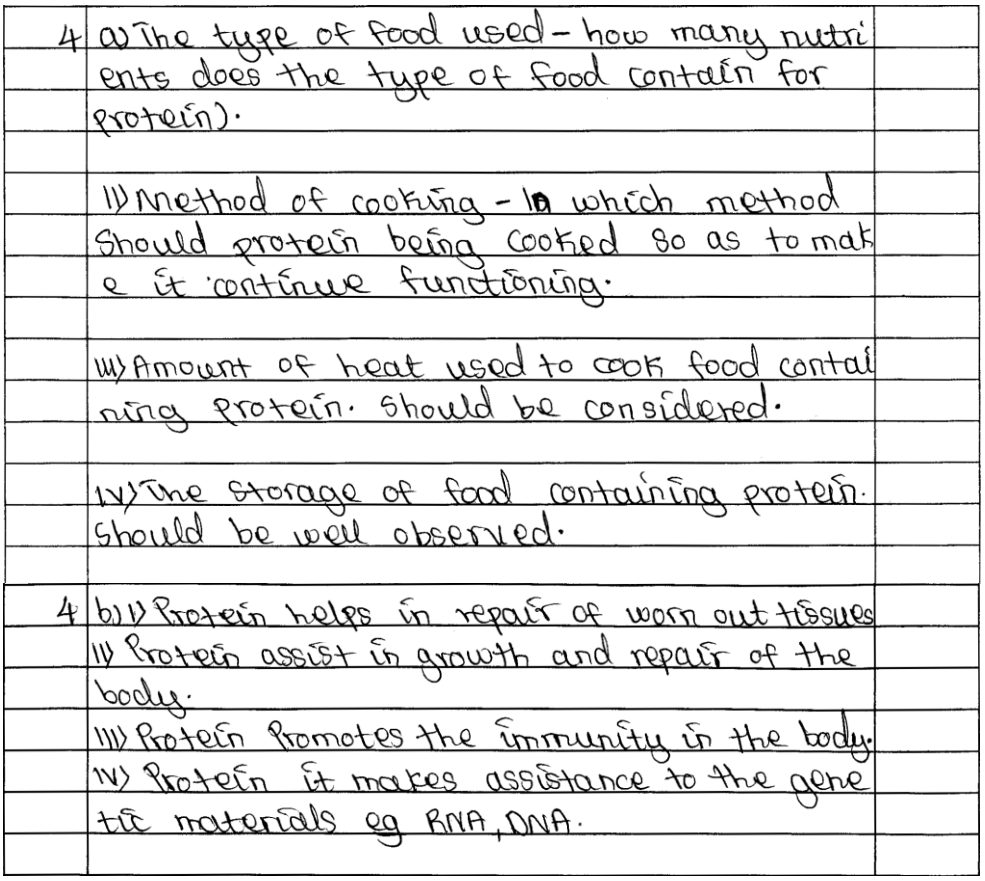
Figure 3: *The percentage of candidates' performance in question 4*

Based on the analysis in Figure 3, the general performance of the candidates was poor because 76.3 per cent of the candidates scored below 35 per cent of the 10.0 marks allocated to this question.

The analysis of the candidates' responses indicates that, some of the candidates who scored from 0.0 to 3.0 marks had inadequate knowledge about protein requirement of an individual. Others did not understand the demands of the question. For example, in part (a), some of the candidates provided the factors that influence the basal metabolic rate (BMR) which include, *hormones, age, sex, psychological tension* and *state of health*, instead of the factors which determine the quantity of protein an individual requires. Others provided incorrect factors such as; *net protein utilization, total protein intake, structure of the protein, availability or sources of protein, availability of other nutrients such fat,* and *specific needs of protein in the body*. These candidates did not understand that the quantity of protein required by an individual depends on the quality of protein and efficiency of digestion, body weight and previous nutritional status, physiological needs and adequacy of calorie intake. However, a few candidates managed to mention 1 to 2 correct factors but some of them failed to give correct explanations.

In part (b), majority of the candidates failed to give the negative effect of the excessive intake of protein to the health of an individual. They provided a variety of incorrect effects such as: *excess protein becomes a major*

source of energy, can cause abnormal rapid growth than carbohydrates, vitamins and minerals, required for growth in larger quantities, used mainly for synthesis of hormones and enzymes, inhibit absorption of other nutrients, protein can be stored in the body for future use and *cause food poisoning and infections.* The candidates who scored from 1.0 to 3.0 marks in this question managed to give at least one correct effect of excessive intake of protein to the health but failed to give correct explanations. Extract 4.1 is a sample of responses provided by one of the candidates from this category.


4 a) The type of food used - how many nutrients does the type of food contain for protein).

ii) Method of cooking - in which method should protein being cooked so as to make it continue functioning.

iii) Amount of heat used to cook food containing protein. should be considered.

iv) The storage of food containing protein. should be well observed.

4 b) i) Protein helps in repair of worn out tissues
ii) Protein assist in growth and repair of the body.
iii) Protein promotes the immunity in the body.
iv) Protein it makes assistance to the genetic materials eg RNA, DNA.

Extract 4.1: *A sample of candidates' incorrect responses in question 4*

Extract 4.1 shows that the candidate provided irrelevant factors that determine the quantity of protein an individual requires in part (a). In part (b), the candidate provided the functions of protein in the body, instead of the negative effect of excessive intake of protein to the health of an individual.

Further analysis shows that the candidates who scored from 3.5 to 8.5 marks had adequate knowledge of the concept of body requirements for different nutrients. In part (a), the candidates were able to identify the factors that determine the quantity of protein an individual requires for different functions. They also managed to give the negative effects of excessive intake of protein to the health of an individual in part (b). However, these candidates failed to score full marks in this question because they failed to provide the required number of points in one or all parts of the question. Others provided insufficient explanations on the factors that determine the quantity of protein an individual requires. Extract 4.2 is a sample of correct responses from one of the candidates

Qn 4

a. The following are factors which determine the quantity of protein an individual requires for structural and regulatory functions and for energy which are;

i) Adequate calories intake

This determine the quantity of protein an individual requires for structural and regulatory and energy function since absence of enough calories in the body cause protein to stop doing its function of repairing the ~~body~~ damaged worn out tissue and start performing the role of carbohydrate of providing energy into the body. But presence of calories to have sparing effect to protein functions.

ii) Special physiological needs.

This include during pregnancy, lactating, elders. Where by pregnant mothers require high amount of protein rich food to support their ~~well~~ foetus growth since they still grow rapidly ~~to prod~~ and also to support them themselves so they need additional protein compare to elders. Also lactating mother require high amount of protein for production of milk to feed the baby's

iii/ Efficiency of protein digestibility and quality
This also determine the amount of protein needed for structural, regulatory function and energy because high quality protein is more digestible and easily to be absorbed by the body to even in small amount but low quality (poor quality) protein required to be eaten much since its not efficient as it doesn't have all amino acids

iv/ State of health.
This also determine the amount of protein required by an individual for structural, regulatory and energy function depe because it depend on health well being of a person. sick people require high amount of protein than healthier peop le since sick people require high amount to repair their damaged cells.

b.

An excessive intake of protein is not beneficial to health due to the following points;

i. An excess intake of protein rich food to cause loss of calcium through urine.

ii An excess protein is not used well and so its uneconomical source of energy.

iii Once body need is taken care off it, excess protein is deaminated by the liver and urea is synthesized causing overworking of liver and kidney as the kidney is required to excrete additional amount of urea in the body. Excess protein create unnecessary burden to the vital organ such as liver and kidney.

iv. Excess intake of protein especially of animal origin such as meat, milk, and egg form a ~~sub~~ substantial part of high fat diet tea resulting into high risk of blood high blood cholesterol level.

Extract 4.2: *A sample of candidates' correct responses in question 4*

Extract 4.2 illustrates a sample of responses from the candidate who correctly identified the factors that determine the quantity of protein an individual requires in part (a) and the negative effects of excessive intake of protein to the health in part (b).

2.1.5 Question 5: Food quality and safety

Part (a) of this question required the candidates to give the reason as to why spinach is not considered as a good source of calcium and sodium inspite of containing a reasonable amount of those minerals. Part (b) required them to give the biological effects of (i) glucosinolates and (ii) saponins natural toxicants. In part (c), the candidates were required to give the reasons for a very small amount of natural toxicants found in most foods not necessarily create a hazard in the body.

This question was attempted by 276 (92.4%) candidates who sat for the examination. Sixteen (16) candidates (5.5%) did not attempt it. Data shows that, 225 (92.4%) candidates scored from 0.0 to 3.0 marks of whom 93 (33.7%) scored 0.0. The candidates who scored from 3.5 to 5.0 marks were 20 (7.2%) and 1 (0.4%) candidate scored 6 marks. There was no candidate who scored above 6.0 out of 10.0 marks. Table 2 summarises the candidates' performance.

Table 2: The percentage of candidates' performance in question 5

Scores	No. of Candidates	Percentage
0.0-3.0	255	92.4
3.5-5.5	20	7.2
6.0-10.0	01	0.4

Table 2 shows a weak performance in this question because 92.4 per cent of the candidates scored below average (3.5) marks.

The analysis shows that, some of the candidates who scored low marks had inadequate knowledge about the concept of hazards of natural toxicants in foods. These candidates provided irrelevant responses to both parts of the question. In part (a), for example, one candidate wrote, *because when spinach is taken by itself without any other source of these minerals they cannot carry out their functions appropriately within the body*. Another

candidate wrote, *spinach is grouped as water soluble food therefore when prepared, preserved or cooked by using improper methods can lead to loss of high amounts of these minerals*. A few candidates provided insufficient explanation in this part, hence scored 0.5 or 1.0 mark. For example, one candidate wrote, *spinach contain anti-mineral substance which hinder absorption of minerals*. This candidate did not specify the type of anti-mineral contained in spinach and he/she assumed that the anti-mineral found in spinach hinders the absorption of all minerals, which is incorrect.

Majority of the candidates in this category skipped one or both sub-parts (b) (i) and (b) (ii) indicating that they lacked knowledge about the effects of natural toxicants found in foods. Others wrote irrelevant biological effects of each of the given natural toxicant. For example, one candidate wrote, (i) *Glucosinolates contain large amounts of sugar which cause biological effects such as high blood cholesterol and diseases*, (ii) *Saponins are mostly known as amylase inhibitor as they inhibit the action of amylase enzymes for convection of starch into glucose hence, leading to disease known as hypertrophia*. Another candidate wrote, (i) *Glucosinolates inhibit storage of glucose in the body* and (ii), *Saponins may hinder the absorption of fats in the body*.

In part (c), the candidates provided incorrect reasons for a very small amount of natural toxicant found in most foods not necessarily create a hazard in the body. The incorrect reasons provided by the candidates include: *The body can neutralise its effect by detoxification through the liver, the low amount of a toxicant can be removed easily through the waste so does not accumulate in the body, in the digestive system there are different acids which neutralize some natural toxicants, the body contain a large amount of water which remove the toxicants with urine and sweat* and *alkaline foods inactivate the natural toxicants*. However, a few candidates scored 1.0 to 2.0 marks as they correctly explained the removal/destruction of natural toxicants during normal processes of food preparation and cooking as learned under the topic of Food processing and preservation. Extract 5 is a sample of responses from a script of the candidate with weak performance.

5 (a) Spinach is not considered to be a good source of mineral despite of containing calcium and potassium because spinach contain dietary fibre which doesn't provide any nutrient to an individual.

(b) Biological effect of:

(i) Glucosinolates.
- It prevents absorption of other nutrients.
- destroy nerve cell.

(ii) Saponins:
- It stops conduction of nerve impulse.
- prevents absorption of other nutrient in the body.

(c) The body contains organ known as liver which regulate amount of toxin in the body.

Extract 5: *A sample of candidates' incorrect responses in question* 5

In Extract 5, the candidate provided incorrect responses to all parts of the question.

Furthermore, the analysis indicates that the majority of the candidates with average and good performances were able to give the reason for spinach not considered as a good source of calcium and potassium inspite of containing reasonable amount of these minerals in part (a). They were aware that, spinach also contains heat resistant oxalates which bind calcium and potassium minerals and hinder their absorption or decrease their bioavailability. In part (b), the candidates failed to differentiate the biological effects of glucosinolates and saponins with those of other natural toxicants found in foods. Consequently, they provided incorrect responses.

In part (c), most of the candidates managed to give the reasons for a very small amount of natural toxicants found in most foods not necessarily create a hazard in the body. They were aware that, the presence of the toxicants in very low concentrations in foods, the consumption of a variety

of foods in the same meal together with the application of different methods of food preparation and cooking decrease the chances of the toxicants to create hazards in the body.

2.1.6 Question 6: Nutrient requirement

The candidates were required to account for the factors that influence meal planning in a commercial catering institution in part (a) of this question. In part (b), they were required to give the measures of improving the nutritive value of foods served so as to meet the nutritional needs of the customers.

The question was attempted by all 292 (100%) candidates. The analysis shows that, 34 (13.0%) candidates scored from 6.0 to 7.5 marks, 183 (62.7%) scored from 3.5 to 5.5 marks and 71 (24.3%) scored from 0.0 to 3.0 marks. Figure 4 summarises this performance.

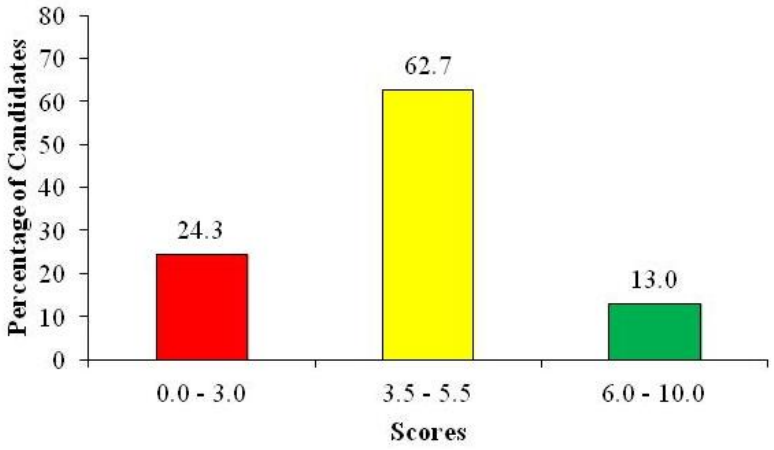


Figure 4: *The percentage of candidates' performance in question 6*

Figure 4 shows that the performance of the candidates was good, since 75.7 per cent of the candidates scored from 3.5 to 7.5 out of 10.0 marks.

The candidates' responses analysis indicates that, 75.7 per cent of the candidates performed well on this question. This indicates that they had adequate knowledge of the concept of meal planning. In part (a), most of the candidates failed to score all the 7.0 marks allocated to this part because they mixed correct and incorrect factors influencing meal planning. For example, one candidate included the following factors in responding to this part: *Proper permit for operating as a food and beverage business,*

suitability of food safety measures and *correct business plan*. This candidate did not understand that these are the conditions for establishing a catering service. Another candidate provided the factors that affect menu planning as he/she wrote: *supplies and storage of equipment and food items, space and equipment in the kitchen* and *staff knowledge and skills in food preparation, storage and preservation*.

In part (b), some of the candidates provided 2 to 3 correct measures to improve the nutritive value of the foods served. The incorrect measures mentioned by the candidates include, *use of food supplementation, assessing nutritional status, provision of nutrition education, ensure food availability to meet food demand, adding preservatives such as flavouring and stabilisers, improve health status* and *by fortifying all the foods*.

In contrast, 13.0 per cent of these candidates had weak performance in this question. Some of them had insufficient knowledge about meal planning; others misinterpreted the demands of all parts of the question. In part (a), for example, one candidate provided the factors to consider when designing a recipe to meet its aims and purposes by writing, *Availability of the preparation cooking and serving utensils, good nutritional quality according to meal planning, must fit into your needs for the menu planned, should be within food budget, should have desirable sensory qualities, can be made within the time available* and *must use of ingredients which are easily available*. Another candidate wrote, *sick people, labour-intensive workers, sedentary people, elders, pregnant and lactating mothers*. This candidate did not understand that these are the groups of people to consider when planning meals and not the factors influencing meal planning. Other candidates provided irrelevant factors that influence meal planning such as, *to attract more customers in catering business, understand other catering services surrounding you, no repetitions of dishes, include herbs and seasonings, anticipate the number of customers* and *prepare, cook and serve the meal in time and while hot*.

Further analysis indicates that, in part (b), most of the candidates provided a variety of irrelevant responses due to lack of knowledge. For example, one candidate wrote; *Quality and quantity of food to be cooked, type of food items for preparing the food* and *add new ingredients to the food*. Another one wrote, *improve texture and flavour, proper storage of food* and

preserve food to avoid quantity loss. Other candidates misinterpreted the demand of this part. For example, one candidate wrote, *eating variety of foods from each food group, controlling the portion sizes of food to consume in meals* and *by doing physical activities*. The candidate did not understand that these are the measures for the maintenance of good health and prevention of diseases and not measures of improving the nutritive value of foods served so as to meet the nutritional needs of the customers. Extract 6 is a sample of incorrect responses from one of the candidates.

6 a)

i) Meal planning serves time and energy needed in preparing and cooking the meal in the institution.

ii) It help to know what to buy in advance when the shopping is done for food and ingredients.

iii) It avoids wastage of food because the food cooked is planned with the number of people, there will be no food left this influence meal planning

iv) It maximize profit in the catering by serving the energy, time and limit food wastage, this also influence meal planning in catering

v) Meal planning avoid loss that can be caused by food wastage, and energy wastage, this help to maximize the income of the caterer

vi) It increase effective working and cooking of qualified food, as the ingredients, method of cooking and ways of preparing food is already planned

vii) Meal planning easy the work of food preparation proces in the catering institution, this improve the services of food in the catering, this also influence meal planning.

b) i) Improvement of sanitation and hygiene in preparation of the food to avoid food contamination that can also affect the food nutritive value by deterioration.

ii) The use of storage and preservation methods that keep the food safe for more cooking example the use of refrigarator and heat treatment to perishable foods like vegetables and fruits this will help to improve the nutritive value of the food.

Extract 6: *A sample of candidates' incorrect responses in question* 6

In Extract 6, the candidate provided the advantages of planning meals instead of the factors influencing meal planning in part (a). The candidate provided irrelevant responses in part (b) which indicates that he/she had inadequate knowledge of meal planning.

2.1.7 Question 7: Food storage

The question required the candidates to suggest the methods of preventing food grain deterioration by insect pests.

The question was opted by 285 (80.5%) candidates and 57 (19.5%) candidates skipped it. The analysis shows that 44 (18.7%) candidates scored from 12 to 18.5 marks, 130 (55.3%) scored from 7.0 to 11.5 marks, and 61 (26.0%) scored from 0.0 to 6.5 marks. Figure 5 summarises the performance.

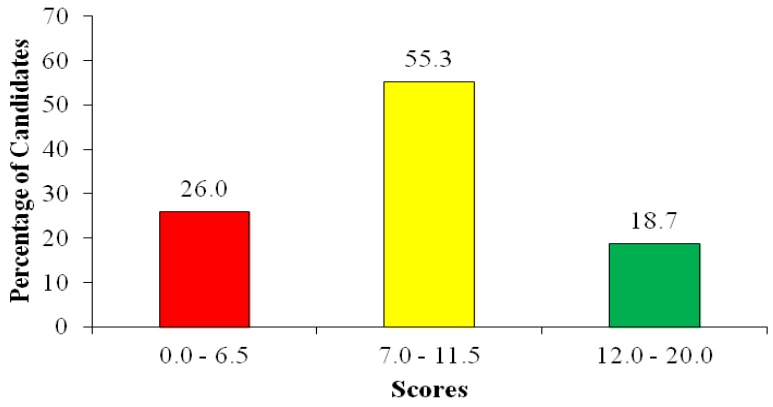


Figure 5: *The percentage of candidates' performance in question 7*

Figure 5 shows that the general performance of the candidates was good, since 74.0 per cent of the candidates scored 7.0 to 18.5 out of 20.0 marks.

The analysis of the candidates' responses shows that, the candidates who scored from 7.0 to 18.5 marks had sufficient knowledge about the methods for controlling agents of food deterioration. These candidates correctly suggested the methods of preventing food grain deterioration by insect pests. They also organised their responses in essays having introduction, main body and conclusion. However, the candidates who scored average marks provided insufficient explanations to the correct methods particularly on how each method prevents insect pests from causing food grain deterioration. Extract 7.1 illustrates the case.

07. Food grain deterioration is the process which occur mainly on food grain whereby it looses its quality interms of colour, flavour, smell and also its quantity. Food grain deterioration may occur either biologically, chemically or physically.

Insects are one of the major agents of food grain deterioration which may occur during pre-harvest, handling or actual storage. The following are the methods of preventing food grain deterioration by insects or pests:-

The use of Insecticides or pesticides:- One among the major method of preventing insect or pests from food grain deterioration is by using insecticides or pesticides which have a

great effect on killing the insect or pest rapidly when it comes into contact directly.

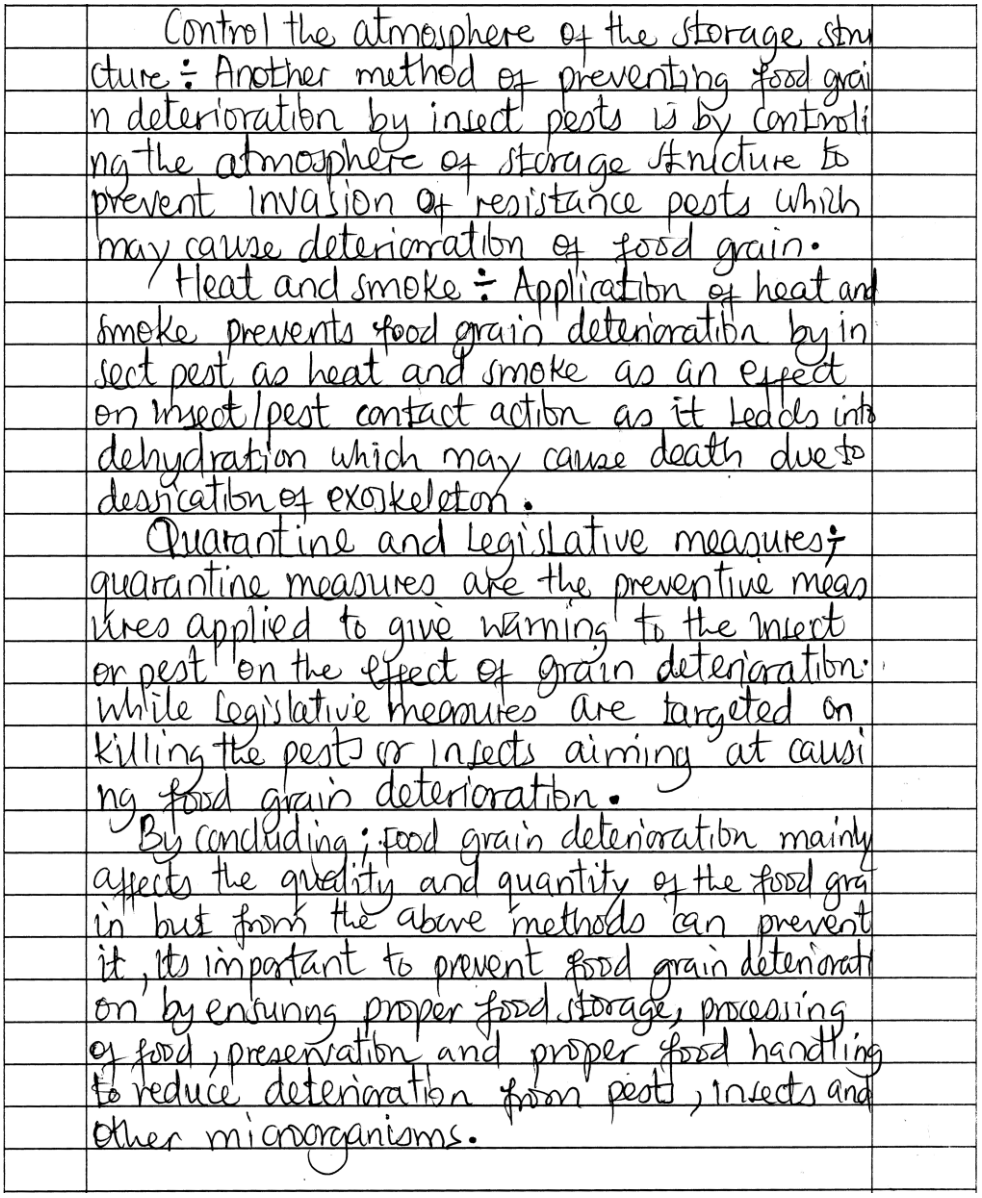
Ad-mixture of inert materials ÷ Insects and pests can be prevented by using admixture of inert materials like ashes or sand which may cause abrassion to the insect or pest, and lead into dehydration and finally death of the insect or pest.

Use of material from botanical origin ÷ materials from botanical origin includes pine oil, vegetable oil which acts as ovicides on the insects egg and cause death of the insect by interfering with its reproduction on the food grain.

Fumigation ÷ Insects and pests also can be prevented from food grain by the process of fumigation which involves the application of gaseous substance which affects the respiratory system of the pest and insect and finally cause death of the organism.

Proper sanitary measures ÷ This is mostly applied in actual storage of the food grain whereby the storage structure should be well cleaned and removing the residuals of previous crops this will help in preventing resistant pests and insects which may invade the food grain and cause deterioration.

proper drying of the food grain ÷ proper drying of the food grain will not favour the growth of microorganism and pests/insects which may cause deterioration of the food grain.


Control the atmosphere of the storage structure ÷ Another method of preventing food grain deterioration by insect pests is by controlling the atmosphere of storage structure to prevent invasion of resistance pests which may cause deterioration of food grain.

Heat and smoke ÷ Application of heat and smoke prevents food grain deterioration by insect pest as heat and smoke as an effect on insect/pest contact action as it leads into dehydration which may cause death due to desiccation of exoskeleton.

Quarantine and Legislative measures ÷ quarantine measures are the preventive measures applied to give warning to the insect or pest on the effect of grain deterioration. While Legislative measures are targeted on killing the pests or insects aiming at causing food grain deterioration.

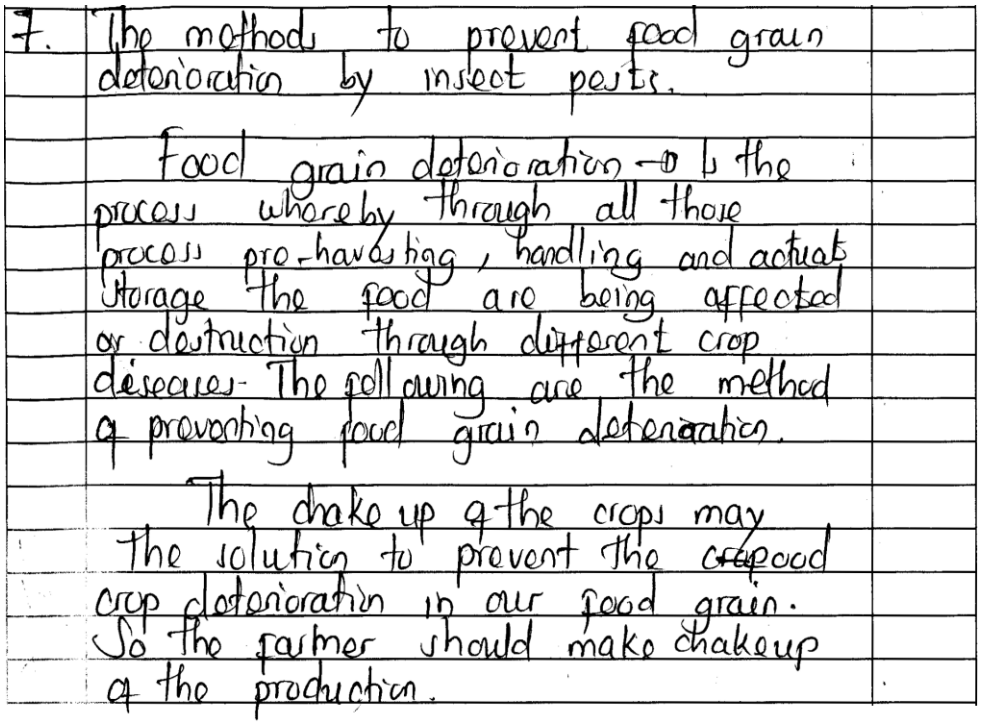
By concluding ; Food grain deterioration mainly affects the quality and quantity of the food grain but from the above methods can prevent it, its important to prevent food grain deterioration by ensuring proper food storage, processing of food, preservation and proper food handling to reduce deterioration from pests, insects and other microorganisms.

Extract 7.1: *A sample of candidates' correct response in question* 7

In Extract 7.1, the candidate was knowledgeable on the methods of preventing food grain deterioration by insect pests.

The analysis indicates further that, the candidates who scored low marks (26.0 %) provided irrelevant introduction and conclusion. These candidates also wrote incorrect methods of preventing food grain deterioration by insect pests. Others mentioned one to six correct methods. However, these candidates either provided incorrect or interchanged the explanations

hence, failed to score good marks. The incorrect methods observed in the candidates' scripts include, *good arrangement in the storage structure, avoid local methods of storage, processing the grain, extra checkups by removing them from the containers, controlled temperature and ventilation* and *store food in its optimal temperature*. Another candidate wrote the methods of preserving food as the methods of preventing food grain deterioration by insect pests as, *freezing, blanching, sterilisation, pasteurisation, use chemical preservatives, refrigeration* and *frying.* These responses imply that the candidates had inadequate knowledge of the concept of the methods for controlling agents of food deterioration. Extract 7.2 is a sample of responses from one of the candidates with weak performance.


7. The methods to prevent food grain deterioration by insect pests.

Food grain deterioration → is the process whereby through all those process pre-harvesting, handling and actual storage the food are being affected or destruction through different crop diseases. The following are the method of preventing food grain deterioration.

The shake up of the crops may The solution to prevent the crop food crop deterioration in our food grain. So the farmer should make shake up of the production.

Provision of treatment to prevent the food grain deterioration. So the one who will provide the treatment is agriculturistic to solve the problem of grain deterioration

The doorness of the shamba may prevent food crop deterioration. So that we need shake up of the product to prevent more spread of food grain deterioration.

Improvement of the material for growing crops and harvesting. Also through this the government should provide more support in preintroduction of growing Material and harvesting materia like Tractor plow and others.

Inorder to prevent food grain deterioration should introduce the monthly treatment of the crops. Also we may prevent food grain deterioration by indroducing the system of treatment of the grain or crops.

The seriousness of care the crops. Also the farmer must be stable in the looking the growing of the crops, we can fand some of the farmer Lack seriou on careing of the crops by doing that we can prevent food grain deterioration.

Therefore, The above point explain on how to prevent food grain deterioration by insect pest. Also there some other storage grain should be used so as to prevent spread of different pesticide

Extract 7.2: *A sample of candidates' incorrect responses in question 7*

In extract 7.2, the candidate provided irrelevant methods of preventing food grain deterioration by insect pests due to insufficient knowledge about food crop deterioration.

2.1.8 Question 8: Technology of specific products

The candidates were required to describe the roles of yeast fermentation in bread making process in part (a) while, part (b) required them to give the factors which affect the rate of yeast fermentation during bread making.

This question was skipped by most candidates as only 60 (20.5%) candidates who sat for the examination opted it. Among them, 2 (3.3%) scored from 12.0 to 15.5 marks, 37 (61.7%) scored from 7.0 to 11.5 marks and 21 (35.0%) scored from 2.5 to 6.5 marks. There was no candidate who scored below 2.5 marks and above 15.5 marks out of 20.0. Figure 6 is a summary of the performance.

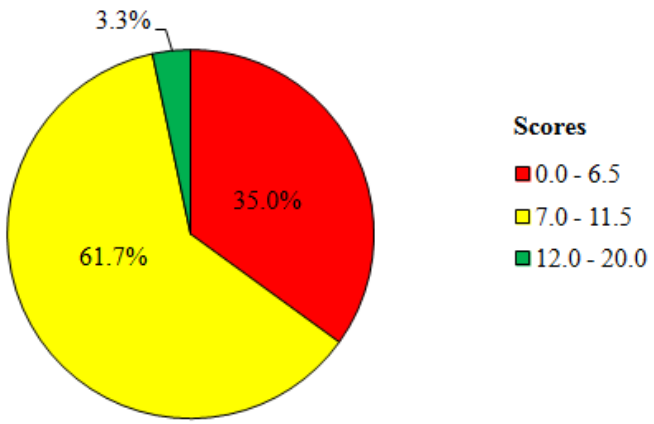


Figure 6: *The percentage of candidates' performance in question 8*

Figure 6 shows that performance of the candidates in this question was good because 65.0 per cent scored from 7.0 to 15.5 marks out of the 20.0.

The analysis of the candidates' responses to this question shows that, the candidates who had average and good performances demonstrated sufficient knowledge about yeast fermentation. In part (a), the candidates understood that, yeast fermentation produces carbon dioxide gas which makes the dough rise during baking. However, these candidates failed to score more than 2.0 marks in this part because they failed to explain properly how the process improves the handling property of the dough,

enhances the carbon dioxide gas retention in the dough and extends the shelf-life of the dough.

In part (b), the candidates correctly gave the factors which affect the rate of yeast fermentation. However, the candidates who failed to score all 12.0 marks allocated to this part because they provided 4 to 7 correct factors out of 8. The incorrect factors provided by these candidates include, *energy present, time of the day, baking experience, number of loaves required, type of flour, availability of air* and *lack of baking knowledge.*

Furthermore, 35.0 per cent of the candidates scored low marks in this question. These candidates did not understand the demand of all parts of the question thus, provided incorrect responses. In part (a), some of the candidates wrote the advantages of food fermentation as the roles of yeast fermentation in bread baking. For example, one candidate wrote, *it reduces the natural toxins present in raw foods such as tanning and phytates in cereals and cyanogens in cassava, reduces cooking time and serving fuel requirement* and *improves bioavailability of nutrients*.

In part (b), some of the candidates provided the changes which take place during baking instead of the factors which affect the rate of yeast fermentation during bread making. For example, one candidate wrote, *coagulation of protein, hardening of starch, the dough change from raw flavour to baked flavour, destruction of yeast* cells and *the dough become light*. Other candidates gave the factors which affect growth and survival of microorganisms in foods such as, *oxidation reduction, storage time, gaseous atmosphere surrounding the food, relative humidity of the atmosphere, antimicrobial constituents, biological structure, nutrient content of the bread* and *moisture content of the bread*. Extract 8 is a sample of responses with low scores given by one of the candidates.

8 Yeast is the micro-organism living called fungus. Main used in bread making. When yeast undergo fermentation, it produce Alcohol, CO_2 and Energy. Under the necessary condition which are Moisture, Temperature and sugar.

Equation:

$$\text{Yeast} + \text{Sugar} \xrightarrow[20^\circ C - 25^\circ C]{\text{fermentation}} \text{Energy} + CO_2 + \text{Alcohol}$$

Carbondioxide gas (CO_2) used in bake bread making to raise up a dough when alcohol evaporate. The following are the roles of Yeast fermantation in bread making.

To make a dough to raise up and give its sleape, in the mixture of flour and yeast with other ingredient to make a bread, Yeast play a role of raise up the dough and give it sleape. or good appearance.

Also to incorparate air into the mixture and make it sponge and light. yeast when mixed with other ingredient during first kneading the alcohol evaporate and carbondioxide (CO_2) remain.

To make the baking product with brown colour, After baking the

bread it leave brown colour at the top which mean have presence of yeast in the mixture. Which under the process called calamarization. The following are the factors which affect the rate of yeast fermentation during bread making.

Fermentation is the growth of yeast under the favourable condition which is Warmth, sugar and temperature

Mixing is the process of mixing with other ingredient to make a dough.

First kneading is the process of bold the mixture together to get a stiff and sept dough.

Raising or first proving, to leave the mixture to rest for a minutes in order to rise up.

Second kneading, is the process of kneading again in order to make the shape

~~Proving or second pro~~

Shaping is the process of making shape of your choice, the way you want your bread to look like. forexample star, Cycle, rectangal.

Proving or second proving to leave for a minutes again before go to the oven for baked.

Baking. final proctor which affect the rate of yeast fermentation during bread making, the product will be with brown in color.

Therefore; Other ingeadient that used in bread making is salt, Liquid (Milk or water), Margarine.

Extract 8: *A sample of candidates' incorrect responses in question 8*

In extract 8, the candidate failed to describe clearly the roles of yeast fermentation in bread making process in part (a). In part (b), the candidate provided the steps of bread making instead of the factors which affect the rate of yeast fermentation during bread making. The candidate scored the lowest marks.

2.1.9 Question 9: Food production

Part (a) of the question required the candidates to describe the major groups of factors which cause low food crop production, while part (b) required them to suggest the ways of improving food crop production.

This question was opted by 285 (97.6%) candidates. Among them, 4 (1.4%) scored from 13 to 15.5 marks, 220 (77.2%) scored from 7.5 to 11.5 marks, and 61 (21.4%) scored from 1.5 to 6.5 marks. Table 3 illustrates the performance.

Table 3: The percentage of candidates' performance in question 9

Scores	No. of Candidates	Percentage
0.0-6.5	61	21.4
7.0-11.5	220	77.2
12-20.0	04	1.4

Table 3 shows that the general performance in this question was good because 78.6 per cent of the candidates scored from 7.0 to 15.5 marks.

The analysis of candidates' responses in this question reveals that, 1.4 per cent of the candidates who scored high marks were aware that low food crop production is caused by environmental, economic, cultural and social, biological, and political groups of factors in part (a). However, the candidates did not score all 15.0 marks allocated to this part because they provided insufficient explanations to the mentioned factors. Those who performed averagely mixed correct and incorrect factors hence, failed to score more than 9.0 marks in this part. Others provided examples instead of groups of factors. Such examples of factors include, *dietary preferences, incidence of resistant food crop pests, lack of morale to farmers, migration of energetic group of people from rural to the cities to look for better life, floods, drought* and *lack of land for food production.*

In part (b), the candidates were aware that, food crop production can be improved through adopting soil reclamation processes, public education and proper legislation to address social cultural factors affecting food crop production, various stakeholders to address the issues and policies that affect food crop production, investing in irrigation systems rather than depending on rainfall only, and training farmers for new or modern techniques of agriculture.

On the contrary, 21.4 per cent of the candidates scored low (0.0-6.5) marks. The analysis shows that some of these candidates had insufficient knowledge about the causes of low food crop production. Others misinterpreted the requirements of the question. For example, in part (a), one candidate provided the vulnerable groups of people instead of major groups of factors which cause low food crop production as he/she wrote, *young children, pregnant women, lactating mothers* and *sick people.* Another candidate mentioned the factors which affect the choice of dishes we eat such as, *customs and taboos, body health status* and *lifestyle*. Other candidates provided irrelevant or incorrect explanations to the correctly mentioned factors.

In part (b), majority of the candidates gave a variety of incorrect ways of improving food crop production. The incorrect responses provided by the candidates include, *proper storage, treatment of insects that affect the production of food crops, timely harvesting, apply monthly treatment of food crops, proper selection of farm, provision of fertilizers, follow "kilimo kwanza", proper methods of food preservation* and *improvement of materials for growing crops and harvesting*. A few candidates managed to mention 1 or 2 relevant ways of improving food production. Extract 9 is a sample of responses from one of the candidates with weak performance.

09. a) GROUPS OF FACTORS CAUSING LOW FOOD CROP PRODUCTION.

Food crop production: Refers to the process or situation in which crops are well stored and later on produced or supplied to people. Food crop production is influenced by reliable rainfalls, pest control and also the use of fumigants to kill the weeds and insects that invades the crops. Food crop production is never affected by a single factor. The following are the major groups of factors which cause low food crop production.

Refugees: There are groups of factors which cause low food production since the food will be supplied to many people that are able to produce foods by their own instead due to wars and they migrate from one place to another and therefore causing to the production of food being low.

Elders: There are among of the major groups of factors which cause low food crop production since the elders lose appetite on food and therefore the food deteriorate and therefore resulting to increasing in wastage of food and hence causing to low food crop production.

Disabled people: There are the people that are not able to participate in crop production and therefore depending to others or to the government and therefore resulting to increase in dependance rate and therefore stagnating the economic development and hence lower food crop production.

a) **Household headed by women:** this is where by the women are regarded as disabled since they are do not work on hard activities such as men and therefore cannot produce more food as how the men does and hence resulting to low food crop production.

Land Lords: this occurs where by the land lords, invest more than the tetants and therefore the food that are produced and that of high amount is consumed by the land lords and hence resulting to low food crop production.

b) The following are the ways of Improving food crop production.

Emphasize ~~on~~ family planning: this is where by the family should have number of family members that everyone can be provided with food equal.

Provision of education: education should be provided on the use of fertilizers to prevent wilting of the crops and hence resulting to low food crop production.

Proper storage: the food crops should be stored properly to prevent invasion of pests that lowers the food crop production.

Food crop production: alleviate poverty, reduces natural calamities such as floods, drought due to presence of crops that facilitate production of rainfall.

Extract 9: *A sample of candidates' incorrect responses in question 9*

In Extract 9, the candidate explained the groups of people which cannot directly participate in food crop production in part (a). In part (b), the candidate provided incorrect explanation to a correctly mentioned way of improving food production hence, scored the lowest marks.

2.2 155/2 FOOD AND HUMAN NUTRITION PAPER 2

This paper consisted of two sections namely: A and B. Section A comprised 6 (1 - 6) short answer questions which carried 10.0 marks each. Section B comprised 3 (7 - 9) essay questions which carried 20.0 marks each. The candidates were required to answer all the questions in Section A and two questions from Section B. The pass mark in each question in Section A was 3.5, and 7.0 in Section B.

2.2.1 Question 1: Food microbiology

This question required the candidates to briefly explain the stages which bacteria undergo when introduced into a fresh food in part (a). In part (b), they were required to briefly explain what would happen when a culture of lactic acid bacteria is introduced to a glass containing fresh cow's milk.

The question was attempted by 282 (96.6%) candidates. The analysis shows that 100 (35.5%) candidates scored from 6.0 to 9.5 marks, 65 (23.0%) scored from 3.5 to 5.5 marks, and 117 (41.5%) scored from 0.0 to 3.0 marks. Figure 7 summarises the performance.

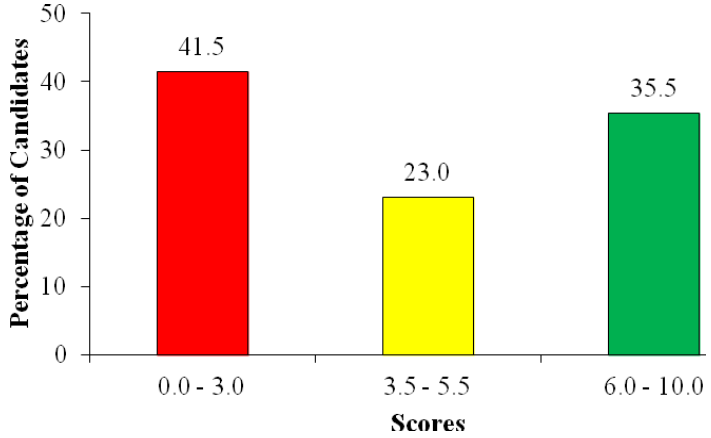


Figure 7: *The percentage of candidates' performance in question 1*

The trend of the performance indicated in Figure 7 shows that, the performance of the candidates was average because 58.5 per cent passed by scoring from 3.5 to 9.5 out of 10.0 marks.

Despite the average performance in this question, the analysis indicates 35.5 per cent of the candidates had high performance because they scored

from 6.0 to 9.5 marks out of 10.0. These candidates correctly explained the stages which bacteria undergo when introduced into a fresh food in part (a). The stages of growth provided by the candidates were: Initial/lag stage, positive growth, logarithmic (log)/exponential, negative growth, stationary, accelerated death and logarithmic death stages. However, majority of the candidates in this category failed to score all the 7.0 marks allocated to this part because either they exchanged the explanations or gave incorrect explanations to some of correctly mentioned stages. In part (b), the candidates were aware that, lactic acid bacteria ferment the milk sugar (lactose) to produce lactic acid which cause clotting of the milk. They also explained the formation of the flavour of fermented milk. The candidates who failed to score full marks in this part provided unsatisfactory explanation on the clotting process of fresh milk.

Furthermore, the analysis indicates that some of the candidates who scored low (0.0 - 3.0) marks either failed completely to provide the responses sequentially or provided less responses in both parts (a) and (b). Others misinterpreted the demand of one part or all parts of the question. For example, in part (a), one candidate mentioned five instead of seven stages of bacterial growth in the following order: *Lag phase, exponential phase, stationary, decline* and *growth phase*. In this response, the candidate listed instead of explaining the stages and he/she interchanged the positions. Another candidate mentioned, *water, temperature, pH, nutrients, air* and *time,* which are the conditions required for growth of microorganisms. In part (b), one candidate wrote, *adequate heat treatment, proper personal hygiene* and *prevent cross contamination*, which are the ways of preventing food poisoning or microbial food contamination. A few candidates mentioned the step of clotting of the milk but did not explain the process of clotting and the properties of the product. Extract 10 shows a sample of incorrect responses from one of the candidates.

1. (a) (i) Sewage.
-> Lead to the food contamination by the microorganisms such as bacteria during food preparation.

(ii) Food handlers.
-> Such as the cookers who do not consider personal hygiene and sanitation may contaminate the food through sneezing and coughing.

(iii) Poor - kitchen hygiene.
-> If the kitchen is not well cleaned with safety water may contaminate the food during food preparation. Such bacteria include salmonella.

(iv) Poor - reheating of the foods.
-> Such as the left over food cause the growth of the microorganisms in the foods such as bacteria.

(v) Animal feeding may cause the microorganism to contaminate the food. For example present of animal faeces in the foods.

(vi) Air and dust contaminate the food by the facilitate the growth of the microorganisms such as bacteria.
(vii) Soil cause the microorganisms to contaminate the foods such as bacterias and cause spoilage of foods if not well washed.

(b) (i) Lactic acid bacteria being added to a glass containing fresh cow's milk cause curdling of milk and form curds and whey.

(ii) curds are used for different food desserts and cheese.

(iii) It is used by the vegetarian people.
- Lacto-vegetarian and Lactoovo-vegetarian consume sour milk with their food or diet to improve their health status.

Extract 10: *A sample of candidates' incorrect responses in question 1*

In Extract 10, the candidate provided the primary sources of microbial food contamination in part (a). In part (b), the candidate failed to understand that lactic acid bacteria cause fermentation and not curdling of fresh milk.

2.2.2 Question 2: Catering and institutional feeding

The candidates were required to differentiate outdoor catering from leisure-linked catering establishments in part (a). In part (b), they were required to briefly describe the common types of transport catering establishments.

The question was attempted by all 292 (100%) candidates. The analysis indicates that, 97 (34.2%) candidates scored from 6.0 to 9.0 marks and 97 (34.1%) scored from 3.5 to 5.5 marks. The candidates who scored from 0.0 to 3.0 marks were 90 (31.7) of whom, 44 (15.5%) scored 0.0. This data is summarised in Figure 8.

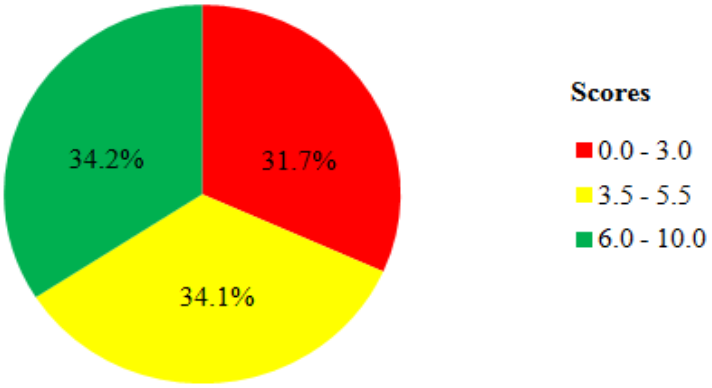
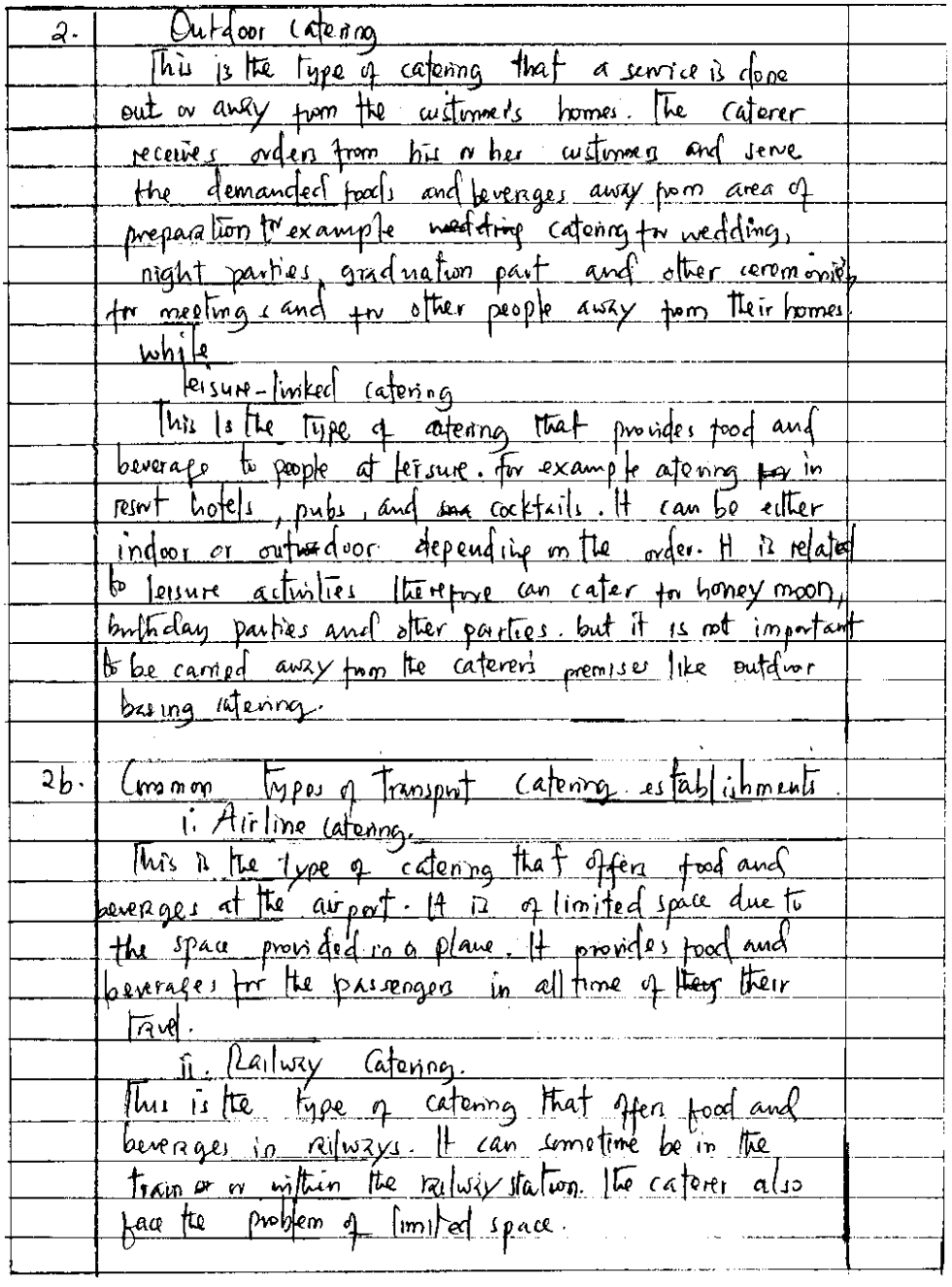


Figure 8: *The percentage of candidates' performance in question 2*

From Figure 8, more than half (68.3%) candidates scored from 3.5 to 9.0 marks indicating a good performance.

The analysis on the candidates' responses shows that, some of the candidates with good performance correctly differentiated the given terms as, *outdoor catering is the provision of food and drinks away from home base supplies such as for parties while, leisure–linked catering is the provision of food and drinks to people at rest or recreation activities* in part (a). However, the candidates with average performance provided partial difference hence, failed to score full marks in this part.

In part (b), most of the candidates correctly provided the types of transport catering establishments. The candidates who failed to obtain all the 8.0 marks allocated to this part, either provided 2 to 3 out of four correct types or provided unclear or incorrect explanations to some of the mentioned types of transport catering establishments. Extract 11.1 is a sample of responses from a script of one of the candidates with good performance.



2. Outdoor catering

This is the type of catering that a service is done out or away from the customers homes. The caterer receives orders from his or her customers and serve the demanded foods and beverages away from area of preparation for example ~~wedding~~ catering for wedding, night parties, graduation part and other ceremonies for meeting, and for other people away from their homes while

leisure-linked catering

This is the type of catering that provides food and beverage to people at leisure. for example catering ~~for~~ in resort hotels, pubs, and ~~and~~ cocktails. It can be either indoor or ~~out~~outdoor depending on the order. It is related to leisure activities therefore can cater for honey moon, birthday parties and other parties. but it is not important to be carried away from the caterer's premises like outdoor basing catering.

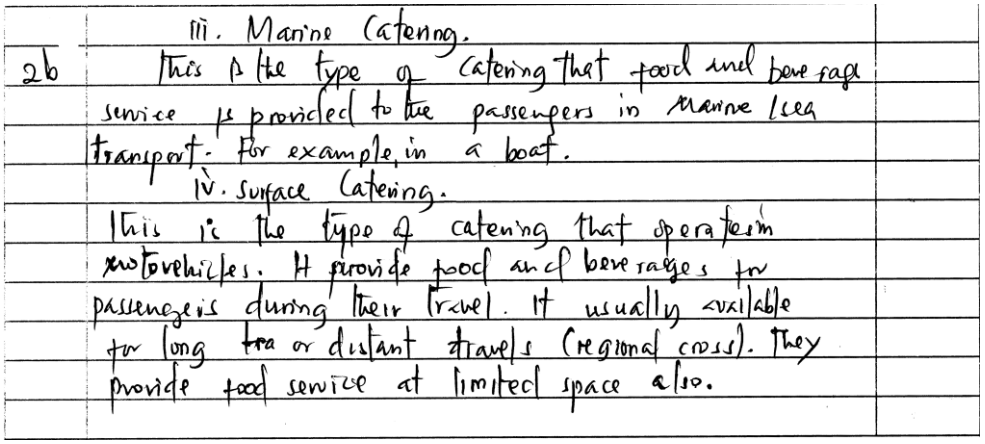
2b. Common types of Transport catering establishments

i. Airline catering.

This is the type of catering that offers food and beverages at the airport. It is of limited space due to the space provided in a plane. It provides food and beverages for the passengers in all time of ~~they~~ their travel.

ii. Railway Catering.

This is the type of catering that offers food and beverages in railways. It can sometime be in the train or in within the railway station. The caterer also face the problem of limited space.



Extract 11.1: *A sample of candidates' correct responses in question 2*

In Extract 11.1, the candidate managed to differentiate outdoor from leisure-linked catering in part (a) and described the common types of transport catering establishments in part (b).

Further analysis reveals that, the candidates with weak performance (31.7%) had inadequate knowledge of the types of catering. In part (a), the candidates provided incorrect difference between the given types of catering. For example, one of the candidate wrote, *Outdoor catering involves provision of food and drinks and sometimes accommodation to the customers from the outside the establishment while leisure–linked catering involves provision of food and drinks to the customers under network of several establishments found in various places.* Another candidate wrote, *Outdoor catering refers to the catering services such as canteen while leisure–linked catering refers to the catering services such as Table d'hote and A'la carte.*

In part (b), some of the candidates managed to mention 1 correct type of transport catering establishments. Other candidates misinterpreted the demands of this part of the question. For example, one candidate wrote, *hotel, snacks bar, restaurant and pubs*, which are the types of commercial catering and not types of transport catering establishments. Extract 11.2 is a sample of responses from a script of one of the candidates from this category.

2. a. Outdoor catering doesn't provide accommodation to customers while leisure - linked catering may provide place for resting to customers.

Also

Outdoor catering the customer can take away the foods But In leisure - linked ~~cust~~ catering the customer doesn't ~~do~~ go away with foods.

2b

i) Industrial catering

This is the catering which offer ~~f~~ services like foods, drinks to ~~industrial~~ people but ~~also~~ under contracts-

ii) Commercial catering

This offer food to people but the customer must pay for the meals inorder to maximize profit

iii. Welfare catering

This offers services to the customers ~~as~~ like food, drinks and sometime accommodation without any payment example in hospitals.

iv. Outside catering

meals can be supplied or offered at all courses.

Extract 11.2: *A sample of candidates' incorrect responses in question 2*

In Extract 11.2, the candidate failed to differentiate outdoor catering from leisure-linked catering establishments in part (a). In part (b), the candidate provided the types of catering establishments instead of the types of transport catering establishments.

2.2.3 Question 3: Nutrition programme planning and intervention

The candidates were required to give the importance of nutrition education in part (a). In part (b), they were required to outline the points to be included in the nutrition education presentation on the prevention of protein-energy malnutrition among pre-school children.

The question was attempted by all 292 (100%) candidates. Among them, 38 (13.0%) scored from 6.0 to 9.5 marks, 127 (43.5%) scored from 3.5 to 5.5 marks and 127 (43.5%) scored from 0.0 to 3.0 marks. This performance is illustrated in Figure 9.

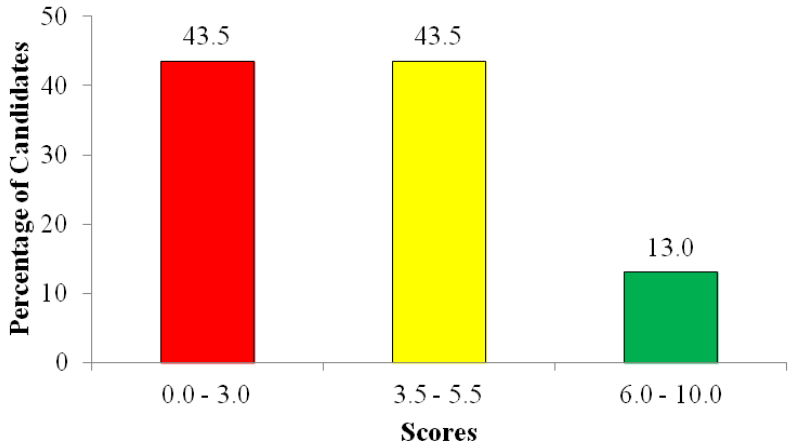


Figure 9: *The percentage of candidates' performance in question 3*

Figure 9 shows an average performance as 56.5 per cent of the candidates passed by scoring from 3.5 to 9.5 marks.

The analysis of the candidates responses indicates that, the candidates who scored high marks (13.0%) were competent in the needs for nutrition education and its roles in preventing the prevailing malnutrition among children in the society. They correctly gave the importance of nutrition education in part (a). In part (b), the candidates correctly outlined the points to be included in the nutrition education on the prevention of protein-energy malnutrition among pre-school children. However, most of the candidates failed to score full (10.0) marks because they provided partial responses to one part or both parts of the question. Extract 12.1 is a sample of responses from one of the candidates from this category.

3a i) It helps to provide knowledge based on food and nutrition.
- Through nutrition education people get knowledge on the matters concerned with food and nutrition hence they can prepare a very well balanced meals as they can use proper methods and the right quantities and quality of ingredients in the food preparation. Example: People are taught ways or methods of cooking which aids in preserving nutrients during food preparation eg poaching.

ii) It helps to reduce the rate of malnutrition.
- Through nutrition education people get to learn the important foods with essential nutrients and the quantities to be consumed so as to prevent ~~mouth~~ malnutrition. Example: Proper weaning practices taught to women in clinics: reduce protein energy malnutrition especially to children.

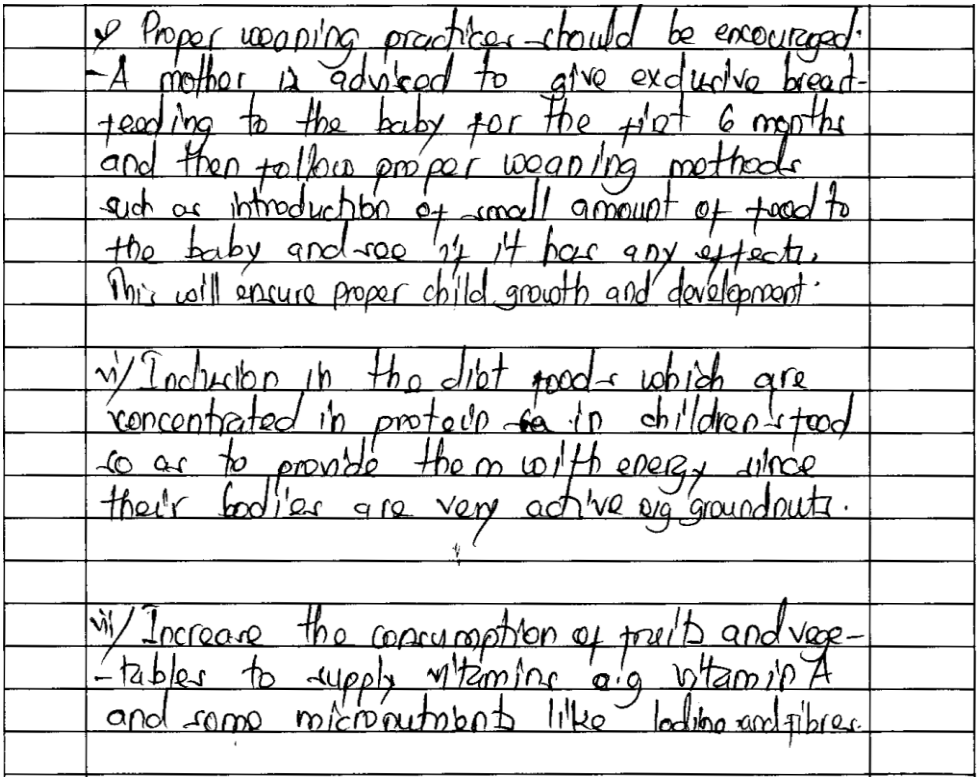
iii) It helps to improve the nutrition status of the people as people are taught different ways for protecting their health such as maintaining hygiene which will help to prevent infections-

-and diseases and hence which may lead to body weakness. and also they are taught about health eating example: Eating less fat and eating more fibres.

b. i/ The amount of food should be increased at each meal. This will help to satisfy the body needs of nutrients to the body and hence prevent malnutrition as in between meals such as snacks are reduced.

ii/ Childrens feeding frequency should be increased since they are very active and hence their bodies utilize large amount of nutrients to spend on their activities and also because the childrens feel hungry frequently.

iii/ Breast feeding should be promoted. A child should be fed for atleast 2 years so that she can have a good health since breast feeding has numerous advantage such as anti allergic effect and increase immunity to the infant due to presence of immunoglobulin



Extract 12.1: *A sample of candidates' correct responses in question 3*

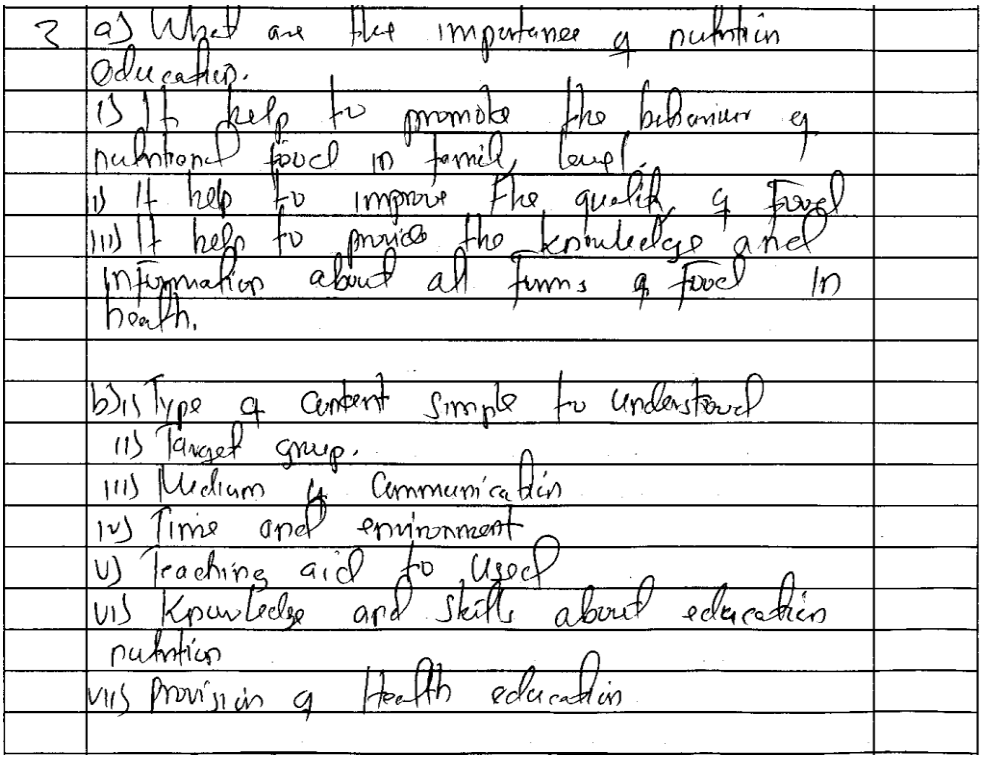
In Extract 12.1, the candidate responded correctly to both parts (a) and (b).

The candidates who scored average marks (43.5%) managed to give correct responses in part (a) of the question. However, they failed to score all 7.0 marks allocated to part (b) because some of them repeated some of the points. For example, one candidate wrote, *increase the production and intake of the foods which are rich in vitamins* and *encourage more consumption of vitamin A to prevent vitamin A deficiency disorder (VAD) among children,* as two different points. Others failed to provide the required number of points to this part.

Further analysis shows that the candidates who scored below pass mark (43.5%) had inadequate knowledge about nutrition education, particularly on its importance and roles in preventing protein-energy malnutrition among children. Those who scored from 1.0 to 3.0 marks (41.1%) outlined 1 to 2 out of 3 points in part (a). The common points mentioned by most of the candidates were, *provide education for the elimination of hunger and malnutrition in the society* and *to enable people understand food as the best*

drug for protection and maintenance of good health. Other candidates were able to provide 1 to 3 points to be included in the nutrition education in part (b).

On the other hand, the candidates who scored 0.0 and 0.5 marks failed to respond correctly to both parts (a) and (b). For example, in part (a), one candidate wrote, *body building and repair, provide energy* and *regulate the body processes*. This candidate did not understand that these are the functions of food in the body and not the importance of nutrition education. Other candidates mentioned the signs and symptoms of protein-energy malnutrition such as, *nutritional anaemia, poor body growth of children, body irritation, oedema, moon face* and *muscle wasting*. These responses imply that the candidates misunderstood the requirements of the question. Extract 12.2 is a sample of responses from one of the candidates with weak performance.


3 a) What are the importance of nutrition education.
i) It help to promote the behaviour of nutritional food in family level.
ii) It help to improve the quality of food
iii) It help to provide the knowledge and information about all forms of food in health.

b) i) Type of content simple to understood
ii) Target group.
iii) Medium of Communication
iv) Time and environment
v) Teaching aid to used
vi) Knowledge and skills about education nutrition
vii) Provision of Health education

Extract 12.2: *A sample of candidates' incorrect responses in question* 3

In Extract 12.2, the candidate provided irrelevant importance of nutrition education in part (a) and the factors to consider in planning for a successful nutrition education programme in part (b).

2.2.4 Question 4: Food microbiology

The question required the candidates to state the ways through which food becomes contaminated by the salmonellae found in faeces in part (a) and to give the control measures of salmonella food poisoning in part (b).

This question was attempted by all 292 (100%) candidates. The analysis indicates that, 194 (79.5%) of the candidates scored from 6.0 to 10.0 marks, of whom 36 (12.3%) scored 10.0 marks. The candidates who scored from 3.5 to 5.5 marks were 38 (18.1%), while 60 (2.4%) scored from 0.5 to 3.0 marks. Figure 10 summarises the performance of the candidates in this question.

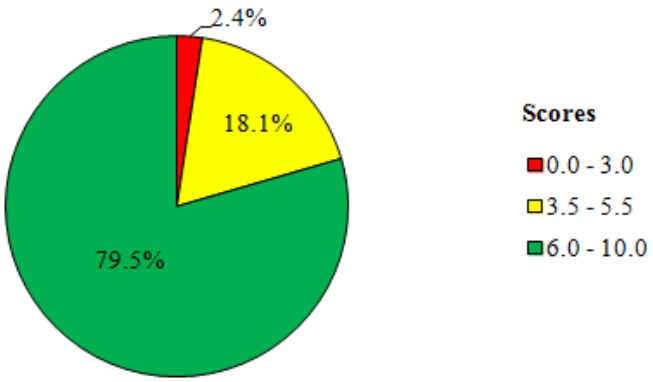


Figure 10: *The percentage of candidates' performance in question 4*

Based on the analysis in Figure 10, the general performance in this question was good because 97.6 per cent of the candidates passed the question by scoring from 3.5 to 10.0 marks.

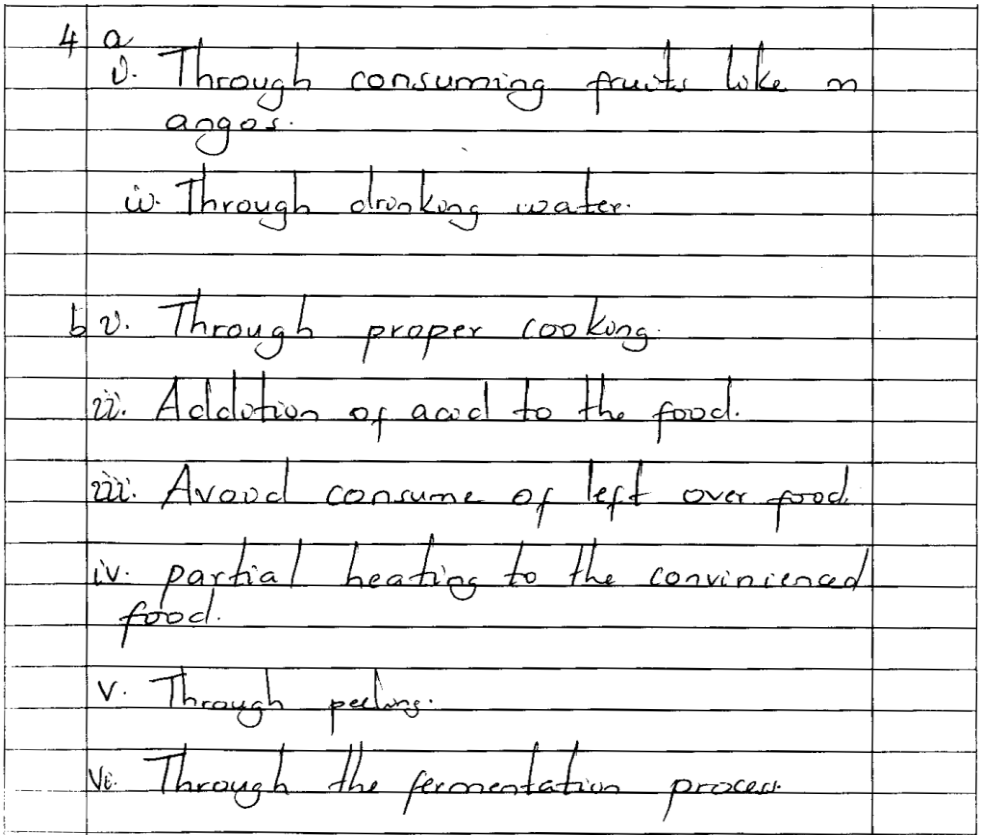
The candidates who scored average and good marks were aware of the primary sources of microbial food contamination. In part (a), they explained clearly that *food may become contaminated by salmonella from the animal gut content contaminating the meat surface during slaughtering or via faeces of pests that come into contact with food, by salmonella from the contaminated environment and indirect faecal contamination as a result*

of poor hygiene. Those who failed to score all the 3.0 marks allocated to this part provided correctly 1 instead of 2 points.

In part (b), most of the candidates correctly provided control measures of salmonella food poisoning. However, some of the candidates gave 3 to 6 correct control measures of salmonella food poisoning, hence failed to score all the 7.0 marks.

On the contrary, some of the candidates who scored lower (0.5 to 3.0) marks misinterpreted the demands of all parts of this question. Others demonstrated insufficient knowledge about the concept of microbial food contamination, thus provided irrelevant responses. In part (a), some of the candidates mentioned the examples of personal hygiene practices. For example, one candidate wrote, *wash hands with soap after visiting toilet and before touching food, sick people not allowed in the kitchen* and *cough and sneeze on handkerchief.*

In part (b), some of the candidates mentioned the conditions necessary for bacterial growth such as, *moisture, humidity*, *temperature* and *food*. Others repeated the points. For example, one candidate wrote, *use different cutting boards for raw meat and the foods which do not require further processing* and *keep uncooked foods and cooked foods separately*, as 2 different points while they fall under 'prevention of cross contamination'. Extract 13 is a sample of responses from one of the candidates who scored the lowest marks.



Extract 13: *A sample of candidates' incorrect responses in question 4*

In Extract 13, the candidate mentioned incorrect points in all parts except in part (b) (i) where he/she provided a partially correct control measure of salmonella food poisoning. The candidate scored the lowest marks.

2.2.5 Question 5: Malnutrition

The question required the candidates to explain the causes of nutritional anaemia in part (a) and to explain the ways of preventing nutritional anaemia to vulnerable age groups in part (b).

The analysis shows that the question was attempted by all 292 (100%) candidates. Among them, 146 (50.0%) scored from 6.0 to 9.0 marks, 94 (32.2%) scored from 3.5 to 5.5 marks and 52 (17.8%) scored from 0.0 to 3.0 marks. Figure 11 is a summary of this performance.

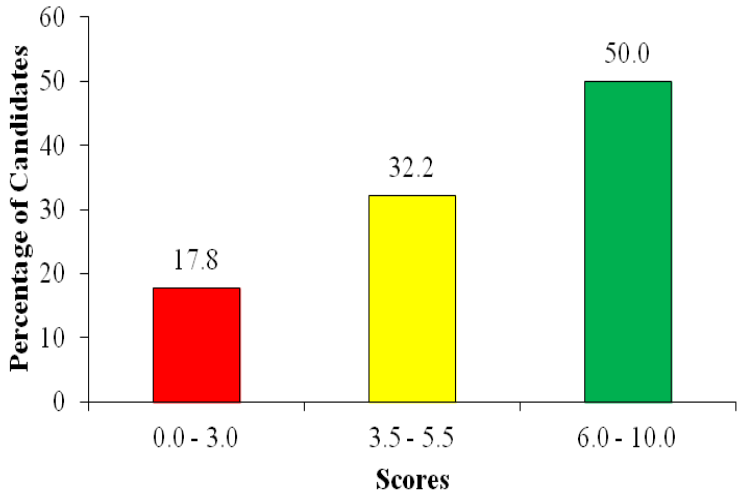


Figure 11: *The percentage of candidates' performance in question 5*

Figure 11 shows good performance in this question, as 82.2 per cent of the candidates passed by scoring average marks or above.

The analysis shows that the candidates with good performance were knowledgeable about the nutritional disorders, particularly on the causes and preventive measures. These candidates correctly explained the causes of nutritional anaemia in part (a). In part (b), they correctly explained the ways of preventing nutritional anaemia to vulnerable age groups. Those who scored average marks provided partial responses to one or both parts (a) and (b). Extract 14.1 is a sample of responses from a script of one of the candidates with good performance.

5a) Causes of Nutritional anemia

a) Low intake of iron foods

This is the main cause of nutritional anemia the intake of the iron determine the precence of iron in the body if the intake of iron is low this will cause nutritional anemia.

b) Malabsorption of iron in the body

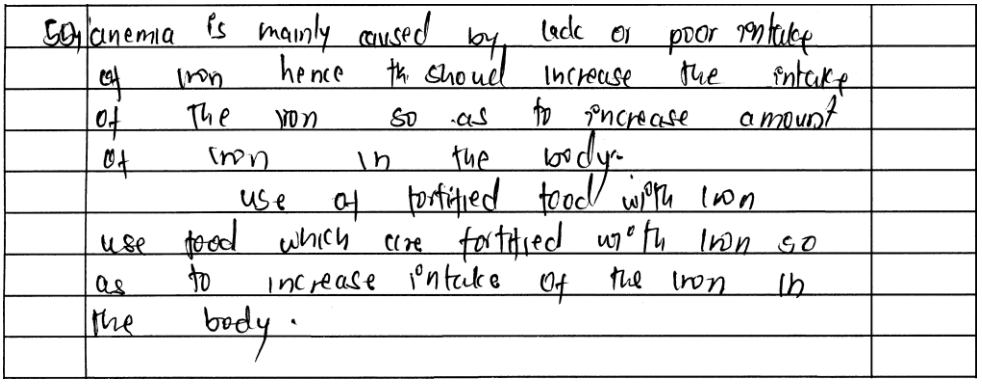
There are several factors which may cause malabsorption of iron in the body such as precence of phytates, lack of vitamin C, type of the iron which may hinder or lower absorption of the iron in the body.

c) Increase in demand of the body

when the iron is needed in extra amounnd also may cause ~~malnutri~~ nutritional anemia as the ~~et~~ iron which is available do not meet the requirement of the body example pregnant mother need more iron for the formation of babys brain for blood needed during delivery as well as blood for ~~pl~~ her normal body activities if the ~~b~~ supplied iron do not fit to the demand of the body cause nutritional anemia.

5b) Ways to prevent mal nutritional anemia to the ultra violet group

Increase intake of iron foods, As nutritional



Extract 14.1: *A sample of candidates' correct responses in question* 5

In Extract 14.1, the candidate correctly responded to both parts (a) and (b). This shows that the candidate is knowledgeable about nutritional disorders.

Some of the candidates who scored low marks in this question misunderstood the demands of all parts. Others provided irrelevant responses due to lack of knowledge about the causes and control measures of common nutritional disorders. For example, some of the candidates explained the causes of undernutrition in part (a) and the control measures of a specific disorder in part (b). Other candidates provided the causes of low food production and the methods of controlling low food production instead of the causes and prevention of nutritional anaemia, respectively. Extract 14.2 is a sample of responses from a script of one of the candidates with weak performance.

5. Three causes of nutrition anaemia

i) lack of vitamin b.

This type of vitamin are able to make People People strong during the making body with higher amout of the body to having higher amount of Vitamin.

ii) lack of iron.

This is the kind of types of food which will make food to makes to the frequency of anaemical in small amount This will make people to having alot of the Minear example fish.

iii) lack of ~~x~~ immunization.

This is process body to protect against disease ~~to~~ so if this it will being in small amount it can cause disease which will make body general weakness.

b) two ways of preventing nutritional anaemia to vulnerable age group

i) eating the food which are based in iron and vitamin k. This mean that when a parson will eating these food will make him to being ~~so~~ strong and aware.

ii) To eating more balance diet.

This mean when will being eating balanced diet will ~~use~~ keep him to being aware from Disease Make body to having ability making body and being against from diseases.

Extract 14.2: *A sample of candidates' incorrect responses in question* 5

In extract 14.2, the candidate provided incorrect causes and preventive measures of nutritional anaemia.

2.2.6 Question 6: Nutrition programme planning and intervention

This question required the candidates to explain the natural methods of birth control.

The question was attempted by 289 (99.0%)%) candidates. Among them, 167 (57.8%) candidates scored from 6.0 to 10.0 marks, 93 (32.2%) scored from 3.5 to 5.5 marks, and 29 (10.0%) scored from 0.0 to 3.0 marks. Figure 12 illustrates the performance.

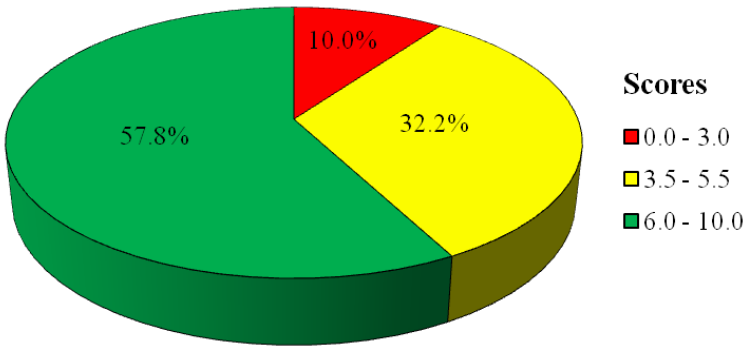


Figure 12: *The percentage of candidates' performance in question 6*

Based on the analysis in Figure 12, the general performance of the candidates in this question was good because 90 per cent of the candidates scored from 3.5 to 10.0 marks.

The candidates who performed well in this question were aware of the methods of birth control. These candidates explained precisely how the withdrawal, calendar, cervical mucus, symptothermal, basal body temperature, lactational infertility, ovulation indicator testing kit and abstinence methods work to prevent pregnancy without the use of chemicals or physical devices. However, most of the candidates in this category did not score above 8.0 out of 10.0 marks because either they provided unsatisfactory explanations to the correctly mentioned methods or provided 2 to 4 correct methods out of 5. Extract 15.1 shows a sample of responses from one of the candidates with good performance.

6 Natural Birth Control methods.

(i) Withdraw natural method.

- Is the type of Contraceptic method were during sexual Intercourse ~~sperms~~ Penis ~~is are~~ taken out from the vagina before ejaculation to ensure no fertilization.
- This method is not 100% effective.
- It make Male to lost satisfication during Copulation.
- Withdraw has no side effect on the body.

(ii) CERVICAL MUCUS.

- The thinner, watery and running cervical mucus favor fertilization as it facilitate purpusion of sperm toward an oocyte.
- Thicker cervical mucus hinder fertilization and hence this periods favors prevention of fertilization.
- This method is done reguraly and it need participation of both parteiner.
- Though it is not much effectively but it has no side effect on the body

(iii) SYMPTOTHERMAL.

- Is the contraceptic method which involues checking of Bodytemperatural and Cervical mucus together.
- Were if the body temperature is high and the cervical mucus is very running, It marks danger period the period which fertilization can easly occur but

in presence of thick and lower body temperature birth Control is favoured due to hinderance in fertilization.

(iv) SAFE DAYS / CALENDAR DAYS / RYTHM

This day are usually and carefully counted.

- The 3 or 4 days before and after Ovulation. (that period of 28 days) are danger days and they should be abstained as fertilization can easly take place.
- But also Days after Mentrual are the safe days in which fertilization can not take place, specifically 4 to 5 days Only.
- This method need carefullness and can not be 100% effectively as Implant method.

(v) BODY TEMPERATURE:

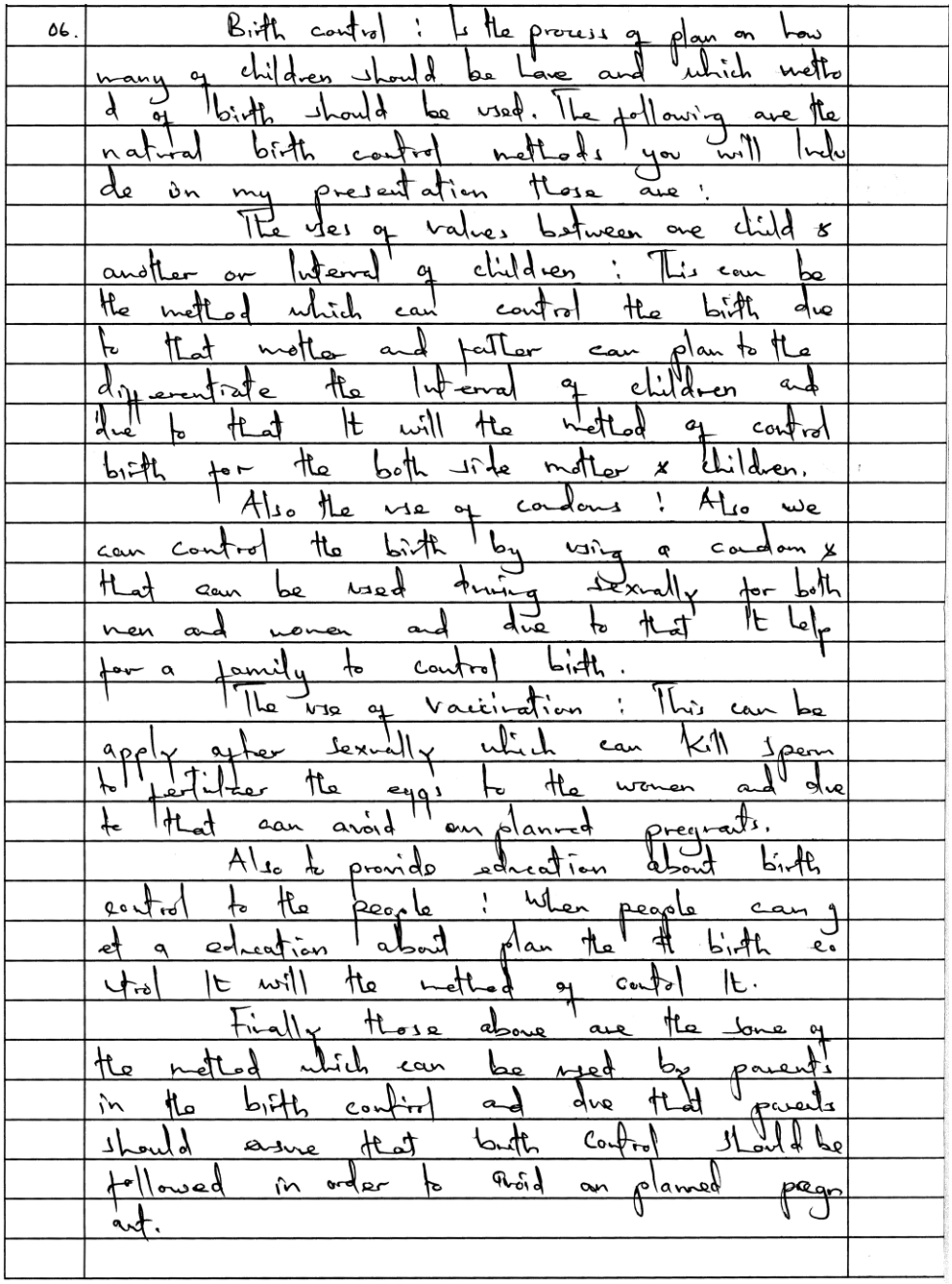
- The body temperature is measure when at rest that if it exeeds 36 this means - fertilization can easly occur. (37.8°)
- For the fertilization not to occur the body at rest should have temperature of at least 36°c
- This methods can be affected by rise in body temperature due to disease and Infections.
- Also it is not surely effective.

Extract 15.1: *A sample of candidates' correct responses in question* 6

In extract 15:1, the candidate correctly provided the natural methods of birth control.

The candidates who scored low marks (10.0%) had insufficient knowledge of birth control methods. Some of the candidates mixed natural and chemical methods of birth control. Others were able to list 1 to 3 correct natural birth control methods but gave incorrect or unclear explanations on how they prevent pregnancy. For example, one candidate mentioned, *calendar method and abstaining sex method* then gave the following explanations: *calendar method help women to know the dangerous days and free days; abstaining sex method helps to control birth by preventing the sperm to meet the egg so fertilization of the egg cannot occur*. Extract

15:2 is a sample of responses from one of the candidates who scored lower marks.



06. Birth control : Is the process of plan on how many of children should be have and which method of birth should be used. The following are the natural birth control methods you will include on my presentation those are :

The use of values between one child & another or interval of children : This can be the method which can control the birth due to that mother and father can plan to the differentiate the interval of children and due to that it will the method of control birth for the both side mother & children.

Also the use of condoms : Also we can control the birth by using a condom & that can be used during sexually for both men and women and due to that it help for a family to control birth.

The use of vaccination : This can be apply after sexually which can kill sperm to fertilize the eggs to the women and due to that can avoid an planned pregnats.

Also to provide education about birth control to the people : When people can get a education about plan the ft birth control it will the method of control it.

Finally those above are the tone of the method which can be used by parents in the birth control and due that parents should asure that birth control should be followed in order to void an planed pregnant.

Extract 15:2: A sample of candidates' incorrect responses in question 6

In Extract 15:2, the candidate provided wrong natural methods of birth control.

2.2.7 Question 7: Malnutrition

In this question, the candidates were required to describe the anthropometric methods of assessing the nutritional status of an individual and to give the advantages and limitations of using anthropometry.

The question was opted by 89 (30.5%) candidates. Among them, 8 (9.0%) candidates scored from 12.0 to 14.0 marks, 53 (59.5%) scored from 7.0 to 11.5 marks and 28 (31.5%) scored from 0.5 to 6.5 marks. This performance is summarised in Figure 13.

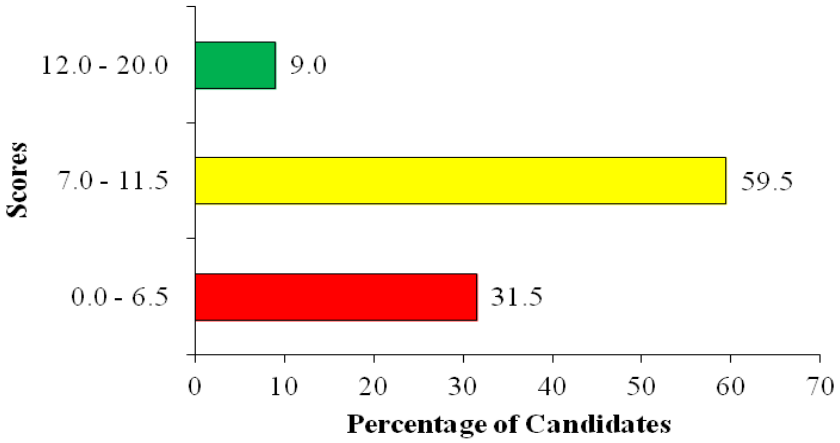


Figure 13: *The percentage of candidates' performance in question 7*

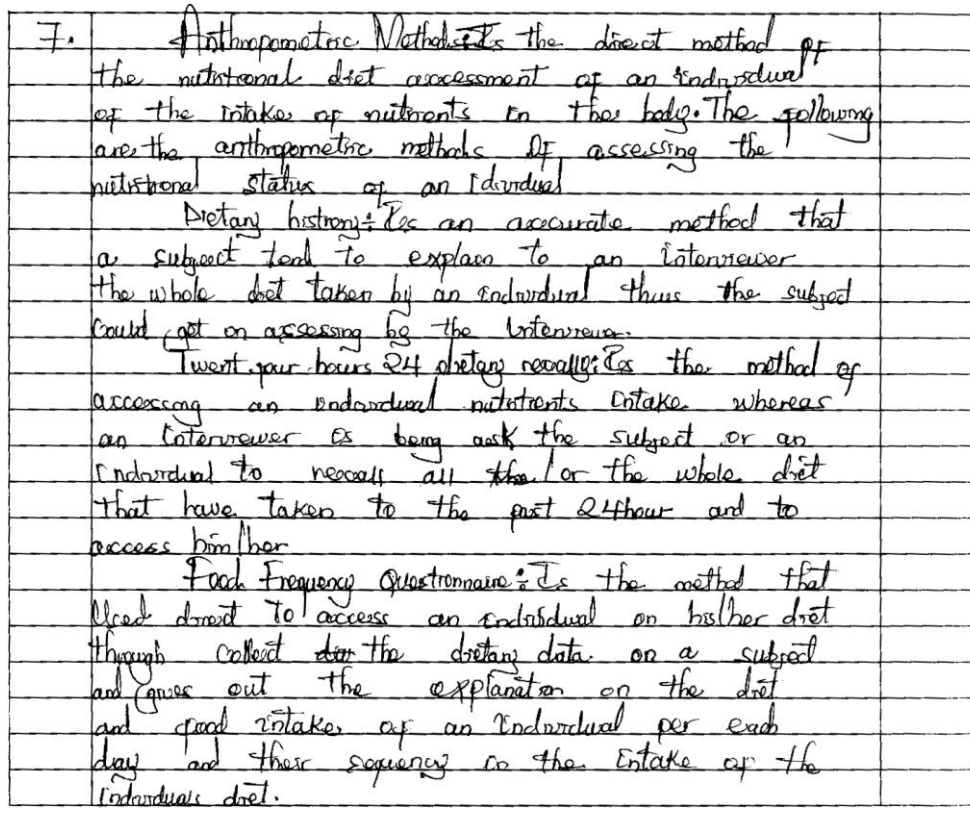
Figure 13 shows good performance in this question, because 68.5 per cent of the candidates scored from 7.0 to 14.0 out of 20.0 marks.

The analysis of the candidates' responses shows that, most of the candidates who scored average marks or above were aware of the methods of assessing the nutritional status of an individual. They correctly described the anthropometric methods such as, *weight for age, mid-upper arm circumference, skin fold thickness, chest circumference, head circumference, weight for height/length, waist circumference and height/length for age*. However, the majority of the candidates did not score full marks in the second part of the question because they failed to provide correct advantages and limitations of using anthropometry.

The analysis indicates further that, the candidates who scored low marks (31.5%) had insufficient knowledge about the assessment of nutritional

status of the people. Most of the candidates managed to mention at least 1 correct method but failed to give correct explanations. Others provided a variety of incorrect anthropometric methods. For example, one candidate wrote, *weight and age, height and age, neck circumference, body size, chest diameter* and *wrist circumference.*

It was observed that most of the candidates in this category gave incorrect advantages of using anthropometry. For example, one candidate wrote, *it helps monitoring stages of growth of children, it can change the eating habits of the people.* Another one wrote, *it provides the progress of the growth of an individual, it can be used to assess growth of different parts of the body at the same time.* Likewise, the candidates provided incorrect limitations of using anthropometry which include, *it cannot give the causes of poor nutritional status, it require food and nutrition experts for assessment, data are not confidential, it is expensive method, it is difficult to interpret the obtained data, cannot detect early stages of nutrients deficiency* and *it is used only in a small population*. Extract 16 is a sample of responses from one of the candidates with low scores.



7. Anthropometric Method: It's the direct method of the nutritional diet assessment of an individual of the intake of nutrients in the body. The following are the anthropometric methods of assessing the nutritional status of an individual

Dietary history: Its an accurate method that a subject tend to explain to an interviewer the whole diet taken by an individual thus the subject could get on assessing by the interviewer.

Twent four hours 24 dietary recall: Its the method of accessing an individual nutrients intake whereas an interviewer is being ask the subject or an individual to recall all the/or the whole diet that have taken to the past 24hour and to access him/her

Food Frequency Questionnaire: Its the method that used direct to access an individual on his/her diet through collect the dietary data on a subject and figure out the explanation on the diet and food intake of an individual per each day and their sequency in the intake of the individuals diet.

7. Food diary technique:- Its one of the direct method of nutritional assessment of an individual thus an individual is being accessed by an interviewer or an ~~quiet~~ questionnaire on assessment of diet per day an individual.

Observable food technique:- Its the method that used to access an individual's diet only on observing of the food intake of individual; it also an accurate method.

Clinical method:- Its the direct method or a the accessing of individual's diet through having a direct check on clinical with a specialist. Example Clinical check up of body

Biochemical Method:- Its the direct method that it including an individual diet assessment through taking up of laboratory instrumental per accessed individual. The following are the two advantages of of using anthropometry

It time saving:- This anthropometric method it save time because it is very quick and easy to use it

It some of the methods are accurate:- This anthropometric method. It's some of methods are, accurate example dietary history.

The following are the limitations of using an anthropometry methods.

It's expensive:- Some of the methods in the anthropometric they cost alot of money thus making it very expensive.

It's a time Consume:- In this method of an anthropometric method it's cost time some of it's techniques and method, takes too big to get to access per an individual.

Generally:- Anthropometric techniques theses methods enable the individual to be accessed from his/her own diet intake per daily

Extract 16: *A sample of candidates' incorrect responses in question* 7

In extract 16, the candidate provided the general methods instead of the anthropometric methods used for assessing the nutritional status of the individual. The candidate also gave incorrect advantages and limitations of using anthropometry.

2.2.8 Question 8: Catering and institutional feeding

The question required the candidates to describe the importance of food menu in part (a) and the types of menus in part (b).

The question was opted by 215 (73.6%) candidates. Data shows that 107 (49.8%) candidates scored from 12.0 to 18.0 marks, 82 (38.1%) scored from 7.0 to 11.5 marks, and 26 (12.1%) scored from 1.0 to 6.5 marks. Figure 14 summarises this performance.

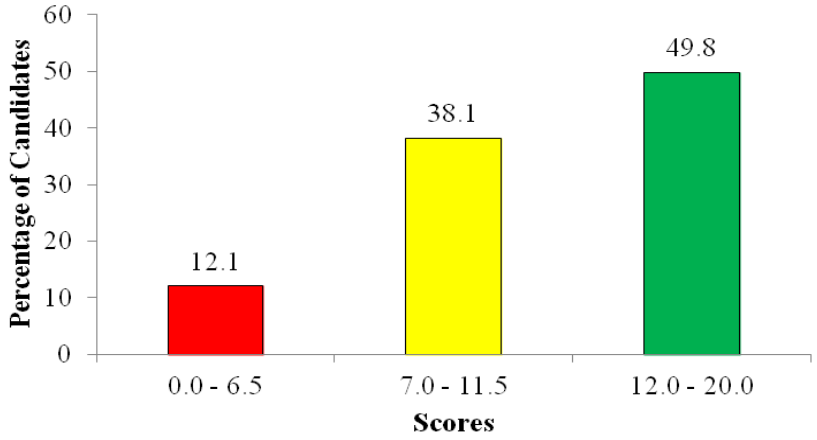


Figure 14: *The percentage of candidates' performance in question 8*

Figure 14 shows a good performance because 87.9 per cent of the candidates passed by scoring from 7.0 to 18.0 marks.

The analysis of the candidates' responses shows that, the candidates who scored average marks or above were knowledgeable about the concept of menu. These candidates satisfactorily explained the importance of menus in part (a) and the types of menus in part (b) of this question. However, the candidates did not score some marks in this question because they provided less than the required number of responses in each part. Extract 17.1 is a sample of correct responses from one of the candidates.

Qn 8.

Menus is the communication between the caterer and the customer. It inform the customer on what the caterer can offer at a certain catering establishment. ~~The~~ In order for a catering business to ~~be~~ get ~~success~~ success it should have a menus since it act as a guidelines. The following are some of the importance of food menus;

Its the means of communication between the caterer and customers; this is the one among the importance of menus in catering business since it inform the customer on what the caterer can offer. Also it show list of dishes offered.

It helps the customer to spend money according to his or her budget; this also is an advantage of food menus because it show all ~~of~~ food dishes prepared in a certain establishment and their prices so enable customer to choose on how much money may use depend on the kind of services he or she prefer example soups = 2000/=

It save time; this also is an advantage of food menus in a catering business because dishes prepared in each day is well known by ~~the~~ the staff members so it reduce wastage of time thinking on what kind of meals is required and also reduce time of going to buy unnecessary items since all ingredients required is shown there. The following are some of the ~~the~~ types of menus including;

Table de hôte menu; This is the type of menu where by all meals are offered at a complete set of price. It ~~of~~ include all courses

such as breakfast, lunch and dinner. In this type the food is already prepared waiting for the customers orders.

A' la carte menu ; This is the type of menu ~~in~~ which offer all food dishes or meals at individual price. Each dish have its own price. The customers should wait for the food to be prepared since it offered according to orders. It can have courses or one course meal but not all.

Function menu ; this is the type of menu which offer foods and drinks for various special events like graduation, wedding ceremonies, birthday. The food depend on the kind of customers

Hospital menu ; This is the type of menu which offer services like food and drinks to sick people ~~in~~ at hospitals. The patient is to be given the menu card the day before so as to choose what she or he likes to use and avoid food loss.

Ethnicity menu ; this is the kind of menu which offers meals according to races. It can be Tanzania menu, India menu, America menu and other countries. Here in ~~the~~ a catering establishment your ~~are~~ given a menu card according to your country. It also known as speciality menu.

Workers menu ; this is the type of ~~no~~ for menu which offers meals to people at works or at job area. It The food offered depend on the kind of job ~~per~~ or task performed. example menu for teachers at school, doctors, dietician and also Food inspector menu.

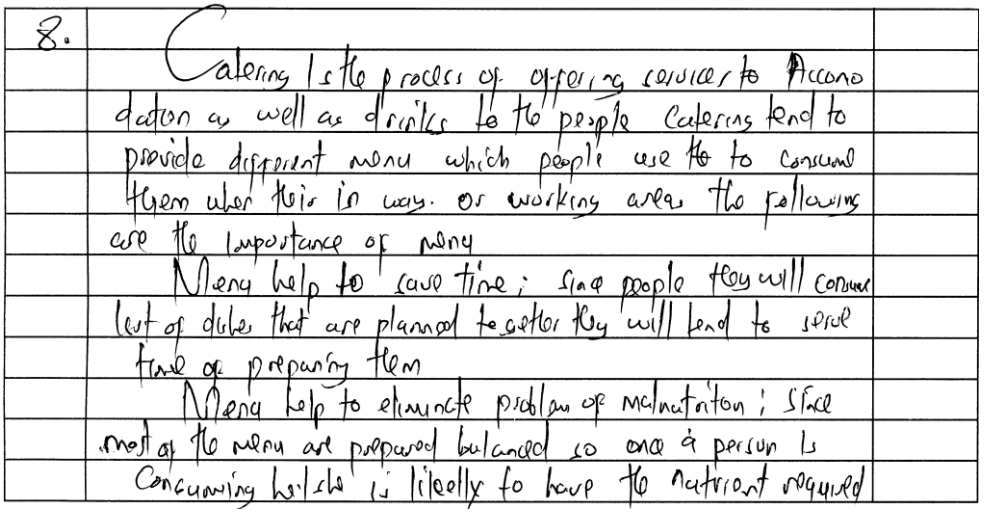
Therefore menu card is very important in any catering business either industrial catering, transport catering, and others since it act as the guider ~~to~~ to customers and caterer. Also it ensure good success of the business as there is no food wastage.

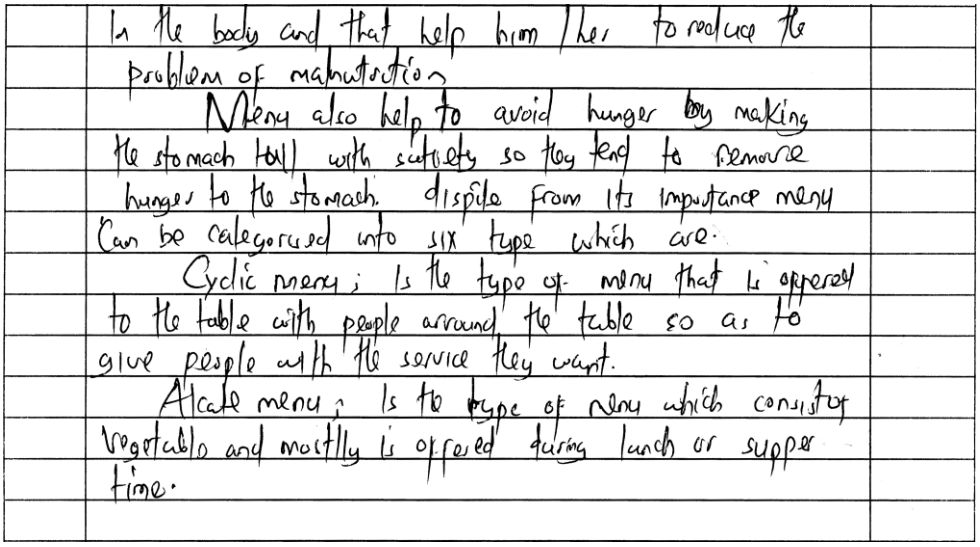
Extract 17.1: *A sample of candidates' correct responses in question 8*

In Extract 17.1, the candidate repeated one of the importance of menus, hence did not score 2.0 marks.

Further analysis indicates that, the candidates who scored low (1.0 - 6.5) marks included some incorrect points, while responding to both parts (a) and (b) of the question. In part (a), most of the candidates provided 1 correct importance of menu and the other 2 were incorrect. The incorrect importance of menus provided by the candidates include, *it helps the kitchen staff on what to prepare, save and preserve food every day, menus motivate cooks, it saves time in compiling the ingredients, menu cards attract new customers* and *is important in budgeting for the business.* Other candidates provided the importance of catering. For example, one candidate wrote, *create employment to different people* and *contribute to national economy as they are taxed*.

In responding to part (b) of the question, some of the candidates wrote a few correct types of menu with incorrect points, which were the types of catering establishments or commercial catering. Others just outlined a few points instead of describing them. These responses indicate that the candidates had insufficient knowledge of the concept of menu, particularly of their importance and types. Extract 17.2 provides a sample of incorrect responses from one of the candidates.


8.
Catering is the process of offering services to accomodation as well as drinks to the people Catering tend to provide different menu which people use the to consume them when their in ways. or working area. the following are the importance of menu
Menu help to save time; since people they will consume list of dishes that are planned together they will tend to spend time of preparing them
Menu help to eliminate problem of malnutrition; since most of the menu are prepared balanced so once a person is consuming he/she is likelly to have the nutrient required


In the body and that help him / her to reduce the problem of malnutrition.
Menu also help to avoid hunger by making the stomach full with satisfy so they tend to remove hunger to the stomach. dispite from its importance menu can be categorised into six type which are.
Cyclic menu; Is the type of menu that is offered to the table with people around the table so as to give people with the service they want.
A'cafe menu; Is the type of menu which consist of vegetable and mostly is offered during lunch or supper time.

Extract 17.2: *A sample of candidates' incorrect responses in question 8*

In Extract 17.2, the candidate provided incorrect importance of menu in part (a). In part (b), the candidate mentioned 1 correct type of menus with incorrect explanation hence, deserved the lowest marks.

2.2.9 Question 9: Nutrition programme planning and intervention

In this question, the candidates were required to describe the common nutrition interventions used to prevent malnutrition in children in developing countries.

This question was opted by 277 (94.9%) candidates. Among them, 72 (20.0%) candidates scored from 12.0 to 18.5 marks, 139 (50.2%) scored from 7.0 to 11.5 and 66 (23.8%) scored from 1.0 to 6.5 out of 20 marks. Figure 15 illustrates this performance.

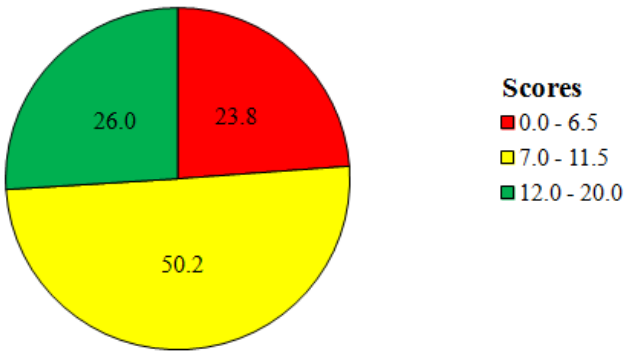


Figure 15: *The percentage of candidates' performance in question 9*

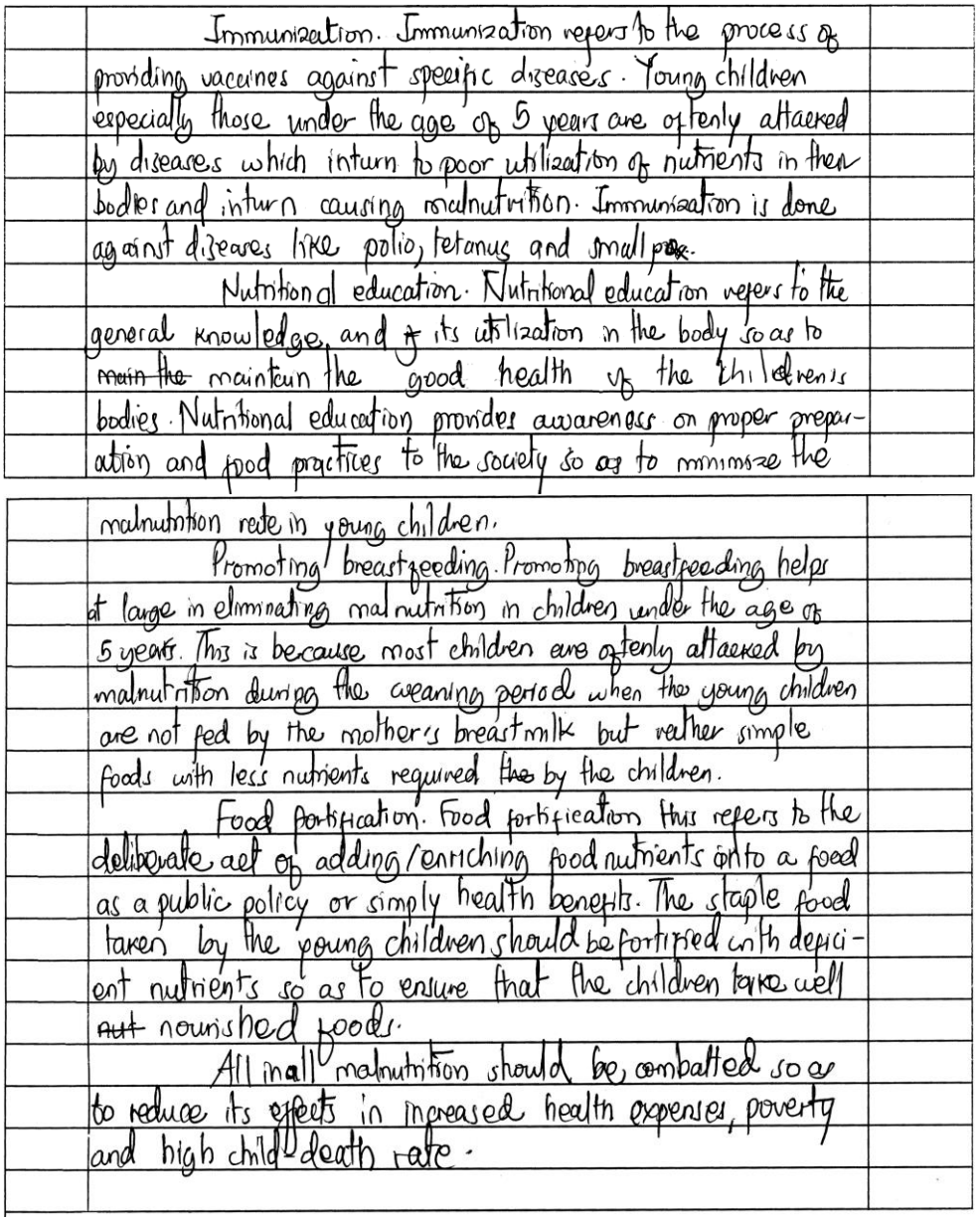
Figure 15 shows a good performance in this question, as 76.2 per cent of the candidates passed by scoring from 7.0 to 18.5 marks.

The candidates who passed the question (76.2%) were aware of the common nutrition intervention programmes which are used to control nutritional problems in our country. They understood that, the malnutrition problem that occurs in children due to low consumption of nutritious foods for the body requirements is undernutrition. This enabled them to correctly describe the relevant programmes to prevent the problem. However, these candidates did not score all 20.0 marks allocated to this question because they provided unsatisfactory explanations to some of the mentioned points. Extract 18.1 is a sample of responses from one of the candidates with good performance.

9. Nutrition intervention refers to the objectives, plans and priorities which are adapted so as to combat malnutrition situation in the community. Nutrition intervention is multi-sectoral discipline which involves many factors in the elimination of malnutrition among the people of a particular community. The following are the common nutrition interventions used to prevent malnutrition in young children;

Nutritional rehabilitation. This is the nutrition intervention program which aims at improving the health of the severly ~~mala~~ ~~suride~~ malnourished children in the society. The children are taken and put under intensive care with adequate nutritional foods so as to strengthen their health once again. Nutrition rehabilitation also provides awareness to the mother on how to take care of the care so as to avoid malnourition to the children.

Nutrient supplementation. This refers to the process of providing nutrient susupplements which help to reduce deficiency of various nutrients in the body of children. Nutrient supplementation involves the provision of vitamins as Vitamin A, B and C which are very essential ~~growth~~ for proper of yound children



Immunization. Immunization refers to the process of providing vaccines against specific diseases. Young children especially those under the age of 5 years are oftenly attacked by diseases which inturn to poor utilization of nutrients in their bodies and inturn causing malnutrition. Immunization is done against diseases like polio, tetanus and small pox.

Nutritional education. Nutritional education refers to the general knowledge, and ~~of~~ its utilization in the body so as to ~~main the~~ maintain the good health of the children's bodies. Nutritional education provides awareness on proper preparation and food practices to the society so as to minimize the malnutrition rate in young children.

Promoting breastfeeding. Promoting breastfeeding helps at large in eliminating malnutrition in children under the age of 5 years. This is because most children are oftenly attacked by malnutrition during the weaning period when the young children are not fed by the mother's breastmilk but rather simple foods with less nutrients required ~~the~~ by the children.

Food fortification. Food fortification this refers to the deliberate act of adding/enriching food nutrients onto a food as a public policy or simply health benefits. The staple food taken by the young children should be fortified with deficient nutrients so as to ensure that the children take well ~~nut~~ nourished foods.

All in all malnutrition should be combatted so as to reduce its effects in increased health expenses, poverty and high child death rate.

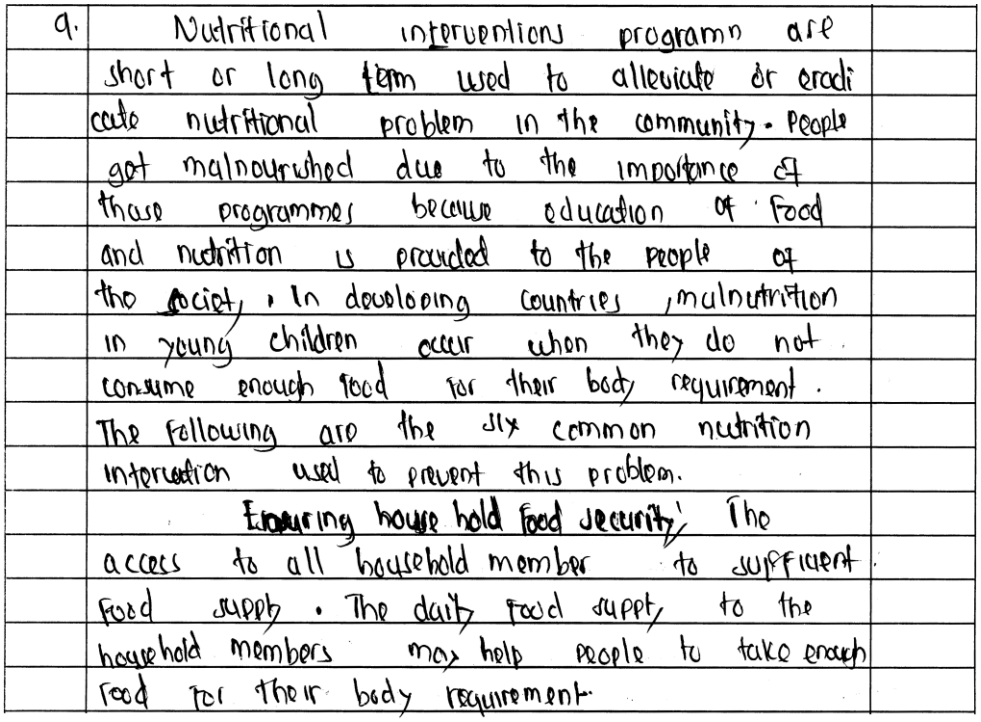
Extract 18.1: *A sample of candidates' correct responses in question 9*

In extract 18.1, the candidate provided the common nutrition interventions used to prevent malnutrition in children in developing countries.

On the contrary, 23.8 per cent of the candidates scored from 1.0 to 6.5 marks due to misconception of the demand of the question. Some of these candidates described the nutrition interventions to be used in nutrition education programmes. Others described the services which are provided in

the Reproductive and Child Health (RCH) clinics which include, *nutritional care of children, safe delivery service, family planning, supplementation of Vitamin A, care for pregnant women, health education, nutritional advice, examination and treatment of minor illnesses* and *growth monitoring.*

Other candidates provided incorrect nutrition interventions used to prevent malnutrition in children in developing countries. They wrote incorrect responses such as, *through environmental sanitation and water supply, improving nutritional knowledge, improvement of health sector, increase intake of enough balanced diets, improving food crop production and consumption, development of laws and legislations to help to eliminate malnutrition, promotion of fair household food distribution to ensure body nutrient needs are met* and *encourage house-to-house nutrition education.* Others listed a few correct points but did not give explanations. These responses indicate that the candidates had limited knowledge of the concept of nutrition interventions. Extract 18.2 shows a sample of one of the candidates' weak responses.



9. Nutritional interventions programm are short or long term used to alleviate or eradicate nutritional problem in the community. People got malnourished due to the importance of those programmes because education of food and nutrition is provided to the people of the society. In developing countries, malnutrition in young children occur when they do not consume enough food for their body requirement. The following are the six common nutrition interventions used to prevent this problem.

Ensuring house hold food security: The access to all household member to suppficient food supply. The daily food supply to the household members may help people to take enough food for their body requirement.

Farming is life : The process of keeping animal and farm plantation is life as we get food from our plantation also we get food from our animal we keep . In animal we get different product like milk and meat.

Forest conservation ; when people preserve forest we can get fruits from different plant which when we eat we add nutrients in our body like Vitamin A and C.

Farming First ; with out animal keeping and crop plantation we cant get basic need like food which is important in our daily activities to take place well so farming First.

The life and death farming ; The nutritional intervention program ensure nutritional problem in the community is alleviated so they introduce the life and death farming for greater food production to avoid malnutrition problem.

The reproductive health of mother and children ; The nutritional intervention program ensure mother and child are get good health to avoid problem like malnutrition.

Generally , nutrition intervention programm is beneficial to our society as it aimed to alleviate or eradicate the nutritional problem in the community and help avoidance of nutritional desease like malnutrition . So these nutritional intervention should be encouraged to the people in order to avoid the malnutrition problem.

Extract 18.2: *A sample of candidates' incorrect responses in question 9*

In Extract 18.2, the candidate provided some of the programmes which are used to increase crop production instead of the programmes which prevent malnutrition in children.

2.3 155/3 FOOD AND HUMAN NUTRTION PAPER 3

This paper comprised 3 (1 - 3) practical questions. The candidates were required to answer all the questions. Question 1 carried 20.0 marks and questions 2 and 3 carried 15.0 marks each. The pass mark in question 1 was 7.0 and 5.5 in questions 2 and 3.

2.3.1 Question 1: Food composition

The candidates were provided with food samples J (rice starch), K (cassava starch) and L (white wheat flour), and were instructed to perform the Experiments I and II by following the given procedures.

In Experiment I, the candidates were instructed to:

(i) Mix sample J and K with distilled water in separate beakers, stir and let them settle for 3 minutes.

(ii) Filter the liquid for each sample to remain with white sediments. Use spatula to take some white sediments from each sample into a slide and examine them under a light or compound microscope in low and high magnification.

In Experiment II, they were instructed to place 2 g of sample L in a crucible and heat it by using dry heat (without burning the sample) and record the observation.

Then, in Experiment I, the candidates were required to answer the following items in part (a) of the question: (i) draw the structures of each sample observed under microscope, (ii) give the properties of each structure observed under the microscope, (iii) give the plant group from which each sample was obtained (iv) identify the samples J and K and (v) outline the common properties of samples J and K. In Experiment II, the candidates were required to name the compound formed after heating the sample in part (b) (i) and outline the properties of the compound formed after heating sample L in part (b) (ii). Part (c) required them to briefly describe the forms of long chains of glucose units that are usually present in samples J, K, and L before heating.

The question was attempted by all 292 (100%) candidates, among them 57 (19.5%) scored from 12.0 to 16.5 marks, 144 (49.3%) scored from 7.0 to

11.5 marks and 81 (31.2%) scored from 0.5 to 6.5 out of 20 marks. Figure 16 illustrates this performance.

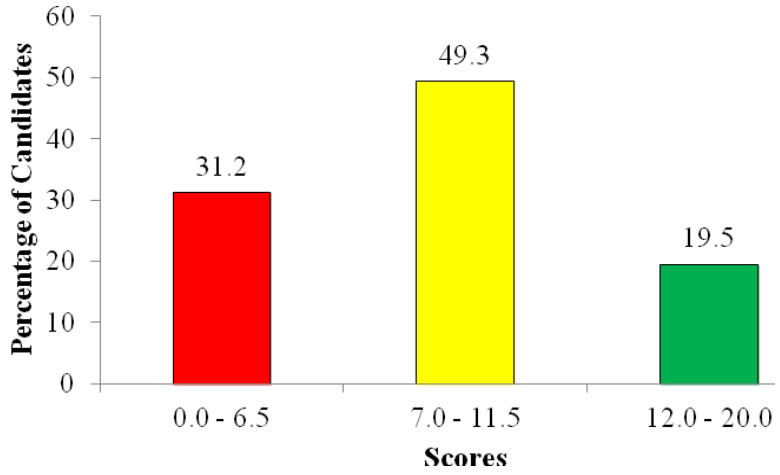


Figure 16: *The percentage of candidates' performance in question 1*

Based on the analysis in Figure 16, the general performance in this question was good, because 68.8 per cent of the candidates passed the question by scoring from 7.0 to 16.5 marks.

The analysis indicates that, the candidates who scored higher (12.0 - 16.5) marks were knowledgeable about the structures and properties of starch as their responses were correct to many parts of the question. In Experiment I, the candidates were competent in observing the structures, demonstrated good drawing skills of the observed samples and gave correct properties in parts (a) (i) and (ii). They managed to identify samples J as rice starch and K as cassava/Tapioca starch in part (a) (iv) which enabled them to correctly outline their common properties in part (a) (v). However, in part (a) (iii), some of the candidates did not obtain the 1.0 mark allocated to this part because they incorrectly grouped the samples as *rice plant* for sample J and *cassava plant* for sample K instead of cereal plant and root plant respectively.

The analysis shows further that, the candidates were competent in making interpretation on Experiment II. They correctly observed the colour change of sample L as from white to brown colour showing that it has been changed to dextrin compound in part (b) (i). This observation enabled the

candidates to correctly outline the properties of the formed compound (dextrin) in part (b) (ii).

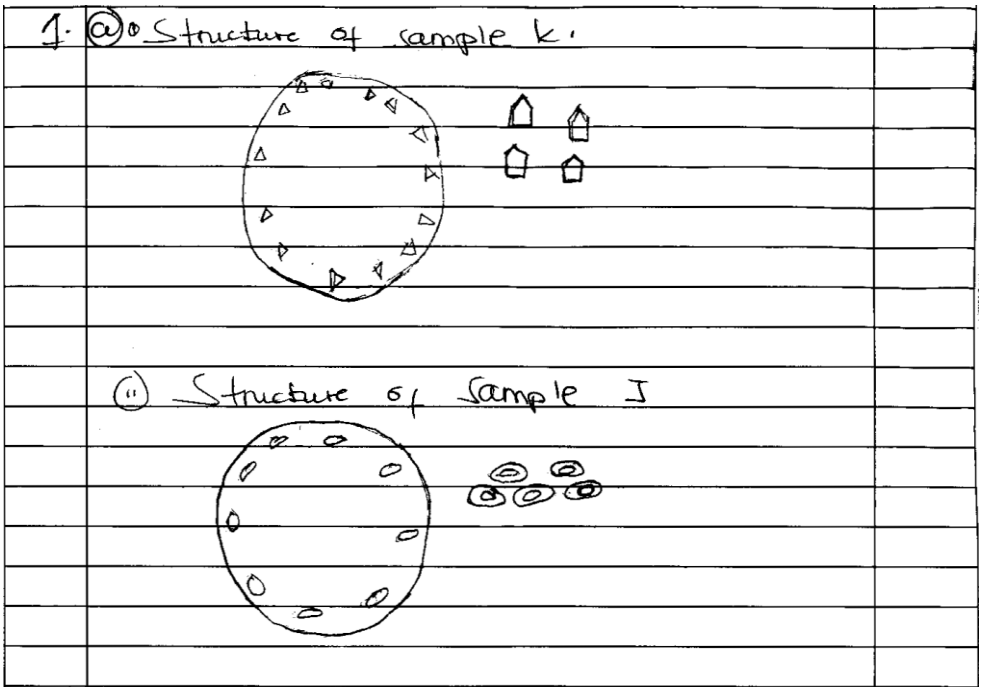
Some of the candidates in this category showed insufficient knowledge of the forms of long chains of glucose units that are present in samples J, K and L before heating asked in part (c). Other candidates managed to mention the forms as amylose and amylopectin, but the explanations lacked clarity and therefore failed to score all the marks allocated to this part.

The candidate who scored average (7.0 - 11.5) marks managed to provide correct responses to parts (a) (i), (ii) and (iv) from Experiment I. In part (a) (iii), some of the candidates provided incorrect groups for samples J and K and in part (a) (v), they failed to provide the required number of common properties of samples J and K. The candidates also responded correctly to the tasks provided in Experiment II, as they observed the colour change from white to brown after heating sample L and named the formed compound in part (b) (i). These candidates did not score all the 4.0 marks allocated to part (b) (ii) because they provided correct and incorrect properties of the formed compound. Some of them mentioned the forms of long chains of glucose units that are usually present in sample J, K, and L before heating but gave incorrect explanations. Others mentioned the linkages that join the long chains of glucose units to form the starches by writing, *1,4-α* and *1,6 linkages* instead of amylose and amylopectin.

In contrast, 31.2 per cent of the candidates had weak performance as they scored low (0.5 - 6.5) marks. In Experiment I, most of the candidates drew unrelated structures of samples J and K due to lack of observation or drawing skills in part (a) (i) of the question. In part (a) (ii), the candidates managed to give 1 to 2 correct properties of the observed structures; others interchanged the properties. In part (a) (iii), the candidates provided incorrect plant groups from which each sample was obtained. For example, one candidate wrote, *sample J was obtained from dicot plant group* and *sample K was obtained from monocot plant group*. Another candidate wrote, *sample J is maize plant and sample K is potato plant.* The candidates also incorrectly identified the samples in part (a) (iv). For example, some candidates wrote, *maize flour, sorghum, wheat* and *millet* for sample J and *root, potato* and *yams* for sample K. In addition, in part (a) (v), some of the candidates provided the specific properties of the samples instead of

common properties. Others gave a variety of incorrect properties such as, *both varies in size, have the ability to form suspension when water is added, are crystals* and *are well packed together*.

It was observed that, in Experiment II, most of candidates recorded the correct colour change and the name of the compound formed after heating sample L in part (b) (i). In part (ii), some of the candidates provided 1 to 2 correct properties of dextrin. Examples of incorrect properties provided by the candidates include, *is stored in plants, is a form of starch, soluble at room temperature, a source of carbohydrates, have round shape* and *formed by simple molecules*. A very few candidates managed to mention the forms of long chains of glucose units that are usually present in sample J, K, and L before heating in part (c). Some described incorrect forms. For example, one candidate wrote, *monosaccharides* and *disaccharides* which are the classes of sugar on the basis of the number of sugar units which are present in their structures. Others skipped this part. These responses imply that the candidates lacked some knowledge of the structure and properties of starch. Extract 19 is a sample of responses from the candidates who scored lower marks.



(ii) properties of Sample J

(i) Oval in shape.

(ii) Vary in size

Properties of sample K.

(i) polygonal in shape.

(ii) Same in size

1(a) (iii) Sample J obtained from Cereals/~~grain~~.

Sample K obtained from Cereals/grain

(iv) Sample J is cassava flour

Sample K is Rice flour

Sample J common properties.

(v) (i) White in colour.

~~(ii) Grow in the high amount of water.~~

(iii) Contain Carbohydrates

(iv) Does not depend high amount of water to grow.

(v) It is inform of Roots.

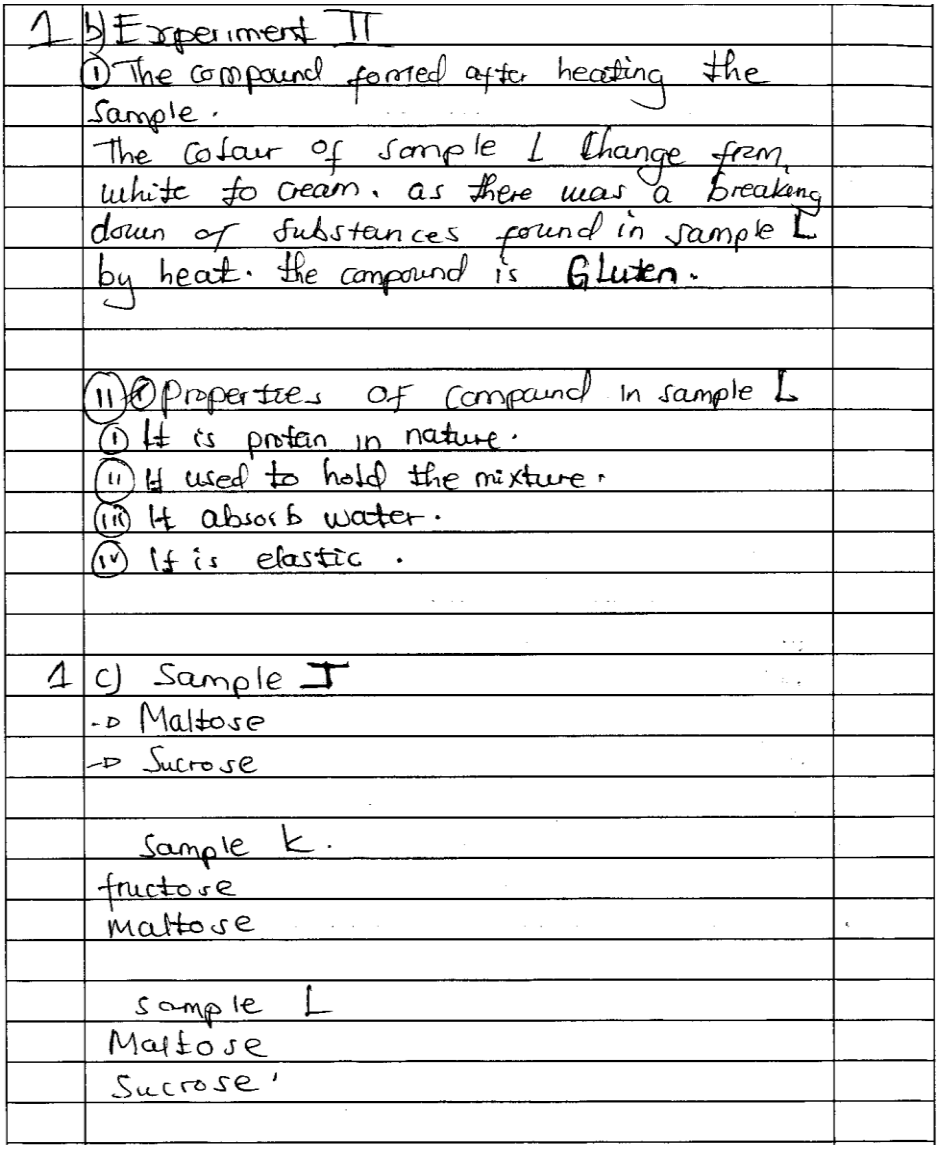
Sample K common properties

(i) White in colour/ it flour is white in colour

(ii) Contain Carbohydrates.

(iii) Grow in high amount of water.

(iv) It is inform of Seeds/grain.



Extract 19: *A sample of responses with lowest scores in question 1*

In extract 19, the candidate provided incorrect responses to all parts of the question except in part (a) (iii) where he/she mentioned one correct point.

2.3.2 Question 2: Food processing and preservation

In this question, the candidates were provided with a fresh egg. They were required to break the egg and separate the contents into two different beakers. The candidates were instructed to perform the Experiments I, II, and III by undergoing through the given procedures:

In Experiment I, the candidates were instructed to:

(i) Put 2 ml of egg white into a test tube and then add 1 ml of 10% sodium hydroxide solution.
(ii) Put 2 ml of egg white into another test tube and then add 2 drops of concentrated nitric acid and leave the mixture to stand for 5 minutes.
(iii) Heat the mixture obtained in step (ii) in the boiling water from the water bath.

In Experiment II, they were directed to:

(i) Put 3 ml of egg white into a clean and dry test tube and then add equal volume of distilled water.
(ii) Shake the mixture well, place a filter paper on a funnel, wet it with distilled water and then filter the mixture into another test tube.
(iii) Put 2 ml of the filtrate into a test tube and then perform the Biuret test and record the observation.

In Experiment III, they were instructed to put a small portion of the egg yolk in an evaporating dish, heat it on dry heat while observing the changes in colour with increase in temperature, then write the observations and give an explanation.

Then, in Experiment I, the candidates were required to record the observations and give explanations in each procedure in part (a) and give the purpose of the experiment in part (b). In Experiment II, they were required to state the principle behind the Biuret test while in Experiment III, the candidates were required to justify the statement that, "The property of egg proteins observed in the experiment make eggs useful in preparing various food products".

The question was attempted by all 292 (100%) candidates. Analysis shows that, 23 (7.9%) candidates scored from 9.0 to 11.5 marks, 103 (35.3%) scored from 5.5 to 8.5 marks and 166 (56.8%) scored from 0.0 to 5.0 marks. None of the candidates scored above 11.5 out of 15 marks. Figure 17 is a summary of this performance.

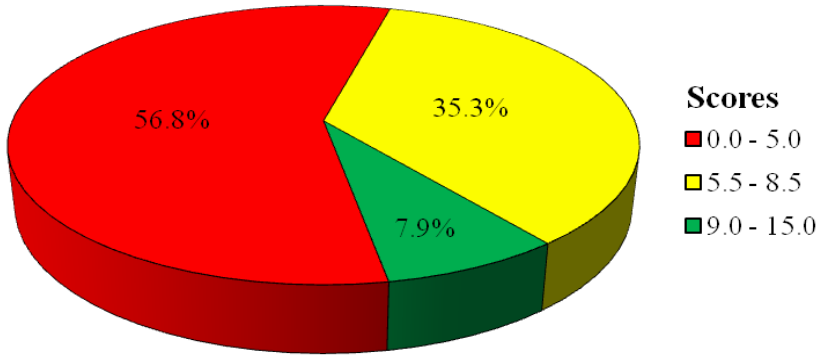


Figure 17: *The percentage of candidates' performance in question 2*

Figure 17 shows that the general performance in this question was average because 43.2 per cent of the candidates scored from 5.5 to 11.5 marks.

The analysis of the candidates' responses shows that, the candidates who passed the question (5.5 - 11.5 marks) demonstrated adequate practical skills of the determination of the effects of alkalis, acids and heat on food nutrients and analysing the type of amino acid present in different proteins. In Experiment I, they correctly observed and explained the coagulation of egg protein due to the action of alkali (sodium hydroxide) and acid (concentrated nitric acid) on the protein of egg white and analysed the colour change due to action of heat on the formed coagulant in part (a). In part (b), the candidates gave the correct purpose of the experiment which is to determine the effects of alkalis and acids on the egg white protein and analysis of the type of amino acid that is present in the egg white protein.

Likewise, in Experiment II, majority of the candidates correctly recorded the observation when conducted Biuret test. However, most of them lost some marks in this part because they failed to state clearly the principle behind the Biuret test.

Moreover, in Experiment III, the candidates demonstrated adequate observation skills on the coagulation of egg yolk which became hard on further heating. They also gave correct explanations because they were aware that the coils of chain of amino acids in raw egg uncoil and collide with one another when heated. Consequently, they bond and form molecules which gives the characteristics of cooked egg when the temperature rises. However, most of the candidates did not deserve all 5.5

marks allocated to this experiment because they failed to give clear explanation on the uses of eggs in preparing various food products associated with the coagulation property of egg proteins.

The candidates who scored low (below 5.5) marks failed to respond correctly to most of the parts of the question. In Experiment I, the majority of the candidates recorded incorrect observations and therefore, gave incorrect explanations in all procedures of part (a). For example, one candidate wrote, in procedure (i), *the solution form an emulsion because sodium hydroxide is less denser than egg white*, (ii) *a suspension solution was formed because concentrated nitric acid acts as emulsifier* and (iii) *egg white expands because of exposure to the heat*. Likewise, in part (b), some of the candidates gave incorrect purpose of the experiment while others provided incomplete purpose as their responses did not indicate that the experiment also analysed the type of amino acid present in the egg white protein.

In addition to that, the candidates failed to perform the Biuret test in Experiment II, and consequently failed to state the principle behind the Biuret test. This indicates that the candidates lacked competence on the tests for the presence of protein in food stuffs.

Moreover, some of the candidates established correct observation on the effect of dry heat on egg yolk in Experiment III, but their explanations lacked clarity. A few candidates mentioned 1 to 2 correct uses of protein which are associated with the coagulation property of egg proteins observed in this experiment though they did not give any explanations. Others provided incorrect uses of egg contents associated with the coagulation property such as, *eggs are used in decoration of food such as pan cakes, as raising agent since ovalbumin has ability to stretch and trap air, protein coagulate when heat is applied on it, as food (egg stew), becomes hard when overcooked, is good source of protein* and *in baking process.* The candidates who scored the lowest marks (0.0 and 0.5) failed to respond correctly to almost all parts of the question. The responses provided by the candidates in this category implies inadequate practical skills of determining the effects acids, alkalis and heat on food nutrients and analysing the type of amino acid present in different proteins. Extract

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

2. EXPERIMENT I.

a) The egg white contain 1ml of 10% of sodium hydroxide solution & make the egg white to stick together or coagulate and thick & chocking smell.

WHILE

The egg white contain 2drops of concentrate nitric acid forms the white ppt (precipitate) and coagulate and when heated it provide the yellowish orange fumes which is Ammonia. Which this lead that the protein is present in Egg.

b) The purpose of this Experiment is to determine if the egg white contain protein. (why) by using nitric acid and sodium hydroxide solution which use as catalyst. Which speed up the rate of chemical reaction is the whey or Egg white.

EXPERIMENT II

→ Principle of Biuret test in this Experiment.

Is to test if Egg is soluble or insoluble in water but accordingly to observation The Egg white with Distilled water mix well / very gently.

EXPERIMENT III

When the egg yolk is heated in an evaporating dish it ~~forms~~ concentrate / clot and form the fume of Ammonia which leads us that protein is present in the Egg which the coloured is Yellow light.

Properties of Egg proteins.

i) To repair body tissues because it contain the protein which help to fight against Infection

ii) Provide body with Antibodies which help to fight against Infection

iii) Help in formation of haemoglobin.

Extract 20: *A sample of candidates' incorrect responses in question 2*

In extract 20, the candidate failed to provide correct responses to all parts on Experiment I, II and III (first part). In Experiment III (the second part), the candidate provided the functions of protein in the body instead of the uses of eggs associated with the coagulation property of egg proteins.

2.3.3 Question 3: Technology of specific products

The candidates were provided with baker's yeast, white sugar, wheat flour, bicarbonate of soda and solution A (which is lime water/calcium hydroxide solution). The candidates were instructed to perform the Experiments I and II by following the given procedures.

In Experiment I, the candidates were directed to:

(i) Place 2 g of bicarbonate of soda into a clean dry test tube. Fit the test tube with a tight-fitting rubber stopper connected into a delivery tube.
(ii) Put 2 ml of solution A into another test tube and then fit the test tube with a tight-fitting rubber stopper connected into a delivery tube.
(iii) Connect the two delivery tubes from each test tube using a rubber tube. Record the observation on the changes in solution A before heating.
(iv) Heat gently the test tube containing bicarbonate of soda. Record the observed changes and give an explanation.

In Experiment II, the candidates were instructed to:

(iv) Put 30 ml of warm water (40°C) into a clean dry beaker.
(v) Add 3 g of baker's yeast and 5 g of sugar then stir.

(vi) Carefully sprinkle a thin layer of wheat flour over the mixture.
(vii) Leave the mixture for about 15 minutes while observing the changes. Record the observed changes in smell and appearance of the thin layer of wheat flour and give explanations.

Then, the question required the candidates to identify solution A in part (a), write balanced chemical equations for the reaction during the heating of bicarbonate of soda and for the resulted colour change in solution A in part (b) and briefly describe the application of Experiment I in the process of making bread and burns in part (c). Part (d) of the question required the candidates to briefly explain what would happen if the environment in Experiment II was maintained at 10°C and in part (e), to explain what Experiment II demonstrates.

The question was attempted by all 292 (100%) candidates. The analysis shows that 205 (70.2%) candidates scored from 9.0 to 15.0 marks, 64 (21.9+-%) scored from 5.5 to 8.5 marks, and 23 (7.9%) scored from 3.0 to 5.0 marks. Figure 18 summarises the performance.

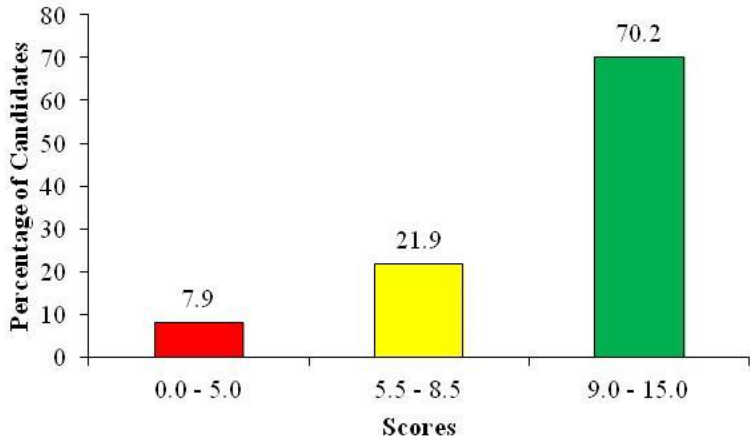


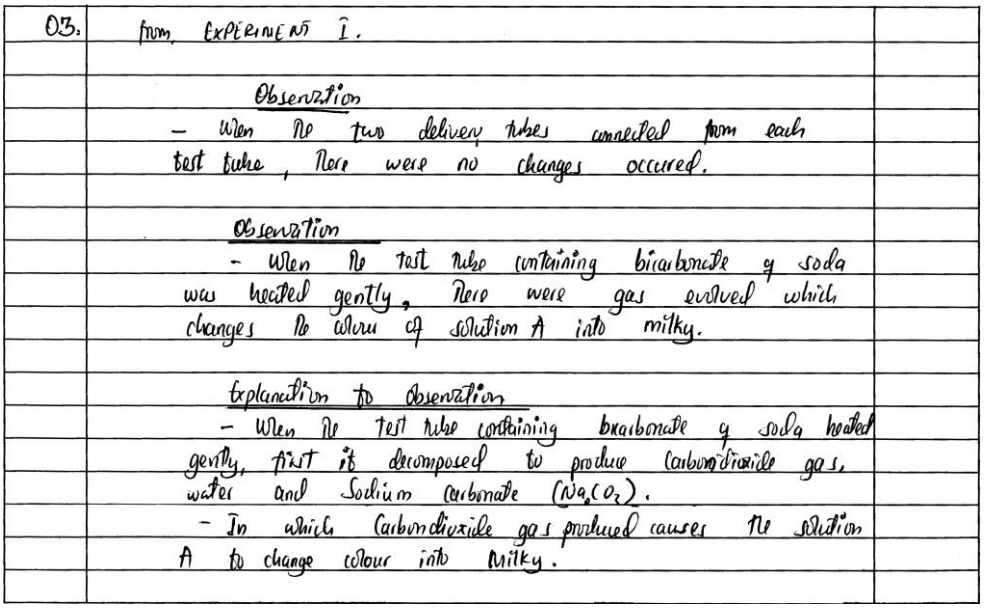
Figure 18: *The percentage of candidates' performance in question 3*

Figure 18 shows good performance in this question, because 92.1 per cent of the candidates passed by scoring from 5.5 to 15.0 marks.

The analysis of the candidates' responses indicates that, the candidates who performed well in this question (scored from 9.0 to 15.0 marks) were knowledgeable about the mode of action of different raising agents. In

Experiment I, the candidates correctly observed the changes in the colour of solution A after heating, gave correct explanation for the changes in colour and correctly identified solution A as lime water in part (a). In part (b), the candidates showed good knowledge in writing balanced chemical equations for the decomposition of bicarbonate of soda and the resulted colour change in solution A which turned milky. In part (c), some of the candidates were not deserved all 2.0 marks allocated to this part because they provided unsatisfactory descriptions on the application of Experiment I in the process of making bread and burns or their descriptions lacked clarity. Some just wrote, *form carbon dioxide which is rising agent*.

Likewise, in Experiment II, the candidates correctly observed the smell of alcohol and air bubbles on top of the mixture/increased volume which was due to fermentation process caused by yeast enzymes. In part (d), most of the candidates correctly explained what would happen if the environment in Experiment II was maintained at 10°C. These candidates understood that, the rate of reaction of yeast is maximum at optimum temperature and it slows down or become inactive when the temperature is low. Similarly, in part (e), most of the candidates provided correct explanation on what Experiment II demonstrates. They explained the fermentation action of yeast to produce alcohol and carbon dioxide gas which is used as a rising agent during baking. Extract 21 shows a sample of responses from one of the candidates who had good performance.


03. from EXPERIMENT I.

Observation
- When the two delivery tubes connected from each test tube, there were no changes occured.

Observation
- When the test tube containing bicarbonate of soda was heated gently, there were gas evolved which changes the colour of solution A into milky.

Explanation to Observation
- When the test tube containing bicarbonate of soda heated gently, first it decomposed to produce Carbondioxide gas, water and Sodium carbonate (Na_2O_2).
- In which Carbondioxide gas produced causes the solution A to change colour into Milky.

from, experiment II.

Observation.

- When the mixture was left for about 15 minutes, it was observed that there was change in volume, as the volume of the mixture tend to increase compared to the original volume and alcohol smell was observed.

Explanation to observation.

- In experiment II above, first the yeast utilizes sugar to form alcohol, energy and carbondioxide to which carbondioxide produced enabled the mixture to rise. And the temperature applied 40°c tend to activate the yeast for proper functioning.

Questions

03. a. Solution A was Calcium hydroxide ($Ca(OH)_2$).

b. A balanced chemical equations for the reaction during the heating of bicarbonate of soda and for the resulted white change in solution A are.

i. Reaction during heating Bicarbonate of soda.

$$2NaHCO_{3(s)} \xrightarrow{\Delta} Na_2CO_{3(s)} + H_2O_{(l)} + CO_{2(g)}$$

ii. For the resulted white change in solution A

$$Ca(OH)_{2(aq)} + CO_{2(g)} \longrightarrow CaCO_{3(s)} + H_2O_{(l)}$$

c. Application of Experiment I in the process of Bread making and buns:

- In experiment I, bicarbonate of soda when applied in the dough mixture it always tend to decompose producing Carbondioxide, sodium carbonate and H_2O. But, Carbondioxide produced help in rising the dough mixture since it is air, so it is applied in the process of bread making and buns.

d. - If the environment in experiment II was maintained at 10°c, then the flour mixture would not continue to rise as the temperature was kept low. As ss will not producing carbondioxide gas and alcohol again.

e. Experiment II demonstrate the raising process of yeast, for proper yeast functioning it required sugar as it utilizes sugar in the presence of optimum temperature hence producing alcohol, energy and carbondioxide which inturn it help in rising the dough mixture.

Extract 21: *A sample of candidates' correct responses in question 3*

In Extract 21, the candidate responded correctly to all parts of the question.

The candidates who scored average (5.5 - 8.5) marks, inspite of showing adequate skills about the mode of action of bicarbonate of soda and yeast raising agents, they either provided insufficient explanations to some parts of the questions or mentioned some correct points without explanations. This was observed particularly on the explanations provided for the recorded observations in both Experiment I and II and in part (c) of Experiment I. These responses indicate that these candidates had insufficient knowledge about the samples provided in those experiments.

The analysis reveals further that, the candidates with weak performance (7.9%) in this question, scored from 3.0 to 5.0 marks. These candidates were incompetent about the action of rising agents. In Experiment I, the candidates correctly observed the colour changes of solution A after heating but gave incorrect or insufficient explanation. Some of these candidates failed to identify correctly solution A in part (a). For example, one candidate wrote, *water* simply because it looked clear as water, and the other one wrote, *chemical solution*. It was observed that, some of the candidates were not competent in writing chemical formulae and chemical equations. Therefore, they wrote incorrect and imbalanced chemical equations for the decomposition of bicarbonate of soda and the resulted colour change in solution A in part (b). Others managed to write correctly 1 of the 2 equations. For example, one candidate wrote the following incorrect equations:

$NaH_2CO_3 \rightarrow Na + CO_2 + H_2O$
$2CaOH_2 + CO_2 \rightarrow 2CaCO_3 + H_2O$

In part (c), some of the candidates managed to mention relatively correct application of Experiment I in the process of making bread and burns although they failed to provide relevant explanations. For example, one of the candidates wrote, *the experiment produces carbon dioxide gas which rise the dough*.

In Experiment II, the candidates correctly observed the smell of alcohol and rising or/and increased volume of the mixture. However, the candidates failed to explain clearly what would happen if the environment in Experiment II was maintained at 10°C in part (d). The candidates were not aware that, yeast is a living organism which act well at its optimum temperature and become inactive at low temperature. Some of incorrect responses such as, *yeast will die, the optimum temperature of yeast will drop automatically, yeast freezes quickly, carbon dioxide and alcohol will be produced very slowly, the dough collapse* and *carbon monoxide will be formed instead of carbon dioxide gas* were observed in candidates' scripts. In part (e), most of the candidates were not able to explain what Experiment II demonstrates because they failed to relate their practical observations with the theoretical knowledge of baking process. They provided irrelevant responses such as, *it demonstrate the function of yeast as rising agent, factors which affect production of carbon dioxide, yeast is living organism, fermentation of wheat flour, production of carbon dioxide by yeast* and *the conditions for fermentation.*

3.0 ANALYSIS OF CANDIDATES' PERFORMANCE PER TOPIC

The topic-wise analysis of candidates' performance shows that the candidates performed well on the topics of *Technology of specific products* (78.6%), *Food production* (78.6%), *Catering and institutional feeding* (78.1%), *Food microbiology* (78.1%), *Malnutrition* (75.4%) and *Nutrition programme planning and intervention* (74.2%). The good performance on these topics was attributed by the fact that most of the candidates had adequate knowledge about the concepts of the subject matter and clearly understood the requirements of the respective questions. In addition, they had adequate practical skills.

The candidates had average performance on the topics of *Food processing and preservation* (52.0%), *Nutrient requirement* (49.7%), *Food composition* (49.2%) and *Food storage* (37.4%). The candidates who performed averagely had relatively adequate knowledge about the concepts of the subject matter. They provided partial responses and lacked clarity in explaining the mentioned points.

On the other hand, the candidates performed weakly on the topic of *Food quality and safety* (7.6%). Weak performance on this topic was associated with insufficient knowledge of the tested concept, failure to interpret the demands of the question and lack of clarity in explanations for the mentioned points. Appendix A is a summary of the candidates' performance on different topics.

Topic-wise comparison of the candidates' performance in the year 2020 and 2021 shows that, in the ACSEE 2021 some topics has their performance improved, while others had their performance decreased. There are other topics whose performance has been maintained. The topics whose performance has improved from weak to good are *Technology of specific products* and *Nutrition programme planning and intervention* while that of *Malnutrition* has improved from average to good. Contrarily, the performance on *Food storage* and *Food processing and preservation* topics has decreased from good to average. However, the topics which have maintained the good performance are *Food production*, *Food microbiology* and *Catering and institutional feeding* while the *Food composition* and *Nutrient requirement* topics have maintained average performance. Similarly, the *Food quality and safety* topic has weak performance as it was reflected in 2020. Appendix B summarises this comparison.

4.0 CONCLUSION

The general performance of the candidates in Food and Human Nutrition in the ACSEE 2021 was good, since 98.29 per cent of the candidates who sat for this examination passed. However, the performance has decreased by 0.05 per cent compared to the 2020 performance.

The analysis showed that, six (6) topics had good performance, four (4) topics had an average performance, and one (1) topic had weak performance. Good performance was attributed by adequate knowledge

about the concepts tested in the respective topics and clear understanding of the requirements of the respective questions and adequate practical skills.

Despite the good performance, the analysis of the candidates' responses in individual questions showed that, the candidates experienced difficulties in answering questions 2, 3, 4 and 6 from Paper 1, set from the topics of *Food storage*, *Food composition*, *Nutrient requirement* and *Food quality and safety*, respectively. This was a result of insufficient knowledge on the tested concepts, failure to interpret the demands of the questions and lack of clarity in explaining the mentioned points.

5.0 RECOMMENDATIONS

With regard to the analysis of the performance in this subject, the following recommendations are put forward so as to improve the performance in the coming years:

(a) Classroom teaching and learning should involve relevant practicals. This will help students to gain competence in conducting laboratory experiments, which some candidates lacked in attempting practical questions in this examination.

(b) Teachers should continue to provide enough reading assignments on the topic of *Food quality and safety,* and guide the students to perform group discussions and class presentations. This will improve the students' acquisition of knowledge about this topic.

(c) Heads of schools and subject teachers should arrange for inviting guest speakers in order to expand the students' understanding on the topic of *Food quality and safety* in which they demonstrated insufficient knowledge.

(d) Students should be engaged in numerous exercises and tests, and be provided with immediate feedback for them to practice answering competence based questions and to be more conversant in the examinations.

Appendix A: Summary of Candidates' Performance per Topic for ACSEE 2021

S/N	Topic	Number of questions	The percentage of candidates who scored 35% or above	Remarks
1.	Technology of specific products	2	78.6	Good
2.	Food production	1	78.6	Good
3.	Catering and institutional feeding	2	78.1	Good
4.	Food microbiology	2	78.1	Good
5.	Malnutrition	2	75.4	Good
6.	Nutrition programme planning and intervention	3	74.2	Good
7.	Food processing and preservation	2	52.0	Average
8.	Nutrient requirement	2	49.7	Average
9.	Food composition	2	49.2	Average
10.	Food storage	2	37.4	Average
11.	Food quality and safety	1	7.6	Weak

Appendix B: The Comparison of Candidates' Performance per Topic between 2020 and 2021

S/N	Topic	2020			2021		
		Number of questions per Topic	The percentage of candidates who scored 35% or above	Remarks	Number of questions per Topic	The percentage of candidates who scored 35% or above	Remarks
1.	Food storage	2	92.0	Good	2	37.4	Average
2.	Food production	1	87.8	Good	1	78.6	Good
3.	Food microbiology	2	86.5	Good	2	78.1	Good
4.	Catering and institutional feeding	2	75.8	Good	2	78.1	Good
5.	Food processing and preservation	1	71.7	Good	2	52.0	Average
6.	Malnutrition	2	52.1	Average	2	75.4	Good
7.	Food composition	1	51.7	Average	2	49.2	Average
8.	Nutrient requirement	2	42.1	Average	2	49.7	Average
9.	Nutrition programme planning and intervention	3	31.7	Weak	3	74.2	Good
10.	Food quality and safety	1	31.0	Weak	1	7.6	Weak
11.	Technology of specific products	1	8.8	Weak	2	78.6	Good

Appendix C: The Comparison of Candidates' Performance between 2020 and 2021